Karlsruher Institut für Technologie

Module Handbook
Economics Engineering M.Sc.

SPO 2015

Summer semester 2026

Date: 01/04/2026

KIT DEPARTMENT OF BUSINESS AND ECONOMICS

Table Of Contents

1. The Module Handbook: Your Guide Through Your Studies 12
1.1. Module Selection and Completion 12
1.2. Module Versions and Revisions 12
1.3. Accessing Module Handbook Versions 12
1.4. Examination Formats and Registration 12
1.5. Grading, Repetition Rules, and Types of Assessment 13
1.6. Examiners 13
1.7. Additional Achievements 13
1.8. Important Resources and Legal Framework 13
1.9. Contact 13
2. Study plan 14
3. Qualification objectives of the Master's program in Economics Engineering 15
4. Key Skills 16
5. Study Program Structure 17
5.1. Master's Thesis 17
5.2. Economics 17
5.3. Business Administration 18
5.4. Informatics 18
5.5. Operations Research 19
5.6. Compulsory Elective Modules 1 20
5.7. Compulsory Elective Modules 2 24
6. Modules 28
6.1. Advanced Machine Learning and Data Science - M-WIWI-105659 28
6.2. Advanced Module Logistics - M-MACH-104888 29
6.3. Advanced Topics in Public Finance - M-WIWI-101511 30
6.4. Advanced Topics in Strategy and Management - M-WIWI-103119 32
6.5. Analytics and Statistics - M-WIWI-101637 33
6.6. Applied Strategic Decisions - M-WIWI-101453 34
6.7. Artificial Intelligence in Production - M-MACH-105968 35
6.8. Automated Manufacturing Systems - M-MACH-101298 36
6.9. BioMEMS - M-MACH-101290 37
6.10. Business & Service Engineering - M-WIWI-101410 39
6.11. Collective Decision Making - M-WIWI-101504 41
6.12. Combustion Engines I - M-MACH-101275 42
6.13. Combustion Engines II - M-MACH-101303 43
6.14. Consumer Research - M-WIWI-105714 45
6.15. Control Engineering II - M-ETIT-101157 46
6.16. Cross-Functional Management Accounting - M-WIWI-101510 47
6.17. Data Science for Finance - M-WIWI-105032 48
6.18. Data Science: Data-Driven Information Systems - M-WIWI-103117 49
6.19. Data Science: Evidence-based Marketing - M-WIWI-101647 51
6.20. Data Science: Intelligent, Adaptive, and Learning Information Services - M-WIWI-105661 52
6.21. Designing Interactive Information Systems - M-WIWI-104080 54
6.22. Digital Marketing - M-WIWI-106258 55
6.23. Digital Service Systems in Industry - M-WIWI-102808 57
6.24. Digitalization in Facility Management - M-BGU-105592 58
6.25. Econometrics and Statistics I - M-WIWI-101638 60
6.26. Econometrics and Statistics II - M-WIWI-101639 61
6.27. Economic Theory and its Application in Finance - M-WIWI-101502 63
6.28. Economics in a Connected World - M-WIWI-107010 64
6.29. Economics of Innovation and Growth - M-WIWI-107011 66
6.30. eEnergy: Markets, Services and Systems - M-WIWI-103720 68
6.31. Electives in Informatics - M-WIWI-101630 69
6.32. Electronic Markets - M-WIWI-101409 71
6.33. Emphasis in Informatics - M-WIWI-101628 73
6.34. Energy and Process Technology I - M-MACH-101296 75
6.35. Energy and Process Technology II - M-MACH-101297 76

6.36. Energy Economics and Energy Markets - M-WIWI-101451 ... 77
6.37. Energy Economics and Technology - M-WIWI-101452 ... 79
6.38. Entrepreneurship (EnTechnon) - M-WIWI-101488 ... 80
6.39. Environmental Economics - M-WIWI-101468 ... 82
6.40. Experimental Economics - M-WIWI-101505 ... 83
6.41. Extracurricular Module in Engineering - M-WIWI-101404 ... 84
6.42. Facility Management in Hospitals for Industrial Engineering - M-BGU-106453 ... 85
6.43. Finance 1 - M-WIWI-101482 ... 87
6.44. Finance 2 - M-WIWI-101483 ... 88
6.45. Finance 3 - M-WIWI-101480 ... 89
6.46. Foundations for Advanced Financial -Quant and -Machine Learning Research - M-WIWI-105894 ... 90
6.47. Fundamentals of Transportation - M-BGU-101064 ... 91
6.48. Generation and Transmission of Renewable Power - M-ETIT-101164 ... 93
6.49. Global Production and Logistics - M-MACH-101282 ... 94
6.50. High-Voltage Technology - M-ETIT-101163 ... 95
6.51. Incentives, Interactivity & Decisions in Organizations - M-WIWI-105923 ... 96
6.52. Industrial Production II - M-WIWI-101471 ... 97
6.53. Industrial Production III - M-WIWI-101412 ... 99
6.54. Informatics - M-WIWI-101472 ... 101
6.55. Information Engineering - M-WIWI-101411 ... 103
6.56. Information Systems in Organizations - M-WIWI-104068 ... 104
6.57. Innovation Management - M-WIWI-101507 ... 105
6.58. Integrated Production Planning - M-MACH-101272 ... 107
6.59. Intellectual Property Law - M-INFO-101215 ... 108
6.60. Lean Management in Construction - M-BGU-101884 ... 109
6.61. Logistics and Supply Chain Management - M-MACH-105298 ... 112
6.62. Machine Tools and Industrial Handling - M-MACH-101286 ... 114
6.63. Management Accounting - M-WIWI-101498 ... 115
6.64. Manufacturing Technology - M-MACH-101276 ... 116
6.65. Market Engineering - M-WIWI-101446 ... 117
6.66. Marketing and Sales Management - M-WIWI-105312 ... 118
6.67. Master's Thesis - M-WIWI-101659 ... 120
6.68. Material Flow in Networked Logistic Systems - M-MACH-101278 ... 122
6.69. Mathematical Programming - M-WIWI-101473 ... 123
6.70. Microeconomic Theory - M-WIWI-101500 ... 125
6.71. Microfabrication - M-MACH-101291 ... 126
6.72. Microoptics - M-MACH-101292 ... 127
6.73. Microsystem Technology - M-MACH-101293 ... 128
6.74. Modeling the Dynamics of Financial Markets - M-WIWI-106660 ... 129
6.75. Modern Mobility on Rails and Roads - M-MACH-106496 ... 132
6.76. Nanotechnology - M-MACH-101294 ... 133
6.77. Natural Hazards and Risk Management - M-WIWI-104837 ... 135
6.78. Network Economics - M-WIWI-101406 ... 136
6.79. Operations Research in Supply Chain Management - M-WIWI-102832 ... 137
6.80. Optoelectronics and Optical Communication - M-MACH-101295 ... 139
6.81. Principles of Food Process Engineering - M-CIWVT-101120 ... 140
6.82. Private Business Law - M-INFO-101216 ... 141
6.83. Process Engineering in Construction - M-BGU-101110 ... 142
6.84. Production Engineering - M-MACH-106590 ... 144
6.85. Project Management in Construction - M-BGU-101888 ... 146
6.86. Public Economic and Technology Law - M-INFO-106754 ... 150
6.87. Rail System Technology and Rail Vehicle Technology - M-MACH-107717 ... 151
6.88. Seminar Module - M-WIWI-101808 ... 153
6.89. Service Analytics - M-WIWI-101506 ... 156
6.90. Service Design Thinking - M-WIWI-101503 ... 158
6.91. Service Economics and Management - M-WIWI-102754 ... 160
6.92. Service Innovation, Design & Engineering - M-WIWI-102806 ... 161
6.93. Service Management - M-WIWI-101448 ... 163
6.94. Service Operations - M-WIWI-102805 ... 164
6.95. Sociology - M-GEISTSOZ-101169 ... 166

6.96. Specialization in Food Process Engineering - M-CIWVT-101119 ... 167
6.97. Stochastic Optimization - M-WIWI-103289 ... 168
6.98. Strategic Design of Modern Production Systems - M-MACH-105455 ... 170
6.99. Student Innovation Lab (SIL) 1 - M-WIWI-105010 ... 171
6.100. Student Innovation Lab (SIL) 2 - M-WIWI-105011 ... 174
6.101. Transport Infrastructure Policy and Regional Development - M-WIWI-101485 ... 177
6.102. Transportation Modelling and Traffic Management - M-BGU-101065 ... 178
6.103. Water Chemistry and Water Technology I - M-CIWVT-101121 ... 181
6.104. Water Chemistry and Water Technology II - M-CIWVT-101122 ... 182
7. Module components ... 183
7.1. "Practical Seminar in Discrete Optimization: Implementing and Evaluating Solution Methods (with Python)" - T-WIWI-114747 183
7.2. (Gen)AI and Virtual Reality for Business - T-WIWI-114749 ... 184
7.3. (Gen)AI-based Automation in Organizations - T-WIWI-114210 ... 185
7.4. Additive Manufacturing of Metallic Components - T-MACH-113985 ... 187
7.5. Additive Manufacturing Processes - T-MACH-113570 ... 189
7.6. Additives and Active Substances - T-CIWVT-111434 ... 191
7.7. Advanced Corporate Finance - T-WIWI-113469 ... 192
7.8. Advanced Food Processing - T-CIWVT-100152 ... 193
7.9. Advanced Game Theory - T-WIWI-102861 ... 194
7.10. Advanced Lab Informatics (Master) - T-WIWI-110548 ... 195
7.11. Advanced Lab Realization of Innovative Services (Master) - T-WIWI-112914 ... 201
7.12. Advanced Lab Security, Usability and Society - T-WIWI-108439 ... 203
7.13. Advanced Machine Learning - T-WIWI-109921 ... 206
7.14. Advanced Machine Learning and Data Science - T-WIWI-111305 ... 208
7.15. Advanced Management Accounting - T-WIWI-102885 ... 209
7.16. Advanced Quantitative Finance - T-WIWI-114979 ... 211
7.17. Advanced Statistics - T-WIWI-103123 ... 212
7.18. Advanced Stochastic Optimization - T-WIWI-106548 ... 213
7.19. Advanced Topics in Digital Management - T-WIWI-111912 ... 214
7.20. Advanced Topics in Digital Twins - T-WIWI-114951 ... 216
7.21. Advanced Topics in Economic Theory - T-WIWI-102609 ... 218
7.22. Advanced Topics in Human Resource Management - T-WIWI-111913 ... 219
7.23. Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines - T-MACH-105173 ... 221
7.24. Analysis Tools for Combustion Diagnostics - T-MACH-105167 ... 222
7.25. Application of Social Science Methods (WiWi) - T-GEISTSOZ-109052 ... 223
7.26. Applied Econometrics - T-WIWI-111388 ... 224
7.27. Applied material flow simulation - T-MACH-112213 ... 225
7.28. Artificial Intelligence for Autonomous Driving - T-WIWI-112966 ... 227
7.29. Artificial Intelligence in Production - T-MACH-112115 ... 228
7.30. Artificial Intelligence in Service Systems - T-WIWI-108715 ... 230
7.31. Artificial Intelligence in Service Systems II: Generative AI Applications & Adoption - T-WIWI-114209 ... 232
7.32. Asset Pricing - T-WIWI-102647 ... 234
7.33. Auction Theory - T-WIWI-102613 ... 235
7.34. Basics of German Company Tax Law and Tax Planning - T-WIWI-108711 ... 236
7.35. Basics of Production Automation - T-MACH-114049 ... 237
7.36. Bayesian Statistics for Analyzing Data - T-WIWI-113471 ... 239
7.37. Behavioral Dimensions of Energy Transitions - T-WIWI-114980 ... 240
7.38. Behavioral Lab Exercise - T-WIWI-113095 ... 241
7.39. BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I - T-MACH-100966 ... 242
7.40. BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II - T-MACH-100967 ... 243
7.41. BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III - T-MACH-100968 ... 245
7.42. Bond Markets - T-WIWI-110995 ... 247
7.43. Bond Markets - Models & Derivatives - T-WIWI-110997 ... 248
7.44. Bond Markets - Tools & Applications - T-WIWI-110996 ... 249
7.45. Boosting of Combustion Engines - T-MACH-105649 ... 250
7.46. Business Data Strategy - T-WIWI-106187 ... 251
7.47. Business Dynamics - T-WIWI-102762 ... 253
7.48. Business Intelligence Systems - T-WIWI-105777 ... 254
7.49. Business Planning for Founders - T-WIWI-115110 ... 256

7.50. Business Process Modelling - T-WIWI-102697 ... 257
7.51. Case Studies Seminar: Innovation Management - T-WIWI-102852 ... 259
7.52. Characteristics of Transportation Systems - T-BGU-106609 ... 260
7.53. Circular Economy – Challenges and Potentials - T-WIWI-114057 ... 261
7.54. Civil Engineering Structures and Regenerative Energies - T-BGU-111922 ... 262
7.55. CO2-Neutral Combustion Engines and their Fuels I - T-MACH-111550 ... 263
7.56. CO2-Neutral Combustion Engines and their Fuels II - T-MACH-111560 ... 264
7.57. Collective Intelligence in Human Judgment and Decision Making - T-WIWI-114186 ... 265
7.58. Collective Perception in Autonomous Driving - T-WIWI-113363 ... 267
7.59. Communication Systems and Protocols - T-ETIT-101938 ... 268
7.60. Competition in Networks - T-WIWI-100005 ... 269
7.61. Computational Economics - T-WIWI-102680 ... 270
7.62. Computational Modelling of Judgments, Decisions and Cognition - T-WIWI-114185 ... 272
7.63. Computational Risk and Asset Management - T-WIWI-102878 ... 273
7.64. Computer Aided Data Analysis - T-GEISTSOZ-104565 ... 274
7.65. Computer Contract Law - T-INFO-102036 ... 275
7.66. Construction Equipment - T-BGU-101845 ... 276
7.67. Control of Linear Multivariable Systems - T-ETIT-100666 ... 277
7.68. Control Technology - T-MACH-105185 ... 278
7.69. Convex Analysis - T-WIWI-102856 ... 280
7.70. Conveying Technology and Logistics - T-MACH-102135 ... 281
7.71. Cooperative Autonomous Vehicles - T-WIWI-112690 ... 282
7.72. Copyright - T-INFO-101308 ... 283
7.73. Corporate Compliance - T-INFO-101288 ... 284
7.74. Corporate Risk Management - T-WIWI-109050 ... 285
7.75. Current Directions in Consumer Psychology - T-WIWI-111100 ... 286
7.76. Current Topics on BioMEMS - T-MACH-102176 ... 287
7.77. Data Science for Business - T-WIWI-114089 ... 288
7.78. Derivatives - T-WIWI-102643 ... 290
7.79. Design and Operation of Industrial Plants and Processes - T-WIWI-114618 ... 291
7.80. Design Thinking - T-WIWI-102866 ... 292
7.81. Designing Interactive Systems: Human-AI Interaction - T-WIWI-113465 ... 294
7.82. Development of Hybrid Drivetrains - T-MACH-110817 ... 296
7.83. Development of Sustainable, Digital Business Models - T-WIWI-113663 ... 297
7.84. Digital Democracy - T-WIWI-113160 ... 298
7.85. Digital Marketing - T-WIWI-112693 ... 299
7.86. Digital Marketing and Sales in B2B - T-WIWI-106981 ... 300
7.87. Digital Services: Innovation & Business Models - T-WIWI-112757 ... 302
7.88. Digital Transformation of Public Administration - T-WIWI-114977 ... 305
7.89. Digitalization from Product Concept to Production - T-MACH-113647 ... 306
7.90. Digitalization in Facility and Real Estate Management - T-BGU-108941 ... 308
7.91. Digitization in the Railway System - T-MACH-113016 ... 309
7.92. Dimensioning of Material Flow Systems in Production and Logistics - T-MACH-113950 ... 310
7.93. Disassembly Process Engineering - T-BGU-101850 ... 312
7.94. Discrete-Event Simulation in Production and Logistics - T-WIWI-102718 ... 313
7.95. Drying of Dispersions - T-CIWVT-111433 ... 315
7.96. Dynamic Macroeconomics - T-WIWI-109194 ... 316
7.97. Dynamic Systems of Technical Logistics - T-MACH-112113 ... 317
7.98. Dynamic Systems of Technical Logistics - Project - T-MACH-112114 ... 318
7.99. Economic Decision Making - T-WIWI-114174 ... 319
7.100. Economics of Innovation - T-WIWI-112822 ... 321
7.101. Efficient Energy Systems and Electric Mobility - T-WIWI-102793 ... 323
7.102. eFinance: Information Systems for Securities Trading - T-WIWI-110797 ... 324
7.103. Electric Power Transmission & Grid Control - T-ETIT-110883 ... 326
7.104. Electronics and EMC - T-ETIT-100723 ... 327
7.105. Emissions into the Environment - T-WIWI-102634 ... 328
7.106. Employment Law - T-INFO-111436 ... 329
7.107. Energetic Refurbishment - T-BGU-111211 ... 330
7.108. Energy and Environment - T-WIWI-102650 ... 331
7.109. Energy and Process Technology I - T-MACH-102211 ... 332

7.110. Energy and Process Technology II - T-MACH-102212 ... 333
7.111. Energy Efficient and Sustainable Tribological Systems - T-MACH-114016 ... 334
7.112. Energy Efficient and Sustainable Tribological Systems (in German) - T-MACH-114015 ... 335
7.113. Energy Efficient Intralogistic Systems - T-MACH-105151 ... 337
7.114. Energy Market Engineering - T-WIWI-107501 ... 338
7.115. Energy Networks and Regulation - T-WIWI-107503 ... 340
7.116. Energy Trading and Risk Management - T-WIWI-112151 ... 342
7.117. Engine Measurement Techniques - T-MACH-105169 ... 343
7.118. Engineering Hydrology - T-BGU-108943 ... 344
7.119. Engineering Interactive Systems: AI & Wearables - T-WIWI-113460 ... 345
7.120. Entrepreneurship - T-WIWI-102864 ... 346
7.121. Entrepreneurship Research - T-WIWI-102894 ... 349
7.122. Entrepreneurship Seasonal School - T-WIWI-113151 ... 350
7.123. Environmental and Resource Policy - T-WIWI-102616 ... 351
7.124. Environmental Communication - T-BGU-101676 ... 352
7.125. Environmental Economics and Sustainability - T-WIWI-102615 ... 353
7.126. Environmental Law - T-BGU-111102 ... 354
7.127. EU Data Protection Law - T-INFO-113887 ... 355
7.128. European and International Law - T-INFO-101312 ... 358
7.129. Examination Prerequisite Environmental Communication - T-BGU-106620 ... 359
7.130. Exercise Transportation Data Analysis - T-BGU-113971 ... 360
7.131. Exercise Transportation Data Analysis - T-BGU-113671 ... 361
7.132. Exercises: Membrane Technologies - T-CIWVT-113235 ... 362
7.133. Experimental Research in Economics and Information Systems - T-WIWI-115061 ... 363
7.134. Extraordinary Additional Course in the Module Cross-Functional Management Accounting - T-WIWI-108651 ... 364
7.135. Extrusion Technology in Food Processing - T-CIWVT-112174 ... 365
7.136. Fabrication Processes in Microsystem Technology - T-MACH-102166 ... 366
7.137. Facility and Real Estate Management II - T-BGU-111212 ... 367
7.138. Facility Management in Hospitals - T-BGU-108004 ... 368
7.139. Financial Analysis - T-WIWI-102900 ... 369
7.140. Financial Econometrics - T-WIWI-103064 ... 370
7.141. Financial Econometrics II - T-WIWI-110939 ... 372
7.142. Financial Intermediation - T-WIWI-102623 ... 373
7.143. Food Chemistry Basics - T-CHEMBIO-109442 ... 374
7.144. Food Science and Functionality - T-CIWVT-111535 ... 375
7.145. Food Science and Functionality - T-CIWVT-108801 ... 376
7.146. Freight Transport - T-BGU-106611 ... 377
7.147. Fuels and Lubricants for Combustion Engines - T-MACH-105184 ... 378
7.148. Fundamentals for Financial -Quant and -Machine Learning Research - T-WIWI-111846 ... 379
7.149. Fundamentals of Catalytic Exhaust Gas Aftertreatment - T-MACH-105044 ... 380
7.150. Fundamentals of National and International Group Taxation - T-WIWI-111304 ... 381
7.151. Fundamentals of Water Quality - T-CIWVT-106838 ... 382
7.152. Gear Cutting Technology - T-MACH-102148 ... 383
7.153. Global Logistics - T-MACH-115017 ... 385
7.154. Global Manufacturing - T-WIWI-112103 ... 387
7.155. Global Optimization I - T-WIWI-102726 ... 388
7.156. Global Optimization I and II - T-WIWI-103638 ... 390
7.157. Global Optimization II - T-WIWI-102727 ... 393
7.158. Global Production - T-MACH-114800 ... 395
7.159. Graph Theory and Advanced Location Models - T-WIWI-102723 ... 398
7.160. Growth and Development - T-WIWI-112816 ... 399
7.161. Heat Economy - T-WIWI-102695 ... 401
7.162. High-Voltage Technology - T-ETIT-110266 ... 402
7.163. High-Voltage Test Technique - T-ETIT-101915 ... 403
7.164. Human Factors in Autonomous Driving - T-WIWI-113059 ... 404
7.165. Human Factors in Security and Privacy - T-WIWI-109270 ... 405
7.166. Hydrogen and reFuels - Energy Conversion in Combustion Engines - T-MACH-111585 ... 406
7.167. Ignition Systems - T-MACH-105985 ... 407
7.168. Incentives in Organizations - T-WIWI-105781 ... 408
7.169. Industrial Mobile Robotics Lab - T-MACH-113701 ... 410

7.170. Information Management for Public Mobility Services - T-BGU-106608 412
7.171. Innovation and Project Management in Rail Vehicle Engineering - T-MACH-113068 413
7.172. Innovation Lab - T-ETIT-110291 416
7.173. Innovation Management: Concepts, Strategies and Methods - T-WIWI-102893 417
7.174. Innovation2Business – Innovation Strategy in the Industrial Corporate Practice - T-MACH-112882 418
7.175. Integrated Design Project in Water Resources Management - T-BGU-111275 419
7.176. Integrated Photonics - T-ETIT-114418 420
7.177. Integrated Production Planning in the Age of Industry 4.0 - T-MACH-109054 421
7.178. Integrative Strategies in Production and Development of High Performance Cars - T-MACH-105188 423
7.179. Intelligent Agent Architectures - T-WIWI-111267 425
7.180. Intelligent Agents and Decision Theory - T-WIWI-110915 427
7.181. International Entrepreneurship and Brand Development - T-WIWI-114893 429
7.182. International Finance - T-WIWI-102646 430
7.183. Internet Law - T-INFO-101307 431
7.184. Introduction to Bionics - T-MACH-111807 432
7.185. Introduction to Food Law - T-CHEMBIO-108091 433
7.186. Introduction to Hydrogeology - T-BGU-101499 434
7.187. Introduction to Microsystem Technology - Practical Course - T-MACH-108312 435
7.188. Introduction to Microsystem Technology I - T-MACH-105182 437
7.189. Introduction to Microsystem Technology II - T-MACH-105183 438
7.190. Introduction to Nanotechnology - T-MACH-111814 439
7.191. Introduction to Sensory Analysis with Practice - T-CIWVT-111534 440
7.192. Introduction to Stochastic Optimization - T-WIWI-106546 441
7.193. IT-Fundamentals of Logistics - T-MACH-105187 442
7.194. Joint Entrepreneurship Summer School - T-WIWI-109064 443
7.195. KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics - T-WIWI-111109 444
7.196. Knowledge Discovery - T-WIWI-102666 445
7.197. Knowledge-Driven Artificial Intelligence - T-WIWI-114863 447
7.198. Laboratory Production Metrology - T-MACH-108878 449
7.199. Large Diesel and Gas Engines for Ship Propulsions - T-MACH-110816 451
7.200. Large-scale Optimization - T-WIWI-106549 452
7.201. Laser Physics - T-ETIT-100741 453
7.202. Lean Construction - T-BGU-108000 454
7.203. Learning Factory “Global Production“ - T-MACH-105783 456
7.204. Liberalised Power Markets - T-WIWI-107043 458
7.205. Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context - T-WIWI-113107 461
7.206. Logistics and Supply Chain Management - T-MACH-110771 462
7.207. Long-Distance and Air Traffic - T-BGU-106301 464
7.208. Machine Learning 1 - Basic Methods - T-WIWI-106340 465
7.209. Machine Learning 2 - Advanced Methods - T-WIWI-106341 467
7.210. Machine Learning and Optimization in Energy Systems - T-WIWI-113073 469
7.211. Machine Tools and High-Precision Manufacturing Systems - T-MACH-110963 470
7.212. Management Accounting 1 - T-WIWI-102800 472
7.213. Management Accounting 2 - T-WIWI-102801 474
7.214. Management of IT-Projects - T-WIWI-113968 476
7.215. Market Research - T-WIWI-107720 478
7.216. Marketing Analytics - T-WIWI-103139 480
7.217. Master's Thesis - T-WIWI-103142 482
7.218. Matching Theory - T-WIWI-113264 483
7.219. Mathematical Methods for Production Systems - T-MACH-113914 484
7.220. Mathematics for High Dimensional Statistics - T-WIWI-111247 486
7.221. Media Management - T-WIWI-112711 487
7.222. Membrane Technologies in Water Treatment - T-CIWVT-113236 489
7.223. Metal Forming - T-MACH-105177 490
7.224. Methods and Models in Transportation Planning - T-BGU-101797 492
7.225. Methods in Economics - T-WIWI-114054 493
7.226. Methods in Innovation Management - T-WIWI-110263 495
7.227. Micro- and Nanosystem Integration for Medical, Fluidic and Optical Applications - T-MACH-108809 496
7.228. Micro- and nanotechnology in implant technology - T-MACH-111030 497
7.229. Microactuators - T-MACH-101910 498

7.230. Microbiology for Engineers - T-CIWVT-108871 ... 499
7.231. Mixed Integer Programming I - T-WIWI-102719 ... 500
7.232. Mixed Integer Programming II - T-WIWI-102720 ... 503
7.233. Mobility Services and New Forms of Mobility - T-BGU-103425 ... 505
7.234. Modeling and OR-Software: Advanced Topics - T-WIWI-106200 ... 506
7.235. Modeling and Simulation - T-WIWI-112685 ... 507
7.236. Modeling the Dynamics of Financial Markets - T-WIWI-113414 ... 509
7.237. Morphodynamics - T-BGU-101859 ... 510
7.238. Multicriteria Optimization - T-WIWI-111587 ... 511
7.239. Multivariate Statistical Methods - T-WIWI-103124 ... 512
7.240. Nano-Optics - T-PHYS-102282 ... 513
7.241. Nature-Inspired Optimization Methods - T-WIWI-102679 ... 514
7.242. Non- and Semiparametrics - T-WIWI-103126 ... 516
7.243. Nonlinear Control Systems - T-ETIT-100980 ... 517
7.244. Nonlinear Optimization I - T-WIWI-102724 ... 518
7.245. Nonlinear Optimization I and II - T-WIWI-103637 ... 520
7.246. Nonlinear Optimization II - T-WIWI-102725 ... 522
7.247. Novel Actuators and Sensors - T-MACH-102152 ... 524
7.248. Online Concepts for Karlsruhe City Retailers - T-WIWI-111848 ... 525
7.249. Operation Methods for Earthmoving - T-BGU-101801 ... 527
7.250. Operation Methods for Foundation and Marine Construction - T-BGU-101832 ... 528
7.251. Operations Research in Health Care Management - T-WIWI-102884 ... 529
7.252. Operations Research in Supply Chain Management - T-WIWI-102715 ... 531
7.253. Optical Transmitters and Receivers - T-ETIT-100639 ... 532
7.254. Optimization under Uncertainty - T-WIWI-106545 ... 533
7.255. Optoelectronic Components - T-ETIT-101907 ... 534
7.256. Overview of Manufacturing Technologies für Industrial Engineers - T-MACH-114686 ... 535
7.257. Panel Data - T-WIWI-103127 ... 537
7.258. Parametric Optimization - T-WIWI-102855 ... 538
7.259. Patent Law - T-INFO-101310 ... 539
7.260. Perceiving, Understanding and Communicating Risk and Uncertainty - T-WIWI-114750 ... 540
7.261. PH APL-ING-TL01 - T-WIWI-106291 ... 542
7.262. PH APL-ING-TL02 - T-WIWI-106292 ... 543
7.263. PH APL-ING-TL03 - T-WIWI-106293 ... 544
7.264. PH APL-ING-TL04 ub - T-WIWI-106294 ... 545
7.265. PH APL-ING-TL05 ub - T-WIWI-106295 ... 546
7.266. PH APL-ING-TL06 ub - T-WIWI-106296 ... 547
7.267. PH APL-ING-TL07 - T-WIWI-108384 ... 548
7.268. Physics for Engineers - T-MACH-100530 ... 549
7.269. Pioneering Leadership in German SMEs - T-WIWI-114184 ... 551
7.270. Platform & Market Engineering: Commerce, Media, and Digital Democracy - T-WIWI-112823 ... 552
7.271. Polymers in MEMS A: Chemistry, Synthesis and Applications - T-MACH-102192 ... 554
7.272. Polymers in MEMS B: Physics, Microstructuring and Applications - T-MACH-102191 ... 555
7.273. Polymers in MEMS C: Biopolymers and Bioplastics - T-MACH-102200 ... 556
7.274. Portfolio and Asset Liability Management - T-WIWI-103128 ... 558
7.275. Practical Course in Water Technology - T-CIWVT-106840 ... 559
7.276. Practical Course Polymers in MEMS - T-MACH-105556 ... 560
7.277. Practical Seminar Digital Service Systems - T-WIWI-106563 ... 561
7.278. Practical Seminar: Artificial Intelligence in Service Systems - T-WIWI-112152 ... 562
7.279. Practical Seminar: Data-Driven Information Systems - T-WIWI-106207 ... 563
7.280. Practical Seminar: Health Care Management (with Case Studies) - T-WIWI-102716 ... 564
7.281. Practical Seminar: Human-Centered Systems - T-WIWI-113459 ... 565
7.282. Practical Seminar: Service Innovation - T-WIWI-110887 ... 567
7.283. Practical Training in Basics of Microsystem Technology - T-MACH-102164 ... 568
7.284. Predictive Mechanism and Market Design - T-WIWI-102862 ... 570
7.285. Predictive Modeling - T-WIWI-110868 ... 571
7.286. Price Management - T-WIWI-105946 ... 572
7.287. Pricing - T-WIWI-102883 ... 573
7.288. Probabilistic Time Series Forecasting Challenge - T-WIWI-111387 ... 575
7.289. Process Design for Machining of Metallic Components - T-MACH-114058 ... 576

7.290. Process Engineering - T-BGU-101844 ... 578
7.291. Process Engineering: Example Food Processing - T-CIWVT-111536 ... 579
7.292. Process Mining - T-WIWI-109799 ... 580
7.293. Product- and Production-Concepts for Modern Automobiles - T-MACH-110318 ... 582
7.294. Production and Logistics Management - T-WIWI-102632 ... 584
7.295. Production Technology for E-Mobility - T-MACH-110984 ... 585
7.296. Project Course Additive Manufacturing: Design Optimization and Production of Metallic Components - T-MACH-113575 ... 587
7.297. Project Lab Cognitive Automobiles and Robots - T-WIWI-109985 ... 589
7.298. Project Lab Machine Learning - T-WIWI-109983 ... 591
7.299. Project Management - T-WIWI-103134 ... 593
7.300. Project Management in Construction and Real Estate Industry I - T-BGU-103432 ... 594
7.301. Project Management in Construction and Real Estate Industry II - T-BGU-103433 ... 596
7.302. Project Paper Lean Construction - T-BGU-101007 ... 598
7.303. Project Studies - T-BGU-101847 ... 600
7.304. Public International Law - T-INFO-113381 ... 601
7.305. Public Management - T-WIWI-102740 ... 603
7.306. Public Revenues - T-WIWI-102739 ... 604
7.307. Python for Computational Risk and Asset Management - T-WIWI-110213 ... 605
7.308. Quality Management - T-MACH-102107 ... 606
7.309. Quantitative Methods in Energy Economics - T-WIWI-107446 ... 608
7.310. Quantum Functional Devices and Semiconductor Technology - T-ETIT-100740 ... 609
7.311. Rail System Technology - T-MACH-106424 ... 610
7.312. Rail Vehicle Technology - T-MACH-105353 ... 612
7.313. Rapid Industrialization of Immature Products using the Example of Electric Mobility - T-MACH-113031 ... 614
7.314. Recommender Systems - T-WIWI-102847 ... 616
7.315. Regulation Theory and Practice - T-WIWI-102712 ... 620
7.316. Responsible Artificial Intelligence - T-WIWI-111385 ... 621
7.317. Risk Management in Industrial Supply Networks - T-WIWI-102826 ... 623
7.318. Safety Engineering - T-MACH-105171 ... 624
7.319. Science Communication in the Innovation Process - T-WIWI-114748 ... 626
7.320. Selected Legal Issues of Internet Law - T-INFO-108462 ... 627
7.321. Selected Topics in Statistics and Analytics: Seminal Papers in Theory and Methods - T-WIWI-114746 ... 628
7.322. Selected topics of system integration for micro- and nanotechnology - T-MACH-105695 ... 629
7.323. Selected Topics on Optics and Microoptics for Mechanical Engineers - T-MACH-102165 ... 630
7.324. Self-Booking-HOC-SPZ-FORUM-STK-Graded - T-WIWI-111439 ... 631
7.325. Self-Booking-HOC-SPZ-FORUM-STK-Graded - T-WIWI-111438 ... 632
7.326. Self-Booking-HOC-SPZ-FORUM-STK-Graded - T-WIWI-113354 ... 633
7.327. Self-Booking-HOC-SPZ-FORUM-STK-Graded - T-WIWI-113352 ... 634
7.328. Self-Booking-HOC-SPZ-FORUM-STK-Graded - T-WIWI-113353 ... 635
7.329. Self-Booking-HOC-SPZ-FORUM-STK-Graded - T-WIWI-111440 ... 636
7.330. Self-Booking-HOC-SPZ-FORUM-STK-Ungraded - T-WIWI-113356 ... 637
7.331. Self-Booking-HOC-SPZ-FORUM-STK-Ungraded - T-WIWI-113357 ... 638
7.332. Self-Booking-HOC-SPZ-FORUM-STK-Ungraded - T-WIWI-111442 ... 639
7.333. Self-Booking-HOC-SPZ-FORUM-STK-Ungraded - T-WIWI-111441 ... 640
7.334. Self-Booking-HOC-SPZ-FORUM-STK-Ungraded - T-WIWI-111443 ... 641
7.335. Self-Booking-HOC-SPZ-FORUM-STK-Ungraded - T-WIWI-113355 ... 642
7.336. Semantic Web Technologies - T-WIWI-110848 ... 643
7.337. Seminar Application of Artificial Intelligence in Production - T-MACH-112121 ... 646
7.338. Seminar Creating a Patent Specification - T-ETIT-100754 ... 648
7.339. Seminar Data-Mining in Production - T-MACH-108737 ... 649
7.340. Seminar Development of Automated Production Systems - T-MACH-113999 ... 651
7.341. Seminar in Business Administration A (Master) - T-WIWI-103474 ... 653
7.342. Seminar in Business Administration B (Master) - T-WIWI-103476 ... 664
7.343. Seminar in Economic Policy - T-WIWI-102789 ... 675
7.344. Seminar in Economics A (Master) - T-WIWI-103478 ... 676
7.345. Seminar in Economics B (Master) - T-WIWI-103477 ... 681
7.346. Seminar in Engineering Science Master (approval) - T-WIWI-108763 ... 686
7.347. Seminar in Informatics A (Master) - T-WIWI-103479 ... 687
7.348. Seminar in Informatics B (Master) - T-WIWI-103480 ... 702

7.349. Seminar in Operations Research A (Master) - T-WIWI-103481 ... 717
7.350. Seminar in Operations Research B (Master) - T-WIWI-103482 ... 720
7.351. Seminar in Statistics A (Master) - T-WIWI-103483 ... 723
7.352. Seminar in Statistics B (Master) - T-WIWI-103484 ... 726
7.353. Seminar in Transportation - T-BGU-100014 ... 729
7.354. Seminar on Modeling and Simulation in Transportation - T-BGU-112552 ... 730
7.355. Seminar on Transport Policy - T-BGU-114772 ... 731
7.356. Seminar Production Technology - T-MACH-109062 ... 732
7.357. Seminar: Commercial and Corporate Law in the IT Industry - T-INFO-111405 ... 734
7.358. Seminar: IT- Security Law - T-INFO-111404 ... 735
7.359. Seminar: Legal Studies Master I - T-INFO-115025 ... 736
7.360. Seminar: Legal Studies Master II - T-INFO-115026 ... 740
7.361. Service Design Thinking - T-WIWI-102849 ... 744
7.362. Service Operations and Cyber Security - T-WIWI-114109 ... 747
7.363. SIL Entrepreneurship Emphasis - T-WIWI-110287 ... 748
7.364. SIL Entrepreneurship Project - T-WIWI-110166 ... 749
7.365. Simulation Game in Energy Economics - T-WIWI-108016 ... 750
7.366. Simulation of Nanoscale Systems, without Seminar - T-PHYS-102504 ... 751
7.367. Site Management - T-BGU-103427 ... 752
7.368. Smart Energy Infrastructure - T-WIWI-107464 ... 753
7.369. Smart Grid Applications - T-WIWI-107504 ... 754
7.370. Social Choice Theory - T-WIWI-102859 ... 755
7.371. Software Quality Management - T-WIWI-102895 ... 756
7.372. Spatial Economics - T-WIWI-103107 ... 758
7.373. Special Topics in Information Systems - T-WIWI-113727 ... 760
7.374. Special Topics in Information Systems - T-WIWI-113724 ... 761
7.375. Special Topics in Information Systems - T-WIWI-113726 ... 762
7.376. Special Topics in Information Systems - T-WIWI-113725 ... 763
7.377. Startup Experience - T-WIWI-111561 ... 764
7.378. Statistical Modeling of Generalized Regression Models - T-WIWI-103065 ... 767
7.379. Stochastic Calculus and Finance - T-WIWI-103129 ... 768
7.380. Strategic Decision-Making in Global Production Networks through Optimization and Simulation - T-MACH-114969 ... 770
7.381. Strategic Transport Planning - T-BGU-103426 ... 773
7.382. Strategy and Management Theory: Developments and “Classics” - T-WIWI-106190 ... 774
7.383. Successful Transformation Through Innovation - T-WIWI-111823 ... 776
7.384. Supplement Enterprise Information Systems - T-WIWI-110346 ... 777
7.385. Supplement Software- and Systemsengineering - T-WIWI-110372 ... 778
7.386. Supply Chain Management with Advanced Planning Systems - T-WIWI-102763 ... 779
7.387. Sustainability in Mobility Systems - T-BGU-111057 ... 781
7.388. Sustainable Vehicle Drivetrains - T-MACH-111578 ... 782
7.389. System Integration in Micro- and Nanotechnology I - T-MACH-114552 ... 783
7.390. System Integration in Micro- and Nanotechnology II - T-MACH-114553 ... 785
7.391. Tax Law - T-INFO-111437 ... 786
7.392. Telecommunications and Internet – Economics and Policy - T-WIWI-113147 ... 787
7.393. Telecommunications Law - T-INFO-101309 ... 789
7.394. Tendering, Planning and Financing in Public Transport - T-BGU-101005 ... 790
7.395. Topics in Experimental Economics - T-WIWI-102863 ... 791
7.396. Topics in Stochastic Optimization - T-WIWI-112109 ... 792
7.397. Trademark and Unfair Competition Law - T-INFO-101313 ... 793
7.398. Traffic Engineering - T-BGU-101798 ... 794
7.399. Traffic Flow Simulation - T-BGU-101800 ... 795
7.400. Traffic Management and Transport Telematics - T-BGU-101799 ... 796
7.401. Transport Economics - T-WIWI-100007 ... 797
7.402. Transportation Data Analysis - T-BGU-100010 ... 798
7.403. Tunnel Construction and Blasting Engineering - T-BGU-101846 ... 799
7.404. Turnkey Construction - T-BGU-111921 ... 800
7.405. Tutoring: Training and Practice - T-WIWI-112967 ... 801
7.406. Upgrading of Existing Buildings - T-BGU-111218 ... 802
7.407. Valuation - T-WIWI-102621 ... 803

7.408. Vehicle Systems for Urban Mobility - T-MACH-113069 804
7.409. Warehousing and Distribution Systems - T-MACH-105174 805
7.410. Water Technology - T-CIWVT-106802 807
7.411. Web App Programming for Finance - T-WIWI-110933 808
7.412. Workshop Business Wargaming – Analyzing Strategic Interactions - T-WIWI-106189 809
7.413. Workshop Current Topics in Strategy and Management - T-WIWI-106188 811
7.414. X-ray Optics - T-MACH-109122 813

1 The Module Handbook: Your Guide Through Your Studies

Welcome to the **Module Handbook** for your study program at the KIT Department of Economics and Management. We are delighted to have you join us and wish you a successful start to the new semester! This handbook provides an essential introduction to the key terms and regulations governing the selection of modules, courses, and examinations within your program.

Your study program is structured around several disciplines (e.g., Business Administration, Economics, Operations Research). Each discipline is further divided into **modules**, with each module comprising one or more interrelated components that often lead to an examination. The scope of each module is defined by **Credit Points (CP)**, which are awarded upon successful completion. While some modules are compulsory, the program's interdisciplinary nature offers a wide range of individual specialization and deepening opportunities within many modules. This flexibility allows you to tailor the content and timeline of your studies according to your personal interests, career aspirations, and needs.

This module handbook serves as a comprehensive guide to the modules within your program. Specifically, it details:

- The **structure** of the modules
- Their **scope** (in CP)
- Module **dependencies**
- Expected **learning outcomes**
- **Assessment methods** and examinations

This handbook is an essential orientation and a helpful guide throughout your studies. Please note that it **complements, but does not replace, the course catalog**, which provides semester-specific and variable course details such as timetables and locations.

1.1 Module Selection and Completion

Each module and each examination can only be selected once. If an examination is selectable within multiple modules, the student's decision on its assignment to a specific module is made at the moment of registration for that examination.

A module is considered completed and passed when its module examination is successfully passed (achieving a grade of 4.0 or better). For modules where the module examination is subdivided into several partial examinations, the module is completed only when all necessary partial examinations have been successfully passed. If a module offers alternative partial examinations, the module examination is considered concluded with the examination that leads to or exceeds the required total credit points. The module grade, reflecting the weight of its predefined credit points, is then included in the overall grade calculation for the study program.

1.2 Module Versions and Revisions

Modules are periodically revised, for instance, due to the introduction of new courses or the cancellation of existing examinations. As a rule, a new module version is created, which applies to all students who are newly starting the module. Students who have already commenced a module, however, are generally "grandfathered" and remain subject to the conditions of the module version valid at the time they began. These students can complete the module under the same conditions as at the beginning (exceptions are regulated by the Examination Board). The decisive date for this is the student's "binding declaration" regarding the choice of the module, as defined by §5(2) of the Study and Examination Regulations. This binding declaration is established by registering for the first examination within that module.

1.3 Accessing Module Handbook Versions

All modules in this handbook are presented in their current version, with the version number indicated in each module description. Older module versions can be accessed via previous module handbooks in the archive at: http://www.wiwi.kit.edu/Archiv_MHB.php.

1.4 Examination Formats and Registration

Module examinations can be taken either as a comprehensive general examination or as partial examinations. If offered as a general examination, the entire learning content of the module will be assessed in a single examination. If the module examination is subdivided, the content of each constituent course will be examined in corresponding partial examinations.

Registration for examinations can be done online via the campus management portal. The following functions are available at https://campus.studium.kit.edu/:

- Register/unregister for examinations
- Check examination results
- Create transcript of records

For further and more detailed information, please refer to: https://campus.studium.kit.edu/faq.php.

1.5 Grading, Repetition Rules, and Types of Assessment

Examinations are categorized into written examinations, oral examinations, and alternative assessment types ("Prüfungsleistungen anderer Art"). All examinations are graded. Ungraded coursework ("Studienleistungen"), on the other hand, can be repeated multiple times and do not receive a grade.

Generally, a failed written exam, oral exam, or alternative assessment can be repeated only once. Should this repeat examination (including any provided oral repeat examination) also be failed, the right to take the examination is forfeited. A request for a second repetition must be submitted in writing to the Examination Board two months after forfeiting the examination right. For more information, please see: http://www.wiwi.kit.edu/hinweiseZweitwdh.php.

1.6 Examiners

The Examination Board has appointed the KIT examiners and lecturers listed in this module handbook for the modules and their respective courses as official examiners for the courses they offer.

1.7 Additional Achievements

Additional achievements are voluntarily undertaken graded assessments that do not impact the student's overall grade. They can pertain to single courses or entire modules. It is mandatory to declare an additional achievement as such at the time of registration for the respective assessment. Additional achievements totaling at most 30 CP may be listed on the final certificate.

1.8 Important Resources and Legal Framework

For current information regarding your studies at the KIT Department of Economics and Management, please visit our website www.wiwi.kit.edu, as well as our channels on Instagram, LinkedIn, and YouTube. Please also consult the current notices and announcements for students at: https://www.wiwi.kit.edu/studium.php.

Comprehensive information regarding the legal and regulatory framework of your study program can be found in the respective study and examination regulations. These documents are available under the Official Announcements of KIT at: http://www.sle.kit.edu/amtlicheBekanntmachungen.php.

1.9 Contact

If you have any questions about modules or exams, please contact the examination office of the KIT Department of Economics and Management:

Ralf Hilser
Sophie Wieczorek
Telefon +49 721 608-43768
E-Mail: pruefungssekretariat@wiwi.kit.edu

Editorial responsibility:

Dr. André Wiesner
Telefon: +49 721 608-44061
Email: modul@wiwi.kit.edu \

2 Study plan

The Master's degree program in Economics Engineering (M.Sc.) has 4 terms and consists of 120 credits (CP) including Master's thesis. The Master's degree program further deepens or complements the scientific qualifications acquired in the Bachelor program. The students should be made capable of independently applying scientific knowledge and methods and evaluate their implications and scope concerning solutions of complex scientific and social problems.

Furthermore, the student has to attend two seminars with a minimum of six CP within the seminar module. In addition to the key skills gained in the seminars (3 CP), the student has to acquire additional key skills totalling at least 3 credits.

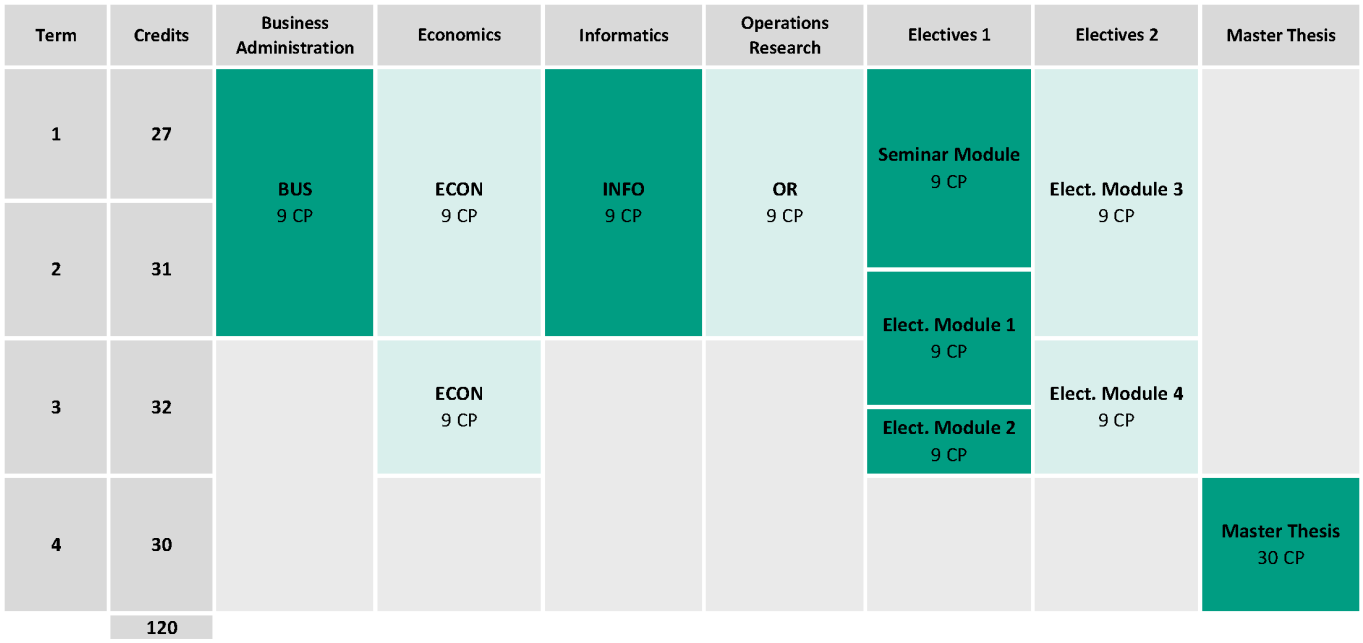

Figure 2: Structure of the Master's degree program SPO 2015 (Recommendation)

Figure 2 shows the structure of the subjects and the credits allocated to the subjects. The student has to choose four elective modules of the mentioned disciplines. Thereby it is only possible to select a maximum of two modules from the same discipline and it is only allowed to choose either one module in law or in sociology.

It is left to the student's individual curriculum (taking into account the examination and module regulations), in which terms the chosen modules will be started and completed. However, it is highly recommended to complete all courses and seminars before beginning the Master's thesis.

3 Qualification objectives of the Master's program in Economics Engineering

Graduates of the interdisciplinary Master's program in Economics Engineering have advanced and in-depth knowledge in economics, business administration, computer science and operations research. This mainly has its focus on business administration. Here, the students analyze how macroeconomic variables (e.g., the national product, the inflation rate or unemployment) are affected by interaction of individual decisions in alternative institutional arrangements and what roles the state and the increasing internationalization have to take up. Formal-theoretical models are analytically derived and simulated using quantitative methods. The objective here is a theoretically based derivation of economic policy recommendations. Other areas of specialization can be chosen based on individual interests. Depending on one's wishes, courses on statistics, engineering sciences and law or sociology can be taken up and specialized in.

They have generalized or specialized expertise in the different disciplines.

The graduates are in a position to define and interpret the specifics, limits, terminologies and doctrines in the selected areas of these subjects, reproduce the current state of research and selectively use this as a basis for further development. Their extensive know-how enables them to think across the various disciplines as well as identify trends and macroeconomic developments at an early stage. They are able to evaluate, select and combine appropriate courses of action for research-related topics. They can then transfer and apply these to solve specific problems.

They can separately analyze extensive problems such as information and current challenges and analyze, compare and evaluate these using appropriate methods and concepts. They evaluate the complexity and risks, identify the improvement potentials and choose sustainable solution processes and improvement methods. This puts them in a position where they are able to make responsible and science-based decisions. They are able to come up with innovative ideas and apply them accordingly. They can oversee these approaches either independently or in teams. They are able to explain and discuss their decisions. They can independently interpret, validate and illustrate the obtained results.

The interdisciplinary use of knowledge also takes account of social, scientific and ethical insights.

The graduates can communicate with expert representatives on a scientific level and assume prominent responsibility both in local and international teams. Karlsruhe's economic engineers are characterized by their interdisciplinary thinking as well as their innovation and management capability. They are particularly qualified for industrial occupations, the service sector or in public administration as well as a downstream scientific career (PhD).

4 Key Skills

The master program Economics Engineering (M.Sc.) at the KIT Department of Economics and Management distinguishes itself by an exceptionally high level of interdisciplinarity. With the combination of business science, economics, informatics, operations research, mathematics as well as engineering and natural science, the integration of knowledge of different disciplines is an inherent element of the programme. As a result, interdisciplinary and connected thinking is encouraged in a natural way. Furthermore, the seminar courses in the master degree programme contribute significantly to the development of key skills by practicing to elaborate and write scientifically sound papers and presentations about special topics. The **integrative** taught key skills, which are acquired throughout the entire programme, can be classified into the following fields:

Soft skills

Team work, social communication and creativity techniques
Presentations and presentation techniques
Logical and systematical arguing and writing
Structured problem solving and communication

Enabling skills

Decision making in business context
Project management competences
Fundamentals of business science
English as a foreign language

Orientational knowledge

Acquisition of interdisciplinary knowledge
Institutional knowledge about economic and legal systems
Knowledge about international organisations
Media, technology and innovation

The integrative acquisition of key skills especially takes place in several obligatory courses during the master programme, namely

- Seminar module
- Mentoring of the Master's thesis
- Business science, economics and informatics modules

Besides the integrated key skills, the additive acquisition of key skills, which are totalling at least three credits within the seminar module, is scheduled. Students may choose freely among the offered courses of HoC, ZAK and Sprachenzenrtum.

5 Study Program Structure

Mandatory	
Master's Thesis	30 CP
Economics	18 CP
Business Administration	9 CP
Informatics	9 CP
Operations Research	9 CP
Compulsory Elective Modules 1	27 CP
Compulsory Elective Modules 2	18 CP

5.1 Master's Thesis

Credits
30

Mandatory				
M-WIWI-101659	Master's Thesis	DE	WS+SS	30 CP

Modelled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in the following fields:
   - Business Administration
   - Informatics
   - Operations Research
   - Economics
   - Compulsory Elective Modules 1
   - Compulsory Elective Modules 2

5.2 Economics

Credits
18

Economics (Election: 2 items)				
M-WIWI-101453	Applied Strategic Decisions	EN	WS+SS	9 CP
M-WIWI-101504	Collective Decision Making	EN	WS+SS	9 CP
M-WIWI-107010	Economics in a Connected World	EN	WS+SS	9 CP
M-WIWI-107011	Economics of Innovation and Growth	EN	WS+SS	9 CP
M-WIWI-101505	Experimental Economics	DE/EN	WS+SS	9 CP
M-WIWI-101500	Microeconomic Theory	EN	WS+SS	9 CP
M-WIWI-101406	Network Economics	DE/EN	WS+SS	9 CP
M-WIWI-101638	Econometrics and Statistics I	DE/EN	WS+SS	9 CP
M-WIWI-101502	Economic Theory and its Application in Finance	EN	WS+SS	9 CP
M-WIWI-101468	Environmental Economics	DE	WS+SS	9 CP
M-WIWI-101485	Transport Infrastructure Policy and Regional Development	DE/EN	WS+SS	9 CP
M-WIWI-101511	Advanced Topics in Public Finance	DE	WS+SS	9 CP

5.3 Business Administration

Credits
9

Business Administration (Election: 1 item)				
M-WIWI-105659	Advanced Machine Learning and Data Science	EN	WS+SS	9 CP
M-WIWI-101410	Business & Service Engineering	DE/EN	WS+SS	9 CP
M-WIWI-105714	Consumer Research	EN	WS+SS	9 CP
M-WIWI-101498	Management Accounting	EN	see notes	9 CP
M-WIWI-101510	Cross-Functional Management Accounting	EN	WS+SS	9 CP
M-WIWI-103117	Data Science: Data-Driven Information Systems	EN	WS+SS	9 CP
M-WIWI-101647	Data Science: Evidence-based Marketing	EN	WS+SS	9 CP
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	DE/EN	WS+SS	9 CP
M-WIWI-105032	Data Science for Finance	EN	WS	9 CP
M-WIWI-104080	Designing Interactive Information Systems	EN	WS+SS	9 CP
M-WIWI-106258	Digital Marketing	EN	WS+SS	9 CP
M-WIWI-103720	eEnergy: Markets, Services and Systems	DE	WS+SS	9 CP
M-WIWI-101409	Electronic Markets	DE/EN	WS+SS	9 CP
M-WIWI-101451	Energy Economics and Energy Markets	DE/EN	WS+SS	9 CP
M-WIWI-101452	Energy Economics and Technology	DE/EN	WS+SS	9 CP
M-WIWI-101488	Entrepreneurship (EnTechnon)	DE/EN	WS+SS	9 CP
M-WIWI-101482	Finance 1	DE/EN	WS+SS	9 CP
M-WIWI-101483	Finance 2	DE/EN	WS+SS	9 CP
M-WIWI-101480	Finance 3	DE/EN	WS+SS	9 CP
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research	EN	see notes	9 CP
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations	DE/EN	WS+SS	9 CP
M-WIWI-101471	Industrial Production II	DE/EN	WS	9 CP
M-WIWI-101412	Industrial Production III	DE/EN	SS	9 CP
M-WIWI-101411	Information Engineering	DE/EN	WS+SS	9 CP
M-WIWI-104068	Information Systems in Organizations	EN	WS+SS	9 CP
M-WIWI-101507	Innovation Management	DE/EN	WS+SS	9 CP
M-WIWI-105312	Marketing and Sales Management	EN	SS	9 CP
M-WIWI-101446	Market Engineering	DE/EN	WS+SS	9 CP
M-WIWI-106660	Modeling the Dynamics of Financial Markets	EN	SS	9 CP
M-WIWI-101506	Service Analytics	EN	WS+SS	9 CP
M-WIWI-101448	Service Management	EN	WS+SS	9 CP
M-WIWI-101503	Service Design Thinking	EN	WS	9 CP
M-WIWI-102754	Service Economics and Management	EN	WS+SS	9 CP
M-WIWI-102806	Service Innovation, Design & Engineering	EN	WS+SS	9 CP
M-WIWI-103119	Advanced Topics in Strategy and Management	DE	WS+SS	9 CP
M-WIWI-105010	Student Innovation Lab (SIL) 1	EN	WS	9 CP

5.4 Informatics

Credits
9

Informatics (Election: 1 item)				
M-WIWI-101472	Informatics	DE/EN	WS+SS	9 CP

5.5 Operations Research

Credits
9

Operations Research (Election: 1 item)				
M-WIWI-101473	Mathematical Programming	DE/EN	WS+SS	9 CP
M-WIWI-102832	Operations Research in Supply Chain Management	DE/EN	WS+SS	9 CP
M-WIWI-102805	Service Operations	DE/EN	WS+SS	9 CP
M-WIWI-103289	Stochastic Optimization	DE/EN	WS+SS	9 CP

5.6 Compulsory Elective Modules 1

Credits
27

Election notes
In the field "Compulsory Elective Modules 1", the **seminar module** (independent of subject) is to be attended over two seminars and further key qualification courses. In addition, **two elective modules** from the subjects of Economics, Business Administration, Informatics, Operations Research, Engineering sciences / Natural Sciences and Statistics are to be chosen in each of the two elective areas. Within a compulsory elective area, the modules must come from different subjects.

Mandatory				
M-WIWI-101808	Seminar Module	DE/EN	WS+SS	9 CP
Economics (Election: at most 9 credits)				
M-WIWI-101453	Applied Strategic Decisions	EN	WS+SS	9 CP
M-WIWI-101504	Collective Decision Making	EN	WS+SS	9 CP
M-WIWI-107010	Economics in a Connected World	EN	WS+SS	9 CP
M-WIWI-107011	Economics of Innovation and Growth	EN	WS+SS	9 CP
M-WIWI-101505	Experimental Economics	DE/EN	WS+SS	9 CP
M-WIWI-101500	Microeconomic Theory	EN	WS+SS	9 CP
M-WIWI-101406	Network Economics	DE/EN	WS+SS	9 CP
M-WIWI-101638	Econometrics and Statistics I	DE/EN	WS+SS	9 CP
M-WIWI-101502	Economic Theory and its Application in Finance	EN	WS+SS	9 CP
M-WIWI-101468	Environmental Economics	DE	WS+SS	9 CP
M-WIWI-101485	Transport Infrastructure Policy and Regional Development	DE/EN	WS+SS	9 CP
M-WIWI-101511	Advanced Topics in Public Finance	DE	WS+SS	9 CP
Business Administration (Election: at most 9 credits)				
M-WIWI-105659	Advanced Machine Learning and Data Science	EN	WS+SS	9 CP
M-WIWI-101410	Business & Service Engineering	DE/EN	WS+SS	9 CP
M-WIWI-105714	Consumer Research	EN	WS+SS	9 CP
M-WIWI-101498	Management Accounting	EN	see notes	9 CP
M-WIWI-101510	Cross-Functional Management Accounting	EN	WS+SS	9 CP
M-WIWI-103117	Data Science: Data-Driven Information Systems	EN	WS+SS	9 CP
M-WIWI-101647	Data Science: Evidence-based Marketing	EN	WS+SS	9 CP
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	DE/EN	WS+SS	9 CP
M-WIWI-105032	Data Science for Finance	EN	WS	9 CP
M-WIWI-104080	Designing Interactive Information Systems	EN	WS+SS	9 CP
M-WIWI-106258	Digital Marketing	EN	WS+SS	9 CP
M-WIWI-102808	Digital Service Systems in Industry	DE	WS+SS	9 CP
M-WIWI-103720	eEnergy: Markets, Services and Systems	DE	WS+SS	9 CP
M-WIWI-101409	Electronic Markets	DE/EN	WS+SS	9 CP
M-WIWI-101451	Energy Economics and Energy Markets	DE/EN	WS+SS	9 CP
M-WIWI-101452	Energy Economics and Technology	DE/EN	WS+SS	9 CP
M-WIWI-101488	Entrepreneurship (EnTechnon)	DE/EN	WS+SS	9 CP
M-WIWI-101482	Finance 1	DE/EN	WS+SS	9 CP
M-WIWI-101483	Finance 2	DE/EN	WS+SS	9 CP
M-WIWI-101480	Finance 3	DE/EN	WS+SS	9 CP
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research	EN	see notes	9 CP
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations	DE/EN	WS+SS	9 CP
M-WIWI-101471	Industrial Production II	DE/EN	WS	9 CP
M-WIWI-101412	Industrial Production III	DE/EN	SS	9 CP
M-WIWI-101411	Information Engineering	DE/EN	WS+SS	9 CP
M-WIWI-104068	Information Systems in Organizations	EN	WS+SS	9 CP
M-WIWI-101507	Innovation Management	DE/EN	WS+SS	9 CP
M-WIWI-105312	Marketing and Sales Management	EN	SS	9 CP
M-WIWI-101446	Market Engineering	DE/EN	WS+SS	9 CP
M-WIWI-106660	Modeling the Dynamics of Financial Markets	EN	SS	9 CP
M-WIWI-101506	Service Analytics	EN	WS+SS	9 CP
M-WIWI-101503	Service Design Thinking	EN	WS	9 CP
M-WIWI-102754	Service Economics and Management	EN	WS+SS	9 CP
M-WIWI-102806	Service Innovation, Design & Engineering	EN	WS+SS	9 CP

M-WIWI-101448	Service Management	EN	WS+SS	9 CP
M-WIWI-103119	Advanced Topics in Strategy and Management	DE	WS+SS	9 CP
M-WIWI-105010	Student Innovation Lab (SIL) 1	EN	WS	9 CP
M-WIWI-105011	Student Innovation Lab (SIL) 2	EN	WS	9 CP
Informatics (Election: at most 9 credits)				
M-WIWI-101628	Emphasis in Informatics	DE/EN	WS+SS	9 CP
M-WIWI-101630	Electives in Informatics	DE/EN	WS+SS	9 CP
Operations Research (Election: at most 9 credits)				
M-WIWI-101473	Mathematical Programming	DE/EN	WS+SS	9 CP
M-WIWI-102832	Operations Research in Supply Chain Management	DE/EN	WS+SS	9 CP
M-WIWI-102805	Service Operations	DE/EN	WS+SS	9 CP
M-WIWI-103289	Stochastic Optimization	DE/EN	WS+SS	9 CP
Natural and Engineering Sciences (Election: at most 9 credits)				
M-MACH-101298	Automated Manufacturing Systems	DE	WS+SS	9 CP
M-WIWI-101404	Extracurricular Module in Engineering		Once	9 CP
M-MACH-101290	BioMEMS	DE	WS+SS	9 CP
M-BGU-105592	Digitalization in Facility Management	DE	WS	9 CP
M-MACH-101296	Energy and Process Technology I		WS	9 CP
M-MACH-101297	Energy and Process Technology II		SS	9 CP
M-ETIT-101164	Generation and Transmission of Renewable Power	DE/EN	WS+SS	9 CP
M-BGU-106453	Facility Management in Hospitals for Industrial Engineering	DE	WS	9 CP
M-MACH-101276	Manufacturing Technology	DE	WS	9 CP
M-MACH-101282	Global Production and Logistics	EN	WS+SS	9 CP
M-BGU-101064	Fundamentals of Transportation	DE	SS	9 CP
M-CIWVT-101120	Principles of Food Process Engineering		WS+SS	9 CP
M-ETIT-101163	High-Voltage Technology	DE	WS+SS	9 CP
M-MACH-101272	Integrated Production Planning	DE	SS	9 CP
M-MACH-105968	Artificial Intelligence in Production	DE	WS+SS	9 CP
M-BGU-101884	Lean Management in Construction	DE	WS	9 CP
M-MACH-105298	Logistics and Supply Chain Management	EN	SS	9 CP
M-MACH-101278	Material Flow in Networked Logistic Systems	DE	WS+SS	9 CP
M-MACH-101291	Microfabrication	DE	WS+SS	9 CP
M-MACH-101292	Microoptics	DE	WS+SS	9 CP
M-MACH-101293	Microsystem Technology	DE	WS+SS	9 CP
M-MACH-106496	Modern Mobility on Rails and Roads	DE	WS+SS	9 CP
M-MACH-101294	Nanotechnology	DE	WS+SS	9 CP
M-WIWI-104837	Natural Hazards and Risk Management	DE	WS+SS	9 CP
M-MACH-101295	Optoelectronics and Optical Communication	DE	WS+SS	9 CP
M-MACH-106590	Production Engineering	DE	WS+SS	9 CP
M-BGU-101888	Project Management in Construction	DE	WS	9 CP
M-ETIT-101157	Control Engineering II		WS+SS	9 CP
M-MACH-105455	Strategic Design of Modern Production Systems	DE	WS+SS	9 CP
M-MACH-101275	Combustion Engines I		WS	9 CP
M-MACH-101303	Combustion Engines II	DE	WS+SS	9 CP
M-BGU-101110	Process Engineering in Construction	DE	WS	9 CP
M-BGU-101065	Transportation Modelling and Traffic Management	DE/EN	WS+SS	9 CP
M-CIWVT-101119	Specialization in Food Process Engineering	DE	WS+SS	9 CP
M-MACH-104888	Advanced Module Logistics	DE	WS+SS	9 CP
M-CIWVT-101121	Water Chemistry and Water Technology I	DE/EN	WS	9 CP
M-CIWVT-101122	Water Chemistry and Water Technology II		WS+SS	12 CP

M-MACH-101286	Machine Tools and Industrial Handling	DE	WS	9 CP
M-MACH-107717	Rail System Technology and Rail Vehicle Technology neu	DE	WS+SS	9 CP
Statistics (Election: at most 9 credits)				
M-WIWI-101637	Analytics and Statistics	DE	WS+SS	9 CP
M-WIWI-101638	Econometrics and Statistics I	DE/EN	WS+SS	9 CP
M-WIWI-101639	Econometrics and Statistics II	DE/EN	WS+SS	9 CP

5.7 Compulsory Elective Modules 2

Credits
18

Election notes
In the field "Compulsory Elective Modules 2", **two elective modules** are to be chosen from the subjects Economics, Business Administration, Informatics, Operations Research, Engineering / Natural Sciences and Statistics. Within a compulsory elective area, the modules must come from different subjects. In elective area 2, the subjects Law or Sociology can also be taken in one of the two elective modules.

Economics (Election: at most 9 credits)				
M-WIWI-101453	Applied Strategic Decisions	EN	WS+SS	9 CP
M-WIWI-101504	Collective Decision Making	EN	WS+SS	9 CP
M-WIWI-107010	Economics in a Connected World	EN	WS+SS	9 CP
M-WIWI-107011	Economics of Innovation and Growth	EN	WS+SS	9 CP
M-WIWI-101505	Experimental Economics	DE/EN	WS+SS	9 CP
M-WIWI-101500	Microeconomic Theory	EN	WS+SS	9 CP
M-WIWI-101406	Network Economics	DE/EN	WS+SS	9 CP
M-WIWI-101638	Econometrics and Statistics I	DE/EN	WS+SS	9 CP
M-WIWI-101502	Economic Theory and its Application in Finance	EN	WS+SS	9 CP
M-WIWI-101468	Environmental Economics	DE	WS+SS	9 CP
M-WIWI-101485	Transport Infrastructure Policy and Regional Development	DE/EN	WS+SS	9 CP
M-WIWI-101511	Advanced Topics in Public Finance	DE	WS+SS	9 CP
Business Administration (Election: at most 9 credits)				
M-WIWI-105659	Advanced Machine Learning and Data Science	EN	WS+SS	9 CP
M-WIWI-101410	Business & Service Engineering	DE/EN	WS+SS	9 CP
M-WIWI-105714	Consumer Research	EN	WS+SS	9 CP
M-WIWI-101498	Management Accounting	EN	see notes	9 CP
M-WIWI-101510	Cross-Functional Management Accounting	EN	WS+SS	9 CP
M-WIWI-103117	Data Science: Data-Driven Information Systems	EN	WS+SS	9 CP
M-WIWI-101647	Data Science: Evidence-based Marketing	EN	WS+SS	9 CP
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	DE/EN	WS+SS	9 CP
M-WIWI-105032	Data Science for Finance	EN	WS	9 CP
M-WIWI-104080	Designing Interactive Information Systems	EN	WS+SS	9 CP
M-WIWI-106258	Digital Marketing	EN	WS+SS	9 CP
M-WIWI-102808	Digital Service Systems in Industry	DE	WS+SS	9 CP
M-WIWI-103720	eEnergy: Markets, Services and Systems	DE	WS+SS	9 CP
M-WIWI-101409	Electronic Markets	DE/EN	WS+SS	9 CP
M-WIWI-101451	Energy Economics and Energy Markets	DE/EN	WS+SS	9 CP
M-WIWI-101452	Energy Economics and Technology	DE/EN	WS+SS	9 CP
M-WIWI-101488	Entrepreneurship (EnTechnon)	DE/EN	WS+SS	9 CP
M-WIWI-101482	Finance 1	DE/EN	WS+SS	9 CP
M-WIWI-101483	Finance 2	DE/EN	WS+SS	9 CP
M-WIWI-101480	Finance 3	DE/EN	WS+SS	9 CP
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research	EN	see notes	9 CP
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations	DE/EN	WS+SS	9 CP
M-WIWI-101411	Information Engineering	DE/EN	WS+SS	9 CP
M-WIWI-104068	Information Systems in Organizations	EN	WS+SS	9 CP
M-WIWI-101471	Industrial Production II	DE/EN	WS	9 CP
M-WIWI-101412	Industrial Production III	DE/EN	SS	9 CP
M-WIWI-101507	Innovation Management	DE/EN	WS+SS	9 CP
M-WIWI-105312	Marketing and Sales Management	EN	SS	9 CP
M-WIWI-101446	Market Engineering	DE/EN	WS+SS	9 CP
M-WIWI-106660	Modeling the Dynamics of Financial Markets	EN	SS	9 CP
M-WIWI-101506	Service Analytics	EN	WS+SS	9 CP
M-WIWI-101503	Service Design Thinking	EN	WS	9 CP
M-WIWI-102754	Service Economics and Management	EN	WS+SS	9 CP
M-WIWI-102806	Service Innovation, Design & Engineering	EN	WS+SS	9 CP
M-WIWI-101448	Service Management	EN	WS+SS	9 CP

M-WIWI-103119	Advanced Topics in Strategy and Management	DE	WS+SS	9 CP
M-WIWI-105010	Student Innovation Lab (SIL) 1	EN	WS	9 CP
M-WIWI-105011	Student Innovation Lab (SIL) 2	EN	WS	9 CP
Informatics (Election: at most 9 credits)				
M-WIWI-101628	Emphasis in Informatics	DE/EN	WS+SS	9 CP
M-WIWI-101630	Electives in Informatics	DE/EN	WS+SS	9 CP
Operations Research (Election: at most 9 credits)				
M-WIWI-101473	Mathematical Programming	DE/EN	WS+SS	9 CP
M-WIWI-102832	Operations Research in Supply Chain Management	DE/EN	WS+SS	9 CP
M-WIWI-102805	Service Operations	DE/EN	WS+SS	9 CP
M-WIWI-103289	Stochastic Optimization	DE/EN	WS+SS	9 CP
Natural and Engineering Sciences (Election: at most 9 credits)				
M-WIWI-101404	Extracurricular Module in Engineering		Once	9 CP
M-MACH-101298	Automated Manufacturing Systems	DE	WS+SS	9 CP
M-MACH-107717	Rail System Technology and Rail Vehicle Technology neu	DE	WS+SS	9 CP
M-MACH-101290	BioMEMS	DE	WS+SS	9 CP
M-BGU-105592	Digitalization in Facility Management	DE	WS	9 CP
M-MACH-101296	Energy and Process Technology I		WS	9 CP
M-MACH-101297	Energy and Process Technology II		SS	9 CP
M-ETIT-101164	Generation and Transmission of Renewable Power	DE/EN	WS+SS	9 CP
M-BGU-106453	Facility Management in Hospitals for Industrial Engineering	DE	WS	9 CP
M-MACH-101276	Manufacturing Technology	DE	WS	9 CP
M-MACH-101282	Global Production and Logistics	EN	WS+SS	9 CP
M-BGU-101064	Fundamentals of Transportation	DE	SS	9 CP
M-CIWVT-101120	Principles of Food Process Engineering		WS+SS	9 CP
M-ETIT-101163	High-Voltage Technology	DE	WS+SS	9 CP
M-MACH-101272	Integrated Production Planning	DE	SS	9 CP
M-MACH-105968	Artificial Intelligence in Production	DE	WS+SS	9 CP
M-BGU-101884	Lean Management in Construction	DE	WS	9 CP
M-MACH-105298	Logistics and Supply Chain Management	EN	SS	9 CP
M-MACH-101278	Material Flow in Networked Logistic Systems	DE	WS+SS	9 CP
M-MACH-101291	Microfabrication	DE	WS+SS	9 CP
M-MACH-101292	Microoptics	DE	WS+SS	9 CP
M-MACH-101293	Microsystem Technology	DE	WS+SS	9 CP
M-MACH-106496	Modern Mobility on Rails and Roads	DE	WS+SS	9 CP
M-MACH-101294	Nanotechnology	DE	WS+SS	9 CP
M-WIWI-104837	Natural Hazards and Risk Management	DE	WS+SS	9 CP
M-MACH-101295	Optoelectronics and Optical Communication	DE	WS+SS	9 CP
M-MACH-106590	Production Engineering	DE	WS+SS	9 CP
M-BGU-101888	Project Management in Construction	DE	WS	9 CP
M-ETIT-101157	Control Engineering II		WS+SS	9 CP
M-MACH-105455	Strategic Design of Modern Production Systems	DE	WS+SS	9 CP
M-MACH-101275	Combustion Engines I		WS	9 CP
M-MACH-101303	Combustion Engines II	DE	WS+SS	9 CP
M-BGU-101110	Process Engineering in Construction	DE	WS	9 CP
M-BGU-101065	Transportation Modelling and Traffic Management	DE/EN	WS+SS	9 CP
M-CIWVT-101119	Specialization in Food Process Engineering	DE	WS+SS	9 CP
M-MACH-104888	Advanced Module Logistics	DE	WS+SS	9 CP
M-CIWVT-101122	Water Chemistry and Water Technology II		WS+SS	12 CP
M-CIWVT-101121	Water Chemistry and Water Technology I	DE/EN	WS	9 CP

M-MACH-101286	Machine Tools and Industrial Handling	DE	WS	9 CP
Statistics (Election: at most 9 credits)				
M-WIWI-101637	Analytics and Statistics	DE	WS+SS	9 CP
M-WIWI-101638	Econometrics and Statistics I	DE/EN	WS+SS	9 CP
M-WIWI-101639	Econometrics and Statistics II	DE/EN	WS+SS	9 CP
Law and Sociology (Election: at most 9 credits)				
M-INFO-106754	Public Economic and Technology Law	DE/EN	WS+SS	9 CP
M-INFO-101216	Private Business Law	DE	WS+SS	9 CP
M-INFO-101215	Intellectual Property Law	DE	WS+SS	9 CP
M-GEISTSOZ-101169	Sociology		WS+SS	9 CP

6 Modules

M 6.1 Module: Advanced Machine Learning and Data Science [M-WIWI-105659]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	3

Mandatory			
T-WIWI-111305	Advanced Machine Learning and Data Science	9 CP	Ulrich

Assessment
The assessment is carried out in an alternative form. The grade is evaluated based on the intermediate presentations during the project, the quality of the implementation, the final written thesis, and a final presentation.

Prerequisites
None

Competence Goal
After a successful project, the students can:

- select and apply modern machine learning methods to solve a data science problem;
- organize themselves in a team in a goal-oriented manner and bring an extensive software project in the field of data science and machine learning to success;
- deepen their data science and machine learning skills
- solve a finance problem with the help of data science and machine learning algorithm.

Content
The course is targeted at students with a major in Data Science and/or Machine Learning and/or Quantitative Finance. It offers students the opportunity to develop hands-on knowledge on new developments in the intersection of quantitative financial markets, data science and machine learning. The result of the project should not only be a final thesis, but the implementation of methods or development of an algorithm in machine learning and data science. Typically, problems and data are taken from current research and innovations in the field of quantitative asset and risk management.

Workload
Total effort for 9 credit points: approx. 270 hours are divided into the following parts: Communication:Exchange during the project: 30 h, Final presentation: 10 h; Implementation and thesis: Preparation before development (Problem analysis and solution design): 70 h, Solution implementation: 110 h, Tests and quality assurance: 50 h.

Recommendations
None

Teaching and Learning Methods
Project

M 6.2 Module: Advanced Module Logistics [M-MACH-104888]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	10

Specialization module logistics (Election:)			
T-MACH-112213	Applied material flow simulation	4,5 CP	Baumann
T-MACH-113950	Dimensioning of Material Flow Systems in Production and Logistics	4 CP	Furmans
T-MACH-112113	Dynamic Systems of Technical Logistics	4 CP	Mittwollen
T-MACH-112114	Dynamic Systems of Technical Logistics - Project	2 CP	Mittwollen
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CP	Kramer, Schönung
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CP	Spieckermann
T-MACH-115017	Global Logistics	4 CP	Furmans
T-MACH-113701	Industrial Mobile Robotics Lab	4 CP	Furmans
T-MACH-105187	IT-Fundamentals of Logistics	4 CP	Thomas
T-MACH-105174	Warehousing and Distribution Systems	4 CP	Furmans
T-MACH-105171	Safety Engineering	4 CP	Kany

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of 9 credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Modeled Prerequisites
You have to fulfill one of 2 conditions:

1. The module M-MACH-105298 - Logistics and Supply Chain Management must have been passed.
2. The module M-MACH-106995 - Automation and Material Flow in Logistics must have been passed.

Competence Goal
The student aquires

- well-founded knowledge and method knowledge in the main topics of logistics,
- ability for modeling logistic systems with adequate accuracy by using simple models,
- ability to evaluate logistic systems and to identify cause-and-effects-chains within logistic systems.

Content
The Advanced Module Logistics provides a comprehensive and well-founded basics for the main topics of logistics. The module allows students to focus on various topics within the field of logistics.

Workload
270 hours

Teaching and Learning Methods
Lecture, tutorial.

M 6.3 Module: Advanced Topics in Public Finance [M-WIWI-101511]

Coordinators: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	7

Electives (Election: between 1 and 2 items)			
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CP	Gutekunst, Wigger
T-WIWI-102740	Public Management	4,5 CP	Wigger
Supplementary Courses (Election: between 0 and 1 items)			
T-WIWI-111304	Fundamentals of National and International Group Taxation	4,5 CP	Wigger
T-WIWI-102739	Public Revenues	4,5 CP	Wigger

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Public Management" or "Basics of German Company Tax Law and Tax Planning" is mandatory in the module and must be successfully examined.

Competence Goal
The student

- understands the theory and politics of taxation
- has knowledge in the area of public debt.
- understands efficiency problems of public organizations.
- is able to work on fiscal problems.

Content
As a branch of Economics, Public Finance is concerned with the theory and policy of the public sector and its interrelations with the private sector. It analyzes the economic role of the state from a normative as well as from a positive point of view. The normative view examines efficiency- and equity-oriented motives for government intervention and develops fiscal policy guidelines. The positive view explains the actual behavior of economic agents in public sector affairs.

In the course of the lectures within this module the students achieve knowledge in the areas of public revenues, national and international law of taxation and theory of public sector organizations.

Additional Information
The course T-WIWI-102790 "Specific Aspects in Taxation" will no longer be offered in the module as of winter semester 2018/2019.

Students who successfully passed the exam in „Public Management“ before the introduction of the module “Advanced Topics in Public Finance” in winter term 2014/15 are allowed to take both courses “Public Revenues” and “Specific Aspects in Taxation".

Workload
Total workload for 9 credit points: approx. 270 hours.

Attendance time: approx. 90 hours

Preparation and follow-up: approx. 135 hours

Exam and exam preparation: approx. 45 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations
Basic knowledge in the area of public finance and public management is required.

M 6.4 Module: Advanced Topics in Strategy and Management [M-WIWI-103119]

Coordinators: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	1

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-106188	Workshop Current Topics in Strategy and Management	3 CP	Lindstädt
T-WIWI-106189	Workshop Business Wargaming – Analyzing Strategic Interactions	3 CP	Lindstädt
T-WIWI-106190	Strategy and Management Theory: Developments and "Classics"	3 CP	Lindstädt

Assessment
The control of success takes place in the form of partial examinations (according to §4(2), 1-3 SPO) on the courses of the module, amounting to a total of 9 LP. The performance review is described for each course of this module. The overall grade of the module is formed from the LP-weighted grades of the partial examinations and truncated after the first decimal place.

Prerequisites
None

Competence Goal
After completing the module, students will be able to

- independently analyze strategic issues and derive recommendations in a structured manner using suitable models and reference frameworks of management theory.
- present their position convincingly in structured discussions using a well-thought-out line of argument.
- deal independently with a current, research-oriented question from strategic management.
- draw his/her own conclusions from the less structured information, drawing on his/her interdisciplinary knowledge and selectively developing current research findings.
- apply and discuss theoretical contents of management theory to real-life situations by intensively dealing with a large number of practice-relevant case studies.

Content
The content will focus on three areas. Firstly, strategic issues are discussed and analyzed on the basis of jointly selected case studies. Secondly, the students deal intensively with the topic of business wargaming in a workshop and analyze strategic interactions. Thirdly, topics of strategy and management theory are developed in a written paper.

Additional Information
The module is admission-restricted. Once you have been admitted to a course, you are guaranteed the opportunity to complete the module. The examinations are offered at least every second semester so that the entire module can be completed in two semesters.

Workload
Total effort for 9 credit points: approx. 270 hours. The exact distribution is done according to the credit points of the courses of the module. The workload for courses with 3 credits is approx. 90h.

M 6.5 Module: Analytics and Statistics [M-WIWI-101637]

Coordinators: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Business and Economics
Part of: Compulsory Elective Modules 1 (Statistics)
Compulsory Elective Modules 2 (Statistics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	5

Mandatory			
T-WIWI-103123	Advanced Statistics	4,5 CP	Grothe
Supplementary Courses (Election: between 4,5 and 5 credits)			
T-WIWI-114746	Selected Topics in Statistics and Analytics: Seminal Papers in Theory and Methods	4,5 CP	Grothe
T-WIWI-106341	Machine Learning 2 - Advanced Methods	4,5 CP	Zöllner
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CP	Grothe
T-WIWI-103124	Multivariate Statistical Methods	4,5 CP	Grothe
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CP	Rebennack

Assessment
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
For all students, the course "Advanced Statistics" within this module is compulsory and must be taken.

Exception for Students of Economathematics: Students enrolled in the Economathematics degree program are exempt from the compulsory requirement to take the "Advanced Statistics" course. Instead, they are permitted to choose any two courses offered within this module. As the technical registration of this choice cannot be performed independently in the Campus system, students of Economathematics are kindly requested to contact the Examination Office of the Department of Economics and Management directly for correct module registration and exam enrollment.

Competence Goal
A Student

- Deepens the knowledge of descriptive and inferential statistics.
- Deals with simulation methods.
- Learns basic and advanced methods of statistical analysis of multivariate and high-dimensional data.

Content

- Deriving estimates and testing hypotheses
- Stochastic processes
- Multivariate statistics, copulas
- Dependence measures
- Dimension reduction
- High-dimensional methods
- Prediction

Additional Information
The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this module is approximately 270 hours.

M 6.6 Module: Applied Strategic Decisions [M-WIWI-101453]

Coordinators: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	7

Mandatory			
T-WIWI-102861	Advanced Game Theory	4,5 CP	Ehrhart, Puppe, Reiß
Supplementary Courses (Election: between 4,5 and 5 credits)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CP	Ruckes
T-WIWI-102613	Auction Theory	4,5 CP	Ehrhart
T-WIWI-115061	Experimental Research in Economics and Information Systems	4,5 CP	Weinhardt
T-WIWI-102623	Financial Intermediation	4,5 CP	Ruckes
T-WIWI-105781	Incentives in Organizations	4,5 CP	Nieken
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CP	Weinhardt
T-WIWI-102862	Predictive Mechanism and Market Design	4,5 CP	Reiß

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course "Advanced Game Theory" is obligatory. Exception: The course "Introduction to Game Theory" was completed. Even those who have already successfully proven "Advanced Game Theory" in another master module can take the module. In this case you can choose freely from the rest of the offer. However, this choice can only be made by the examination office of the Department of Economics and Management.

Competence Goal
Students

- can model and analyze complex situations of strategic interaction using advanced game theoretic concepts;
- are provided with essential and advanced game theoretic solution concepts on a rigorous level and can apply them to understand real-life problems;
- learn about the experimental method, ranging from designing an economic experiment to data analysis.

Content
The module provides solid skills in game theory and offers a broad range of game theoretic applications. To improve the understanding of theoretical concepts, it pays attention to empirical evidence as well.

Additional Information
The course *Predictive Mechanism and Market Design* is not offered each year.

Workload
The total workload for this module is approximately 270 hours. The exact distribution is made according to the credit points of the courses of the module.

Recommendations
Basic knowledge in game theory is assumed.

M 6.7 Module: Artificial Intelligence in Production [M-MACH-105968]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	1

Mandatory			
T-MACH-112115	Artificial Intelligence in Production	5 CP	Fleischer
T-MACH-112121	Seminar Application of Artificial Intelligence in Production	4 CP	Fleischer

Assessment
T-MACH-112115 - Written Exam (90 min)
T-MACH-112121 - Alternative test achievement (graded)

Prerequisites
none

Competence Goal
The Students understand

- the relevance for the application of artificial intelligence in production and know the main drivers and challenges.
- the CRISP-DM process for implementing AI projects in production.
- the most important methods within the CRISP-DM phases and can theoretically select and practically apply them holistically based on practical issues.

Content
The module AI in Production is designed to teach students the practical, holistic integration of machine learning methods in production. The course is oriented towards the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content-related aspects (methods) within the individual phases. In addition to teaching the practical aspects of integrating the most important machine learning methods, the focus is primarily on the necessary steps for data generation and data preparation as well as the implementation and validation of the methods in an industrial environment. The focus of the module is on the practical teaching of the contents, based on production engineering issues. The necessary theoretical basics are taught in the course "Lecture AI in Production". In the course "Project internship Application of AI in Production", practice-relevant architectures of machine learning are used to solve current practical problems in the production environment. The implementation here is also oriented to the phases of the CRISP-DM.

Module Grade Calculation
The overall grade for the module is calculated from the LP-weighted grades of the partial examinations and cut off after the first decimal place.

Workload
Artificial Intelligence in Production
MACH:
regular attendance: 31,5 hours
self-study: 88,5 hours
WING:
regular attendance: 31,5 hours
self-study: 118,5 hours

Seminar Application of Artificial Intelligence in Production
regular attendance: 21 hours
self-study: 99 hours

Teaching and Learning Methods
Lecture, Seminar

M 6.8 Module: Automated Manufacturing Systems [M-MACH-101298]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	3

Mandatory			
T-MACH-114049	Basics of Production Automation	5 CP	Fleischer
T-MACH-113999	Seminar Development of Automated Production Systems	4 CP	Fleischer

Assessment
see individual courses

Prerequisites
none

Competence Goal
The students...

- are able to name and describe the automation tasks in production plants and the components required for implementation.
- can select components from the areas of ‘handling technique, ‘industrial robots’, ‘sensor technology’ and ‘control & drive technology’ for a given application.
- are able to compare different concepts of robotics and select the appropriate one for a given application.
- can assess the automation of production plants implemented on the basis of the examples given and apply them to new problems.
- know the process of planning automated production plants.
- can apply the theoretical knowledge they have acquired in practice.
- are able to develop a solution concept for an automation task, project it and implement the main features of it.

Content
The lecture provides an overview of the structure and functioning of automated production systems. The functioning and application of fundamental elements for the realisation of automated production systems are taught. These include:

- Drive and control technology
- Handling technology for handling workpieces and tools
- Industrial robots
- Quality assurance in automated production plants
- Structures and design of manufacturing and assembly systems
- Introduction to project planning of automated production plants

An interdisciplinary consideration of these sub-areas reveals interfaces to Industry 4.0 approaches. The theoretical foundations are supplemented by practical application examples and live demonstrations in the Karlsruhe Research Factory. Within exercises, the contents of the lecture are deepened and applied to specific problems and tasks.

The seminar Application of Production Automation focuses on the practical implementation of automation tasks. In small groups, solutions to automation problems are developed and basic functionalities are implemented in the Karlsruhe Research Factory. The results of this work are presented in a final presentation.

Workload
The work load is about 270 hours, corresponding to 9 credit points.

Teaching and Learning Methods
Lectures, exercise, excursion

M 6.9 Module: BioMEMS [M-MACH-101290]

Coordinators: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	3

Mandatory			
T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	3 CP	Guber
BioMEMS (Election: at least 6 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CP	Last
T-MACH-102165	Selected Topics on Optics and Microoptics for Mechanical Engineers	3 CP	Mappes
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CP	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CP	Guber
T-MACH-101910	Microactuators	3 CP	Kohl
T-MACH-102176	Current Topics on BioMEMS	4 CP	Guber
T-MACH-111807	Introduction to Bionics	3 CP	Hölscher
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	3 CP	Last

Assessment
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- has basic as well as extensive knowledge about different fields of applications of BioMEMS
- understands continuative aspects of the related subjects optics and microoptics, micro actuators, replications techniques and bionics

Content
Operations through small orifices, a pill which will take pictures on its way through your body or lab results right at the point of care - the need for easier and faster ways to help people is an important factor in research. The module BioMEMS (Bio(medical)-Micro-Electro-Mechanical-Systems) describes the application of microtechnology in the field of Life-Science, medical applications and Biotechnology and will teach you the necessary skills to understand and develop biological and medical devices.

The BioMEMS lectures will cover the fields of minimal invasive surgery, lab-on-chip systems, NOTES-Technology (Natural Orifice Transluminal Endoscopic Surgery), as well as endoscopic surgery and stent technology.

Additionally to the BioMEMS lectures you can specialize in various related fields like fabrication, actuation, optics and bionics. The course Replication processes will teach you some cost efficient and fast ways to produce parts for medical or biological devices. In the course Microactuation it is discussed how to receive movements in micrometer scale in a microsystem, this could be e.g. to drive micro pumps or micro valves. The necessary tools for optical measurement and methods of analysis to gain high resolution pictures are also part of this module. To deepen your knowledge and to get a hands-on experience this module contains a one week lab course. In the lecture bionics you can see how biological effects can be transferred into technical products.

Workload
270 hours

Teaching and Learning Methods
Lectures

M 6.10 Module: Business & Service Engineering [M-WIWI-101410]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	9

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-113160	Digital Democracy	4,5 CP	Fegert
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CP	Satzger
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CP	Satzger
T-WIWI-102847	Recommender Systems	4,5 CP	Geyer-Schulz
T-WIWI-113724	Special Topics in Information Systems	4,5 CP	Weinhardt

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student should

- learn to develop and implement new markets with regards to the technological progresses of information and communication technology and the increasing economic networking
- learn to restructure and develop new business processes in markets under those conditions
- understand service competition as a sustainable competitive strategy and understand the effects of service competition on the design of markets, products, processes and services.
- improve his statistics skills and apply them to appropriate cases
- learn to elaborate solutions in a team

Content
This module addresses the challenges of creating new kinds of products, processes, services, and markets from a service perspective in the context of new developed information and communication technologies and the globalization process. The module describes service competition as a business strategy in the long term that leads to the design of business processes, business models, forms of organization, markets, and competition. This will be shown by actual examples from personalized services, recommender services and social networks.

Additional Information
All practical Seminars offered at the IM can be chosen for *Special Topics in Information Systems*. Please update yourself on www.iism.kit.edu/im/lehre .

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
The total workload for this module is approx. 270 hours (9 credits). The distribution is based on the credit points of the courses in the module. The workload for courses with 4.5 credits is approx. 135 hours, for courses with 5 credits approx. 150 hours.

The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module for an average performance.

Recommendations
None

M 6.11 Module: Collective Decision Making [M-WIWI-101504]

Coordinators: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	4

Compulsory Elective Courses (Election:)			
T-WIWI-102740	Public Management	4,5 CP	Wigger
T-WIWI-102859	Social Choice Theory	4,5 CP	Puppe

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- are able to model and assess problems in public economics and to analyze them with respect to positive and normative aspects,
- understand individual incentives and social outcomes of different institutional designs,
- are familiar with the functioning and design of democratic elections and can analyze them with respect to their individual incentives.

Content
The focus of the module is on mechanisms for public decision making including voting and the aggregation of preferences and judgements.

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

M 6.12 Module: Combustion Engines I [M-MACH-101275]

Coordinators: Prof. Dr. Thomas Koch
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Level	Version
9 CP	graded	Each winter term	1 term	4	5

Wahlpflicht (Election: between 1 and 2 items)			
T-MACH-111550	CO2-Neutral Combustion Engines and their Fuels I	5 CP	Koch
T-MACH-111585	Hydrogen and reFuels - Energy Conversion in Combustion Engines	4 CP	Kubach

Assessment
The module examination contains of two oral examinations. The module score results from the two scores weighted according to the ECTS.

Prerequisites
None

Competence Goal
The student can name and explain the working princile of combustion engines. He is able to analyse and evaluate the combustion process. He is able to evaluate influences of gas exchange, mixture formation, fuels and exhaust gas aftertreatment on the combustion performance. He can solve basic research problems in the field of engine development.

The student can name all important influences on the combustion process. He can analyse and evaluate the engine process considering efficiency, emissions and potential.

Content
Working Principle og ICE

Characteristic Parameters

Characteristic parameters

Engine parts

Crank drive

Fuels

Gasolien engine operation modes

Diesel engine operation modes

Emissions

Fundamentals of ICE combustion

Thermodynamics of ICE

Flow field

Wall heat losses

Combsution in Gasoline and Diesel engines

Heat release calculation

Waste heat recovery

CO2-free engine technology

Workload
regular attendance: 62 hours
self-study: 208 hours

M 6.13 Module: Combustion Engines II [M-MACH-101303]

Coordinators: Dr.-Ing. Heiko Kubach
Julia Reichel

Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	4

Mandatory			
T-MACH-111560	CO2-Neutral Combustion Engines and their Fuels II	5 CP	Koch
Verbrennungsmotoren II (Election: at least 4 credits)			
T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	4 CP	Gohl
T-MACH-105649	Boosting of Combustion Engines	4 CP	Kech, Lachenmaier
T-MACH-105184	Fuels and Lubricants for Combustion Engines	4 CP	Kehrwald
T-MACH-110817	Development of Hybrid Drivetrains	4 CP	Koch
T-MACH-110816	Large Diesel and Gas Engines for Ship Propulsions	4 CP	Weisser
T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment	4 CP	Deutschmann, Grunwaldt, Kubach, Lox
T-MACH-105167	Analysis Tools for Combustion Diagnostics	4 CP	Pfeil
T-MACH-105169	Engine Measurement Techniques	4 CP	Bernhardt
T-MACH-111578	Sustainable Vehicle Drivetrains	4 CP	Toedter
T-MACH-105985	Ignition Systems	4 CP	Toedter

Assessment
The assessment consists of an oral exam (60 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Prerequisites
None

Competence Goal
See courses.

Content
Compulsory:

Supercharging and air management

Engine mapsEmissions and Exhaust gas aftertreatment

Transient engine operationECU application

Electrification and alternative powertrains

Elective:

Fuels and lubricants for ICE

Fundamentals of catalytic EGA

Analysis tools for combustion diagnostics

Engine measurement techniques

Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines

Workload
regular attendance: 62 h

self-study: 208 h

Teaching and Learning Methods
Lecture, Tutorial

M 6.14 Module: Consumer Research [M-WIWI-105714]

Coordinators: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	6

Compulsory Elective Courses (Election:)			
T-WIWI-113471	Bayesian Statistics for Analyzing Data	4,5 CP	Scheibehenne
T-WIWI-113095	Behavioral Lab Exercise	4,5 CP	Nieken, Scheibehenne
T-WIWI-114186	Collective Intelligence in Human Judgment and Decision Making	4,5 CP	Scheibehenne
T-WIWI-114185	Computational Modelling of Judgments, Decisions and Cognition	4,5 CP	Scheibehenne
T-WIWI-111100	Current Directions in Consumer Psychology	4,5 CP	Scheibehenne
T-WIWI-114174	Economic Decision Making	4,5 CP	Scheibehenne
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CP	Weinhardt
T-WIWI-107720	Market Research	4,5 CP	Klarmann
T-WIWI-114750	Perceiving, Understanding and Communicating Risk and Uncertainty	4,5 CP	Gradwohl, Scheibehenne

Assessment
The assessment is based on partial exams within the classes offered in this module. Please check the descriptions of the classes for details.

The overall grade of the module is the arithmetic mean of the grades for each course weighted by the number of credits and truncated after the first decimal.

Prerequisites
Willingness to actively engage with the topic.

Competence Goal

- Understand human judgment and decision making in an economic context
- Learn how to plan, program, conduct, statistically analyze, visualize, model, and report behavioral experiments
- Critically evaluate scientific findings in the aftermath of the replication crisis

Content
This module provides students with in-depth knowledge about consumer research at the intersection between Marketing, Psychology, and Cognitive Science. The module consists of classes that look into how individuals and groups make judgments and decisions and what factors influences their behavior (e.g. the lecture on judgment and decision making). Because most findings in this area of research rely on behavioral experiments, this module also focuses on methodological skills. This includes classes on how to plan and design behavioral experiments, conduct and report meaningful statistical analyses, and develop computational cognitive models. The module also includes classes about reproducibility and transparency in the behavioral sciences. The module is a pre-requisite for writing a Master thesis at the KIT Cognition and Consumer Behavior lab.

Workload
The total workload for this module is approximately 270 hours.

Recommendations
Interest in behavioral research.

M 6.15 Module: Control Engineering II [M-ETIT-101157]

Coordinators: Prof. Dr.-Ing. Sören Hohmann
Dr.-Ing. Mathias Kluwe

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Level	Version
9 CP	graded	Each term	2 terms	4	3

Mandatory			
T-ETIT-100666	Control of Linear Multivariable Systems	6 CP	Kluwe
T-ETIT-100980	Nonlinear Control Systems	3 CP	Kluwe

Assessment
The assessment is carried out as partial written exams of the single courses of this module (T-ETIT-100980 and T-ETIT-100666).

Prerequisites
none

Module Grade Calculation
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Recommendations
For this module a basic knowledge in system theory and control engineering is assumed. These subjects can be found in the course *System Dynamics and Control Engineering* (M-ETIT-102181) which is recommended to have been attended beforehand.

M 6.16 Module: Cross-Functional Management Accounting [M-WIWI-101510]

Coordinators: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	14

Mandatory			
T-WIWI-102885	Advanced Management Accounting	4,5 CP	Wouters
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CP	Mädche
T-WIWI-105781	Incentives in Organizations	4,5 CP	Nieken
T-WIWI-107720	Market Research	4,5 CP	Klarmann
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	3 CP	Kupfer
T-WIWI-102621	Valuation	4,5 CP	Ruckes
T-WIWI-108651	Extraordinary Additional Course in the Module Cross-Functional Management Accounting	4,5 CP	Wouters

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course "Advanced Management Accounting" is compulsory.

The additional courses can only be chosen after the compulsory course has been completed successfully.

Competence Goal
Students will be able to apply advanced management accounting methods to managerial decision-making problems in marketing, finance, organization and strategy.

Content
The module includes a course on several advanced management accounting methods that can be used for various decisions in operations and innovation management. By selecting another course, each student looks in more detail at one interface between management accounting a particular field in management, namely marketing, finance, or organization and strategy.

Additional Information
The module "Cross-functional Management Accounting" always includes the compulsory course “Advanced Management Accounting.” Students look at the interface between management accounting and another field in management. Students build the module by adding a course from the specified list. Students can also suggest another suitable course for this module for evaluation by the coordinator.

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations
None

M 6.17 Module: Data Science for Finance [M-WIWI-105032]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	1 term	English	4	1

Mandatory			
T-WIWI-102878	Computational Risk and Asset Management	4,5 CP	Ulrich
T-WIWI-110213	Python for Computational Risk and Asset Management	4,5 CP	Ulrich

Assessment
The module examination takes the form of an alternative exam assessment.
The alternative exam assessment consists of a Python-based "Takehome Exam". At the end of the third week of January, the student is given a "Takehome Exam" which he processes and sends back independently within 4 hours using Python. Precise instructions will be announced at the beginning of the course. The alternative exam assessment can be repeated a maximum of once. A timely repeat option takes place at the end of the third week in March of the same year. More detailed instructions will be given at the beginning of the course.

Competence Goal
The aim of the module is to use data science, machine learning and financial market theories to generate better investment, risk and asset management decisions. The student gets to know the characteristics of different asset classes in an application-oriented manner using real financial market data. We use Python and web scraping techniques to extract, visualize and examine patterns of publicly available financial market data. Interesting and non-public financial market data such as (option and futures data on shares and interest) are provided. Financial market theories are also discussed to improve data analysis through theoretical knowledge. Students get to know stock, interest rate, futures and options markets through the "data science glasses". Through "finance theory glasses" students understand how patterns can be communicated and interpreted using finance theory. Python is the link through which we bring data science and modern financial market modeling together.

Content
The course covers several topics, among them:

- Pattern detection in price and return data in equity, interest rate, futures and option markets
- Quantitative Portfolio Strategies
- Modeling Return Densities using tools from financial econometrics, data science and machine learning
- Valuation of equity, fixed-income, futures and options in a coherent framework to possibly exploit arbitrage opportunities
- Neural networks and Natural Language Processing

Workload
The total workload for this module is 270 hours (9 credit points).The total number of hours resulting from income from studying online video, answering quizzes, studying Ipython notebooks, active and interactive "Python Data Sessions" and reading literature you have heard.

Recommendations
Basic knowledge of capital markt theory.

Teaching and Learning Methods
Lectures and Exercises

M 6.18 Module: Data Science: Data-Driven Information Systems [M-WIWI-103117]

Coordinators: Prof. Dr. Alexander Mädche
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	11

Compulsory Elective Courses (Election:)			
T-WIWI-114749	(Gen)AI and Virtual Reality for Business	4,5 CP	Pfeiffer
T-WIWI-114210	(Gen)AI-based Automation in Organizations	4,5 CP	Mädche
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CP	Satzger
T-WIWI-114209	Artificial Intelligence in Service Systems II: Generative AI Applications & Adoption	4,5 CP	Satzger
T-WIWI-113471	Bayesian Statistics for Analyzing Data	4,5 CP	Scheibehenne
T-WIWI-106187	Business Data Strategy	4,5 CP	Weinhardt
T-WIWI-105777	Business Intelligence Systems	4,5 CP	Mädche
T-WIWI-114089	Data Science for Business	4,5 CP	Pfeiffer
T-WIWI-113160	Digital Democracy	4,5 CP	Fegert
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CP	Mädche
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CP	Hoffmann, Pfeiffer
T-WIWI-106207	Practical Seminar: Data-Driven Information Systems	4,5 CP	Satzger, Weinhardt

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

Prerequisites
None.

Competence Goal
The student

- understands the strategic role of integrating, transforming, and analyzing large and complex enterprise data in modern business information systems and is capable of comparing and assessing strategic alternatives
- has the core skills to design, model, and control complex, inter-organisational analytical, processes, including various business functions as well as customers and markets
- understands the usage of performance indicators for a variety of controlling and management issues and is able to define models for generating the relevant performance indicators under considerations of data availability
- distinguishes different analytics methods and concepts and learn when to apply to better understand and anticipate business relationships and developments of industrial and in particular service companies to derive fact- and data- founded managerial actions and strategies.
- knows how to capture uncertainty in the data and how to appropriately consider and visualize uncertainty in decision support or business intelligence systems and analytical processes as a whole.

Content

The amount of business-related data availabe in modern enterprise information systems grows exponentially, and the various data sources are more and more integrated, transformed, and analyzed jointly to gain valuable business insights, pro-actively control and manage business processes, to leverage planning and decision making, and to provide appropriate, potentially novel services to customers based on relationships and developments observed in the data.

Also, data sources are more and more connected and single business unit that used to operate on separate data pools are now becoming highly integrated, providing tremendeous business opportunities but also challenges regarding how the data should be represented, integrated, preprocessed, transformed, and finally used in analytics planning and decision processes.

The courses of this module equip the students with core skills to understands the strategic role of integrating, transforming, and analyzing large and complex enterprise data in modern business information systems. Students will be capable to designing, comparing, and evaluating strategic alternatives. Also, students will learn how to design, model, and control complex analytical processes, including various business functions of industrial and service companies including customers and markets. Students learn core skills to understand fundamental strategies for integrating analytic models and operative controlling mechanisms while ensuring the technical feasibility of the resulting information systems..

Furthermore, the student can distinguish different methods and concepts in the realm of data science and learns when to apply. She/he will know the means of characterizing and analyzing hetergeneous, high-dimensional data available data in data warehouses and external data sources to gain additional insights valuable for enterprise planning and decision making. Also, the students know how to capture uncertainty in the data and how to appropriately consider and visualize uncertainty in business information and business intelligence systems.

The module offers the opportunity to apply and deepen this knowledge in a seminar and hands-on tutorials that are offered with all lectures.

Texteintrag

Workload

Attendance time: 90 h

Self-study: approx. 100 h

Exam preparation: approx. 80 h

Total workload: approx. 270 h

Recommendations

For successful participation in the module, basic knowledge of business informatics (in particular of tasks, systems and processes) is very helpful. In this context, prior attendance of the course Grundzüge der Wirtschaftsinformatik [2540450] is recommended. In addition, knowledge of operations research as well as descriptive and inferential statistics is advantageous in order to be able to follow the quantitative content of the module.

M 6.19 Module: Data Science: Evidence-based Marketing [M-WIWI-101647]

Coordinators: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	5

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-103139	Marketing Analytics	4,5 CP	Klarmann
T-WIWI-107720	Market Research	4,5 CP	Klarmann

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Keine.

Competence Goal
Students

- possess advanced knowledge of relevant market research contents
- know many different qualitative and quantitative methods for measuring customer behavior, preparation of strategic decisions, making causal deductions, usage of social media data and sales forecasting
- possess the statistical skills required for working in marketing research

Content
This module provides in-depth knowledge of relevant quantitative and qualitative methods used in market research.Students can attend the following courses:

- The course “Market Research” provides contents of practical relevance for measuring customer attitudes and customer behavior. The participants learn using statistical methods for strategic decision-making in marketing. Students who are interested in writing their master thesis at the Marketing & Sales Research Group are required to take this course.
- The course "Marketing Analytics“ is based on "Market Research“ and teaches advanced statistical methods for analyzing relevant marketing and market research questions. Please note that a successful completion of "Market Research" is a prerequisite for the completion of "Marketing Analytics".

Workload
The total workload for this module is approximately 270 hours.

Recommendations
None

M 6.20 Module: Data Science: Intelligent, Adaptive, and Learning Information Services [M-WIWI-105661]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	3

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-109921	Advanced Machine Learning	4,5 CP	Geyer-Schulz, Nazemi
T-WIWI-114209	Artificial Intelligence in Service Systems II: Generative AI Applications & Adoption	4,5 CP	Satzger
T-WIWI-102762	Business Dynamics	4,5 CP	Geyer-Schulz, Glenn
T-WIWI-111267	Intelligent Agent Architectures	4,5 CP	Geyer-Schulz
T-WIWI-110915	Intelligent Agents and Decision Theory	4,5 CP	Geyer-Schulz
T-WIWI-102847	Recommender Systems	4,5 CP	Geyer-Schulz

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- models, analyzes and optimizes the structure and dynamics of complex economic changes.
- designs and develops intelligent, adaptive or learning agents as essential elements of information services.
- knows the essential learning methods for this and can apply them (also on modern architectures) in a targeted manner.
- develops and implements personalized services, especially in the area of recommender systems.
- develops solutions in teams.

Content
The Intelligent Architectures course addresses how to design modern agent-based systems. The focus here is on software architecture and design patterns relevant to learning systems. In addition, important machine learning methods that complete the intelligent system are discussed. Examples of systems presented include key-map architectures and genetic methods.
The impact of management decisions in complex systems is considered in Business Dynamics. Understanding, modeling, and simulating complex systems enables analysis, purposeful design, and optimization of markets, business processes, regulations, and entire enterprises.
Special problems of intelligent systems are covered in Personalization and Services and Recommendersystems. The content includes approaches and methods to design user-oriented services. The measurement and monitoring of service systems is discussed, the design of personalized offers is discussed and the generation of recommendations based on collected data from products and customers is shown. The importance of user modeling and recognition is addressed, as well as data security and privacy.

Additional Information
The module replaces from summer semester 2021 M-WIWI-101470 "Data Science: Advanced CRM".

Workload
The total workload for this module is approx. 270 hours (9 credits). The distribution is based on the credit points of the courses in the module. The workload for courses with 4.5 credits is approx. 135 hours.

The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module for an average performance.

Recommendations
None

M 6.21 Module: Designing Interactive Information Systems [M-WIWI-104080]

Coordinators: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	6

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-113465	Designing Interactive Systems: Human-AI Interaction	4,5 CP	Mädche
T-WIWI-113460	Engineering Interactive Systems: AI & Wearables	4,5 CP	Mädche
Supplementary Courses (Election: at most 1 item)			
T-WIWI-114749	(Gen)AI and Virtual Reality for Business	4,5 CP	Pfeiffer
T-WIWI-114210	(Gen)AI-based Automation in Organizations	4,5 CP	Mädche
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CP	Weinhardt
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CP	Mädche

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

Prerequisites
In this module, the courses "Designing Interactive Systems" or "Enineering Interactive Systems" must be compulsorily taken.

Competence Goal
The student

- has a comprehensive understanding of conceptual and theoretical foundations of interactive systems
- knows design processes for interactive systems
- is aware of the most important techniques and tools for designing interactive systems and knows how to apply them to real-world problems
- is able to apply design principles for the design of most important classes of interactive systems,
- creates new solutions of interactive systems teams

Content
Advanced information and communication technologies make interactive systems ever-present in the users' private and business life. They are an integral part of smartphones, devices in the smart home, mobility vehicles as well as at the working place in production and administration (e.g. in the form of dashboards).

With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. This module focuses on design processes and principles for interactive systems. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for the design of interactive systems. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

Each lecture in the module is accompanied with a capstone project that is carried out with an industry partner.

Additional Information
See http://issd.iism.kit.edu/305.php for further information.

Workload
The total workload for this module is approximately 270 hours.

M 6.22 Module: Digital Marketing [M-WIWI-106258]

Coordinators: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	2

Mandatory			
T-WIWI-112693	Digital Marketing	4,5 CP	Kupfer
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CP	Klarmann, Konhäuser
T-WIWI-114174	Economic Decision Making	4,5 CP	Scheibehenne
T-WIWI-114893	International Entrepreneurship and Brand Development	6 CP	Kupfer, Terzidis
T-WIWI-107720	Market Research	4,5 CP	Klarmann
T-WIWI-112711	Media Management	4,5 CP	Kupfer
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	3 CP	Kupfer

Assessment
The assessment is carried out as partial exams of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course, weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- have an advanced knowledge about central marketing contents
- have a fundamental understanding of the marketing instruments
- know current fundamental principles and latest trends in the field of digital marketing
- know and understand several strategic concepts and how to implement them
- are able to implement their extensive marketing knowledge in a practical context
- are able to critically discuss and question theoretical concepts and current practices in marketing
- have theoretical knowledge that is fundamental for writing a master thesis in the field of marketing
- have gained insight into scientific research that prepares them to independently write a master's thesis
- have the theoretical knowledge and skills necessary to work in or collaborate with the marketing department of a company

Content

The "Digital Marketing" module explores advanced marketing strategies within the context of digital transformation. Students develop a deep understanding of digital consumer behavior, the digital environment, and digital marketing strategies:

- **Principles of Digital Marketing:** In this mandatory course of the module, students learn about practices and strategies like search engine optimization, word-of-mouth, and influencer marketing.
- **Performance Analytics and Practical Applications:** Practical applications of SEO, SEA, and Content Management Systems. Students learn to monitor performance using Key Performance Indicators (KPIs), dashboards, and Return on Investment (RoI) calculations and apply their knowledge to real-world cases.
- **Contextualization:** Via course selections, students can learn about specific requirements for B2B digital strategies, media industries, and retailing.
- **Decision Psychology:** Students can decide to deepen their knowledge on consumer psychology, including heuristics, nudging, and risk perception.
- **Market Research & Methods:** Students can learn about advanced empirical techniques to interpret customer attitudes and prepare for scientific research.

By integrating these multidisciplinary perspectives, the module enables students to implement sophisticated marketing instruments and critically evaluate current practices in digital business environments.

Workload

Total effort for 9 credit points: approx. 270 hours.
The exact distribution is done according to the credit points of the courses of the module.

M 6.23 Module: Digital Service Systems in Industry [M-WIWI-102808]

Coordinators: Prof. Dr. Wolf Fichtner
Prof. Dr. Stefan Nickel

Organisation: KIT Department of Business and Economics

Part of: Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	9

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CP	Satzger
T-WIWI-107043	Liberalised Power Markets	5,5 CP	Fichtner
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CP	Nickel
T-WIWI-106563	Practical Seminar Digital Service Systems	4,5 CP	Satzger
T-WIWI-114109	Service Operations and Cyber Security	4,5 CP	Mohr

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal

Prerequisites
This module can only be assigned as an elective module.

Competence Goal
Students

- understand the basics of the management of digital services applied on an industrial context
- gain an industry-specific insight into the importance and most relevant characteristics of information systems as key components of the digitalization of business processes, products and services
- are able to transfer and apply the models and methods introduced on practical scenarios and simulations.
- understand the control and optimization methods in the sector of service management and are able to apply them properly.

Content
This module aims at deepening the fundamental knowledge of digital service management in the industrial context. Various mechanisms and methods to shape and control connected digital service systems in different industries are discussed and demonstrated with real life application cases.

Additional Information
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
Total workload for 9 credit points: approx. 270 hours. The allocation is based on the credit points of the courses in the module.

Recommendations
None

M 6.24 Module: Digitalization in Facility Management [M-BGU-105592]

Coordinators: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	2 terms	German	4	2

Election Notes
Module components in extent of min. 3 CP has to be selected.

Mandatory			
T-BGU-108941	Digitalization in Facility and Real Estate Management	6 CP	Lennerts
Compulsory Elective (Election: at most 2 items as well as at least 3 credits)			
T-BGU-111211	Energetic Refurbishment	1,5 CP	Lennerts, Schneider
T-BGU-111212	Facility and Real Estate Management II	1,5 CP	Lennerts
T-BGU-111921	Turnkey Construction	3 CP	Haghsheno

Assessment
- module component T-BGU-108941 with examination of another type according to § 4 Par. 2 No. 3

according to selected course:

- module component T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-111212 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-111921 with written examination according to § 4 Par. 2 No. 1

details about the learning controls, see module components

Prerequisites
none

Competence Goal
Students are able to name and classify fundamental knowledge of the Internet of Things (IoT), sensor networks, and building automation. They can critically analyze and evaluate digital technologies (including cloud storage, data protection, artificial intelligence, image processing, and object detection) in the context of facility and real estate management. Furthermore, they are able to recognize and quantify the optimization potential of automation and digitalization solutions in buildings, as well as designing and practically implementing sensor networks of a certain complexity.

They can describe and explain the theoretical foundations of sensor networks, building automation, and industrial building production. In addition, they are familiar with the basics of building physics, energy-related improvements to the building envelope and building services engineering, as well as the calculation of energy requirements and energy performance assessment according to the German Building Energy Act (GEG). They master outsourcing, procurement regulations, data acquisition, transition management, CAFM, and performance metrics for SLAs and KPIs in facility management.

Students can convey and apply execution planning for shell and finishing, construction engineering fundamentals, construction work, technical building equipment, and processes in turnkey construction (planning, permitting, acceptance, warranty).

Content

- Digitalisation in Facility and Real Estate Management: fundamentals and key concepts of digitalisation in facility and real estate management; practical applications of the Internet of Things (IoT) in building automation; design, setup, and integration of more complex sensor networks into existing FM processes; integration of sensor signals into FM processes; data transmission, cloud-based storage, and requirements for data protection and data security; introduction to methods of artificial intelligence; preparation of a semester-long project with colloquium.
- Facility and Real Estate Management II: outsourcing and procurement regulations in facility management, data acquisition, transition, CAFM in facility management, presentation of metrics for SLAs and KPIs and their digitalisation.
- Energy Refurbishment: fundamentals of building physics, energy-related improvement of the building envelope, improvement of building services engineering and economic efficiency, energy sources and local energy conversion (e.g., photovoltaics, geothermal energy, heat pumps, etc.), calculation of the energy demands of buildings, energy performance assessment of buildings according to GEG.
- Turnkey Construction: execution planning for shell and finishing, construction engineering fundamentals, construction execution and technical building equipment; various processes in turnkey construction (planning, permitting, acceptance, warranty).

Module Grade Calculation
grade of the module is CP weighted average of grades of the partial exams

Additional Information
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Digitalization in Facility and Real Estate Management lecture/exercise: 60 h

according to selected courses or examinations respectively:

- Energetic Refurbishment II lecture: 15 h
- Facility and Real Estate Management II lecture: 15 h
- Turnkey Construction lecture/exercise: 30 h

independent study:

- preparation and follow-up lecture/exercises Digitalization in Facility and Real Estate Management: 40 h
- preparation of project Digitalization in Facility and Real Estate Management, incl. report and presentation (partial examination, compulsory): 80 h

according to selected courses or examinations respectively:

- preparation and follow-up lectures Energetic Refurbishment II: 15 h
- examination preparation Energetic Refurbishment II (selectable partial examination): 15 h
- preparation and follow-up lectures Facility and Real Estate Management II: 15 h
- examination preparation Facility and Real Estate Management II (selectable partial examination): 15 h
- preparation and follow-up lecture/exercises Turnkey Construction: 30 h
- examination preparation Turnkey Construction (selectable partial examination): 30 h

total: 270 h

Recommendations
none

M 6.25 Module: Econometrics and Statistics I [M-WIWI-101638]

Coordinators: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 1 (Statistics)
Compulsory Elective Modules 2 (Economics)
Compulsory Elective Modules 2 (Statistics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	6

Mandatory			
T-WIWI-111388	Applied Econometrics	4,5 CP	Krüger
Supplementary Courses (Election: between 4,5 and 5 credits)			
T-WIWI-103064	Financial Econometrics	4,5 CP	Schienle
T-WIWI-103126	Non- and Semiparametrics	4,5 CP	Schienle
T-WIWI-103127	Panel Data	4,5 CP	Heller
T-WIWI-110868	Predictive Modeling	4,5 CP	Krüger
T-WIWI-111387	Probabilistic Time Series Forecasting Challenge	4,5 CP	Krüger
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CP	Heller
T-WIWI-110939	Financial Econometrics II	4,5 CP	Schienle

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1-3 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course 'Applied Econometrics' [2520020] is compulsory and must be completed if it has not already been successfully completed in one of the modules 'Economics of Innovation and Growth' or 'Economics in a Connected World'. If the course 'Applied Econometrics' has already been completed in another module, the module cannot be chosen by the student. In this case, please contact the Examinations Office of the WIWI-Department, which will adjust the elective requirements in the module.

Competence Goal
The student shows an in depth understanding of advanced Econometric techniques suitable for different types of data.He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

Content
The courses of this module offer students a broad range of advanced Econometric techniques for state-of-the art data analysis.

Workload
The total workload for this module is approximately 270 hours.

M 6.26 Module: Econometrics and Statistics II [M-WIWI-101639]

Coordinators: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Business and Economics
Part of: Compulsory Elective Modules 1 (Statistics)
Compulsory Elective Modules 2 (Statistics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	7

Election Notes
Special note on elective regulations: The partial achievement T-WIWI-111388 "Applied Econometrics" is generally a mandatory requirement for this module.

Exception: If this partial achievement has already been successfully completed as part of the module M-WIWI-101638 "Econometrics and Statistics I", the requirement for this module is waived. In this case, any other partial achievements from the module's offering may be selected instead to reach the required number of credits (LP).

Important note on registration: As the automated verification in the Campus System cannot account for this specific exception, students are unable to register for alternative partial achievements independently. In this case, please contact the **Examination Office of the KIT Department of Economics and Management** directly for manual registration.

Mandatory			
T-WIWI-111388	Applied Econometrics	4,5 CP	Krüger
Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-103064	Financial Econometrics	4,5 CP	Schienle
T-WIWI-110939	Financial Econometrics II	4,5 CP	Schienle
T-WIWI-103124	Multivariate Statistical Methods	4,5 CP	Grothe
T-WIWI-103126	Non- and Semiparametrics	4,5 CP	Schienle
T-WIWI-103127	Panel Data	4,5 CP	Heller
T-WIWI-103128	Portfolio and Asset Liability Management	4,5 CP	Safarian
T-WIWI-110868	Predictive Modeling	4,5 CP	Krüger
T-WIWI-111387	Probabilistic Time Series Forecasting Challenge	4,5 CP	Krüger
T-WIWI-103123	Advanced Statistics	4,5 CP	Grothe
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CP	Heller
T-WIWI-103129	Stochastic Calculus and Finance	4,5 CP	Safarian

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1-3 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The partial achievement *T-WIWI-111388 "Applied Econometrics"* is generally a mandatory requirement for this module.

Exception: If this partial achievement has already been successfully completed as part of the module *M-WIWI-101638 "Econometrics and Statistics I"*, the requirement for this module is waived. In this case, any other partial achievements from the module's offering may be selected instead to reach the required number of credits (LP).

Important note on registration: As the automated verification in the Campus System cannot account for this specific exception, students are unable to register for alternative partial achievements independently. In this case, please contact the **Examination Office of the KIT Department of Economics and Management** directly for manual registration.

Competence Goal
The student shows an in depth understanding of advanced Econometric techniques suitable for different types of data. He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

Content
This modula builds on prerequisites acquired in Module *"Econometrics and Statistics I"*. The courses of this module offer students a broad range of advanced Econometric techniques for state-of-the art data analysis.

Workload
Total workload for 9 credit points: approx. 270 hours. The allocation is based on the credit points of the courses in the module. The workload for courses with 4.5 credits is approx. 135 hours. The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.27 Module: Economic Theory and its Application in Finance [M-WIWI-101502]

Coordinators: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	6

Compulsory Elective Courses (Election: 1 item)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CP	Brumm, Mitusch
T-WIWI-102861	Advanced Game Theory	4,5 CP	Ehrhart, Puppe, Reiß
Supplementary Courses (Election:)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CP	Ruckes
T-WIWI-102647	Asset Pricing	4,5 CP	Ruckes, Uhrig-Homburg
T-WIWI-109050	Corporate Risk Management	4,5 CP	Ruckes
T-WIWI-102623	Financial Intermediation	4,5 CP	Ruckes

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
One of the courses T-WIWI-102861 "Advanced Game Theory" and T-WIWI-102609 "Advanced Topics in Economic Theory" is compulsary.

Competence Goal
The students

- have learnt the methods of formal economic modeling, particularly of General Equilibrium Theory and contract theory
- will be able to apply these methods to the topics in Finance, specifically the areas of financial markets and institutions and corporate finance
- have gained many useful insights into the relationship between firms and investors and the functioning of financial markets

Content
The mandatory course "Advanced Topics in Economic Theory" is devoted in equal parts to General Equilibrium Theory and to contract theory. The course "Asset Pricing" will apply techniques of General Equilibrium Theory to valuation of financial assets. The courses "Corporate Financial Policy" and "Finanzintermediation" will apply the techniques of contract theory to issues of corporate finance and financial institutions.

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

M 6.28 Module: Economics in a Connected World [M-WIWI-107010]

Coordinators: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	1

Mandatory			
T-WIWI-103107	Spatial Economics	4,5 CP	Ott
Compulsory Elective Courses (Election: at most 1 item)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CP	Brumm, Mitusch
T-WIWI-111388	Applied Econometrics	4,5 CP	Krüger
T-WIWI-109194	Dynamic Macroeconomics	4,5 CP	Brumm
T-WIWI-112822	Economics of Innovation	4,5 CP	Ott
T-WIWI-112816	Growth and Development	4,5 CP	Ott
T-WIWI-113147	Telecommunications and Internet – Economics and Policy	4,5 CP	Mitusch

Assessment
The assessment is carried out as partial exams according to § 4 paragraph 2 Nr. 1 – Nr. 3 SPO of the examination regulation of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The overall grade of the module is the average of the grades for each course, weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal

- Theoretical Understanding of Spatial and Network Economics:
  - develop a deep understanding of the economic forces shaping spatial distribution, locational choice, trade flows, and urban development in both physical and digital landscapes.
  - understand how processes of spatial concentration result from the interplay of agglomeration and dispersion forces.
- Equilibrium Analysis and Stability:
  - gain expertise in deriving economic equilibria and analyzing their stability properties
  - understand and identify bifurcation points, exploring their implications for dynamic changes in economic systems.
- Quantitative and Analytical Skills:
  - acquire advanced skills in applying mathematical and computational tools to model spatial and connected economics.
  - use simulations and calibrations to explore dynamic economic systems and assess the implications of policy interventions.
- Programming and Empirical Analysis:
  - build competence in programming tools (e.g., Python, MATLAB, or R) to implement economic models and analyze results.
  - use econometric methods to evaluate and interpret real-world data related to trade, locational choice, and infrastructure development.

Upon completion, these competence goals aim to prepare students for advanced research, policy-making, and strategic decision-making in economics, business engineering, and digital economics, enabling them to tackle real-world problems with a robust theoretical and quantitative foundation.

Content

This module explores the interplay of spatial, digital, and economic networks, focusing on trade, locational choice, and the role of physical and digital infrastructure in shaping economic outcomes. It combines theoretical and applied approaches, equipping students with advanced analytical tools and insights into interconnected economic systems. It investigates the economic forces shaping the spatial distribution of resources, firms, and individuals, with a focus on locational choice, trade flows, and urban development in physical landscapes.

A strong focus is laid on the derivation of economic equilibria, with particular attention to their stability properties. Stability analyses include the identification and exploration of bifurcation points to understand dynamic changes in economic systems. Furthermore, decentralized decisions are critically evaluated using the normative framework of social welfare, offering insights into trade-offs and efficiency in economic systems.

Workload

Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations

Sound understanding of theoretical foundations in microeconomic theory, macroeconomic theory, and statistics according to international standards of a bachelor's degree in Economics, Business Administration or similar disciplines. Basic knowledge in programming (R, Python) is required.

M 6.29 Module: Economics of Innovation and Growth [M-WIWI-107011]

Coordinators: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	1

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-112822	Economics of Innovation	4,5 CP	Ott
T-WIWI-112816	Growth and Development	4,5 CP	Ott
Supplementary Courses (Election:)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CP	Brumm, Mitusch
T-WIWI-111388	Applied Econometrics	4,5 CP	Krüger
T-WIWI-109194	Dynamic Macroeconomics	4,5 CP	Brumm
T-WIWI-114054	Methods in Economics	1,5 CP	Ott
T-WIWI-102789	Seminar in Economic Policy	3 CP	Ott

Assessment
The assessment is carried out as partial exams according to § 4 paragraph 2 Nr. 1 – Nr. 3 SPO of the examination regulation of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The overall grade of the module is the average of the grades for each course, weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal

- Theoretical and Analytical Competences:
  - understand the key mechanisms underlying micro-based macro models.
    gain the ability to analyze formal theoretical models in economics, focusing on innovation, growth and development.
  - understand the identification of equilibria, assessing their stability characteristics, including their graphical derivations based on phase-diagrams.
  - understand the normative perspective of the models: get competence in evaluating decentralized decision-making processes based on the concept of social welfare and
  - understanding associated trade-offs between centralized and decentralized solutions.
- Quantitative and Computational Competences:
  - gain proficiency in calibrating models with real-world data and simulating outcomes to analyze dynamic economic systems.
  - gain experience in applying programming tools (e.g., Python, MATLAB, or R) to implement economic models, run simulations, and interpret computational results.
  - gain the ability to apply econometric techniques to evaluate the effects of physical and digital networks on trade, locational choices, and infrastructure investments.
- Regarding Content:
  - know the basic techniques for analyzing static and dynamic optimization models that are applied in the context of microeconomic and macroeconomic theories.
  - understand the important role of innovation to the overall economic growth and prosperity.
  - identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations.
  - explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare.

Upon completion, students will have gained a strong theoretical foundation and practical skills to evaluate innovation and growth processes that are incentive-based, micro-founded while addressing the macroeconomic perspective. The module prepares students for advanced research or professional applications in academia, policy, and practice.

Content
This module provides a comprehensive introduction to the economic foundations, processes, and quantitative methods that drive innovation and growth and thus shape the development of nations over time. Based on empirical recurring patterns (so-called stylized facts), the overall goal is to gain a sound understanding of the determinants of long-run prosperity, structural change, and the role of government.

The module covers key theoretical concepts, discusses the role of policy frameworks and instruments, and applies quantitative and econometric techniques. Some programming techniques are also applied (R, Python). The courses enable students to understand and analyze economic dynamics from an aggregate perspective, although the theories are consequently micro-founded. Theoretical foundations are indispensable tools for theory building and serve as a normative compass for economic policy making, especially in addressing complex societal challenges.

Workload
Total workload for 9 credit points: approx. 270 hours.

The exact distribution is based on the credit points of the courses in the module.

Recommendations
Sound understanding of theoretical foundations in microeconomic theory, macroeconomic theory, and statistics according to international standards of a bachelor's degree in Economics, Business Administration or similar disciplines. Basic knowledge in programming (R, Python) is required.

M 6.30 Module: eEnergy: Markets, Services and Systems [M-WIWI-103720]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	3

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-107501	Energy Market Engineering	4,5 CP	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CP	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CP	Weinhardt
T-WIWI-113726	Special Topics in Information Systems	4,5 CP	Weinhardt

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
The student

- is aware of design options for energy and especially electricity markets and can derive implications for the market results from the market design,
- knows about current trends regarding the Smart Grid and understands affiliated modelling aproaches,
- can evaluate business models of electricity grids according to the regulation regime
- is prepared for scientific contributions in the field of energy system analysis.

Content
The module conveys scientific and practical knowledge to analyse energy markets and according business models. To do so the scientific discussion on energy market designs is evaluated and analysed. Different energy market models are presented and their design implications are evaluated. Furthermore, the electricity system is analysed with regards to being a network industry and resulting regulation and business models are discussed. Besides these traditional areas of energy economics we will look at methods and models of digitalisation in the energy sector.

Additional Information
The lecture Smart Grid Applications will be available starting in the winter term 2018/19.

Workload
The total workload for this module is approx. 270 hours (9 CP). The allocation is based on the credit points of the courses in the module. The workload for courses with 4.5 CP is approx. 135 hours.

The total number of hours per course results from the time required to attend the lectures and exercises, as well as the examination times and the time required to achieve the qualification objectives of the module for an average student for an average performance.

M 6.31 Module: Electives in Informatics [M-WIWI-101630]

Coordinators: Dr.-Ing. Tobias Käfer
Prof. Dr.-Ing. Sanja Lazarova-Molnar
Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Business and Economics

Part of: Compulsory Elective Modules 1 (Informatics)
Compulsory Elective Modules 2 (Informatics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	23

Compulsory Elective Area (Election:)			
T-WIWI-112966	Artificial Intelligence for Autonomous Driving	4,5 CP	Vinel
T-WIWI-102680	Computational Economics	4,5 CP	Shukla
T-WIWI-112690	Cooperative Autonomous Vehicles	4,5 CP	Vinel
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CP	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CP	Oberweis
T-WIWI-114951	Advanced Topics in Digital Twins	4,5 CP	Lazarova-Molnar
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CP	Volkamer
T-WIWI-113968	Management of IT-Projects	4,5 CP	Alpers
T-WIWI-102666	Knowledge Discovery	4,5 CP	Käfer
T-WIWI-114863	Knowledge-Driven Artificial Intelligence	4,5 CP	Sack
T-WIWI-106340	Machine Learning 1 - Basic Methods	4,5 CP	Zöllner
T-WIWI-106341	Machine Learning 2 - Advanced Methods	4,5 CP	Zöllner
T-WIWI-112685	Modeling and Simulation	4,5 CP	Lazarova-Molnar
T-WIWI-102697	Business Process Modelling	4,5 CP	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CP	Shukla
T-WIWI-109799	Process Mining	4,5 CP	Schreiber
T-WIWI-110848	Semantic Web Technologies	4,5 CP	Käfer
T-WIWI-102895	Software Quality Management	4,5 CP	Oberweis
Seminars and Advanced Labs (Election: at most 1 item)			
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CP	Professorenschaft des Instituts AIFB
T-WIWI-112914	Advanced Lab Realization of Innovative Services (Master)	4,5 CP	Oberweis
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CP	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	5 CP	Zöllner
T-WIWI-109983	Project Lab Machine Learning	5 CP	Zöllner

Assessment
The assessment is carried out as partial exams of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
The student

- has the ability to master methods and tools in a complex discipline and to demonstrate innovativeness regarding the methods used,
- knows the principles and methods in the context of their application in practice,
- is able to grasp and apply the rapid developments in the field of computer science, which are encountered in work life, quickly and correctly, based on a fundamental understanding of the concepts and methods of computer science,
- is capable of finding and defending arguments for solving problems.

Content
The thematic focus will be based on the choice of courses in the areas of Applied Technical Cognitive Systems, Business Information Systems, Critical Information Infrastructures, Information Service Engineering, Security - Usability - Society or Web Science.

Workload
The total workload for this module is approximately 270 hours.

M 6.32 Module: Electronic Markets [M-WIWI-101409]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	9

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102762	Business Dynamics	4,5 CP	Geyer-Schulz, Glenn
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CP	Weinhardt
T-WIWI-105946	Price Management	4,5 CP	Geyer-Schulz, Glenn
T-WIWI-113147	Telecommunications and Internet – Economics and Policy	4,5 CP	Mitusch

Assessment
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- knows coordination and motivation methods and analyzes them regarding their efficiency,
- classifies markets and describes the roles of the participants in a formal way,
- knows the conditions for market failure and knows and develops countermeasures,
- knows institutions and market mechanisms, their fundamental theories and empirical research results,
- knows the design criteria of market mechanisms and a systematical approach for creating new markets,
- models, analyzes and optimizes the structure and dynamics of complex business applications.

Content
What are the conditions that make electronic markets develop, and how can one analyze and optimize such markets?

In this module, the selection of the type of organization as an optimization of transaction costs is treated. Afterwards, the efficiency of electronic markets (price, information and allocation efficiency) as well as reasons for market failure are described. Finally, motivational issues like bounded rationality and information asymmetries (private information and moral hazard), as well as the development of incentive schemes, are presented. Regarding the market design, especially the interdependencies of market organization, market mechanisms, institutions and products are described, and theoretical foundations are lectured.

Electronic markets are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics, such markets can be modelled. Simulations of complex systems allow the analysis and optimization of markets, business processes, policies, and organizations.

Topics include

- classification, analysis, and design of markets
- simulation of markets
- auction methods and auction theory
- automated negotiations
- nonlinear pricing
- continuous double auctions
- market-maker, regulation, control

Workload
The total workload for this module is approx. 270 hours (9 credits). The distribution is based on the credit points of the courses in the module. The workload for courses with 4.5 credits is approx. 135 hours.

The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module for an average performance.

Recommendations
None

M 6.33 Module: Emphasis in Informatics [M-WIWI-101628]

Coordinators: Dr.-Ing. Tobias Käfer
Prof. Dr.-Ing. Sanja Lazarova-Molnar
Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Business and Economics

Part of: Compulsory Elective Modules 1 (Informatics)
Compulsory Elective Modules 2 (Informatics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	23

Compulsory Elective Area (Election: between 1 and 3 items)			
T-WIWI-113363	Collective Perception in Autonomous Driving	4,5 CP	Vinel
T-WIWI-102680	Computational Economics	4,5 CP	Shukla
T-WIWI-112690	Cooperative Autonomous Vehicles	4,5 CP	Vinel
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CP	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CP	Oberweis
T-WIWI-114951	Advanced Topics in Digital Twins	4,5 CP	Lazarova-Molnar
T-WIWI-113059	Human Factors in Autonomous Driving	4,5 CP	Vinel
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CP	Volkamer
T-WIWI-113968	Management of IT-Projects	4,5 CP	Alpers
T-WIWI-102666	Knowledge Discovery	4,5 CP	Käfer
T-WIWI-114863	Knowledge-Driven Artificial Intelligence	4,5 CP	Sack
T-WIWI-106340	Machine Learning 1 - Basic Methods	4,5 CP	Zöllner
T-WIWI-106341	Machine Learning 2 - Advanced Methods	4,5 CP	Zöllner
T-WIWI-112685	Modeling and Simulation	4,5 CP	Lazarova-Molnar
T-WIWI-102697	Business Process Modelling	4,5 CP	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CP	Shukla
T-WIWI-109799	Process Mining	4,5 CP	Schreiber
T-WIWI-110848	Semantic Web Technologies	4,5 CP	Käfer
T-WIWI-102895	Software Quality Management	4,5 CP	Oberweis
Seminars and Advanced Labs (Election: at most 1 item)			
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CP	Professorenschaft des Instituts AIFB
T-WIWI-112914	Advanced Lab Realization of Innovative Services (Master)	4,5 CP	Oberweis
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CP	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	5 CP	Zöllner
T-WIWI-109983	Project Lab Machine Learning	5 CP	Zöllner

Assessment
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
The student

- has the ability to master methods and tools in a complex discipline and to demonstrate innovativeness regarding the methods used,
- knows the principles and methods in the context of their application in practice,
- is able to grasp and apply the rapid developments in the field of computer science, which are encountered in work life, quickly and correctly, based on a fundamental understanding of the concepts and methods of Informatics,
- is capable of finding and defending arguments for solving problems.

Content
The thematic focus will be based on the choice of courses in the areas of Applied Technical Cognitive Systems, Business Information Systems, Critical Information Infrastructures, Information Service Engineering, Security - Usability - Society or Web Science.

Workload
The total workload for this module is approximately 270 hours.

M 6.34 Module: Energy and Process Technology I [M-MACH-101296]

Coordinators: Prof. Dr. Dr. Michael Fischlschweiger
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Level	Version
9 CP	graded	Each winter term	1 term	4	1

Mandatory			
T-MACH-102211	Energy and Process Technology I	9 CP	Bauer, Fischlschweiger, Schwitzke, Velji

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module, whose sum of credits must meet the requirement of credits of this module. The
assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits
and truncated after the first decimal.

Prerequisites
None

Competence Goal
In this modul students achieve a basic understanding of the technical properties of energy conversion processes and machines.

Content
Energy and Process Technology 1:

1. thermodynamic basics and cycle processes (ITT)
2. basics of piston engines (IFKM)
3. basics of turbomachines (FSM)
4. basics of thermal turbomachines (ITS)

Additional Information
All lectures and exams are hold in German only.

M 6.35 Module: Energy and Process Technology II [M-MACH-101297]

Coordinators: Prof. Dr. Dr. Michael Fischlschweiger
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Level	Version
9 CP	graded	Each summer term	1 term	4	1

Mandatory			
T-MACH-102212	Energy and Process Technology II	9 CP	Fischlschweiger, Schwitzke

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module, whose sum of credits must meet the requirement of credits of this module. The
assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits
and truncated after the first decimal.

Prerequisites
None

Competence Goal
In this modul students achieve the ability to evaluate solitary and interconnected energy systems with respect to societal and economical aspects

Content
Energy and Process Technology 2:

1. basics in combustion and pollutant formation (ITT)
2. technical realisation and application of piston engines (IFKM) fluid flow engines (FSM) and thermal turbomachines (ITS)
3. technical aspects of energy supply systems and networks (ITS)

Additional Information
All lectures and exams are hold in German only.

M 6.36 Module: Energy Economics and Energy Markets [M-WIWI-101451]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	9

Mandatory			
T-WIWI-107043	Liberalised Power Markets	5,5 CP	Fichtner
Supplementary Courses (Election:)			
T-WIWI-114980	Behavioral Dimensions of Energy Transitions	3,5 CP	Fichtner
T-WIWI-107501	Energy Market Engineering	4,5 CP	Weinhardt
T-WIWI-112151	Energy Trading and Risk Management	3,5 CP	N.N.
T-WIWI-108016	Simulation Game in Energy Economics	3,5 CP	Genoese
T-WIWI-107446	Quantitative Methods in Energy Economics	3,5 CP	Plötz
T-WIWI-102712	Regulation Theory and Practice	4,5 CP	Mitusch

Assessment
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place every semester. Re-examinations are offered at every ordinary examination date.The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The lecture Liberalised Power Markets has to be examined.

Competence Goal
The student

- gains detailed knowledge about the new requirements of liberalised energy markets,
- describes the planning tasks on the different energy markets,
- knows solution approaches to respective planning tasks.

Content

- Liberalised Power Markets: The European liberalisation process, energy markets, pricing, market failure, investment incentives, market power
- *Energy Trading and Risk Management:* trade centres, trade products, market mechanisms, position and risk management
- *Simulation Game in Energy Economics*: Simulation of the German electricity system
- *Behavioral Dimensions of Energy Transitions*: Explores how energy consumers make decisions regarding their energy use and how these decisions can be influenced by psychological and economic factors, such as financial incentives; examines the social acceptance of energy technologies and policies, and what determines different levels of acceptance.
- *Quantitative Methods in Energy Economics*: The aim of the course is to help the students understand real-world usage of quantitative methods of energy economics and apply these methods

Workload
The total workload for this module is approx. 270 hours (9 credits). The allocation is based on the credit points of the courses in the module. The workload for courses with 3.5 credits is approx. 105 hours, for courses with 5.5 credits approx. 165 hours.
The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module for an average performance.

Recommendations
The courses are conceived in a way that they can be attended independently from each other. Therefore, it is possible to start the module in winter and summer term.

M 6.37 Module: Energy Economics and Technology [M-WIWI-101452]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	5

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102793	Efficient Energy Systems and Electric Mobility	3,5 CP	Jochem
T-WIWI-102650	Energy and Environment	3,5 CP	Karl
T-WIWI-113073	Machine Learning and Optimization in Energy Systems	3,5 CP	Fichtner
T-WIWI-107464	Smart Energy Infrastructure	5,5 CP	Ardone, Pustisek
T-WIWI-102695	Heat Economy	3,5 CP	Fichtner

Assessment
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place every semester. Re-examinations are offered at every ordinary examination date.The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- gains detailed knowledge about present and future energy supply technologies (focus on final energy carriers electricity and heat),
- knows the techno-economic characteristics of plants for energy provision, for energy transport as well as for energy distribution and demand,
- is able to assess the environmental impact of these technologies.

Content

- **Heat Economy**: district heating, heating technologies, reduction of heat demand, statutory provisions
- **Energy and Environment**: emission factors, emission reduction measures, environmental impact
- **Machine Learning and Optimization in Energy Systems**: Understanding and Applying the core principles of the most commonly used machine learning and optimization techniques within the energy sector

Workload
The total workload for this module is approx. 270 hours (9 credits). The allocation is based on the credit points of the courses in the module. The workload for courses with 3,5 credits is approx. 105 hours, and for courses with 5,5 credits approx. 165 hours.

The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module for an average performance.

M 6.38 Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	16

Mandatory part (Election: 1 item)			
T-WIWI-102864	Entrepreneurship	3 CP	Terzidis
Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-115110	Business Planning for Founders	3 CP	Terzidis
T-WIWI-102866	Design Thinking	3 CP	Terzidis
T-WIWI-113151	Entrepreneurship Seasonal School	3 CP	Terzidis
T-WIWI-114893	International Entrepreneurship and Brand Development	6 CP	Kupfer, Terzidis
T-WIWI-109064	Joint Entrepreneurship Summer School	6 CP	Terzidis
T-WIWI-111561	Startup Experience	6 CP	Terzidis
Supplementary Courses (Election: between 0 and 1 items)			
T-WIWI-102894	Entrepreneurship Research	3 CP	Terzidis
T-MACH-112882	Innovation2Business – Innovation Strategy in the Industrial Corporate Practice	4 CP	Albers
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CP	Weissenberger-Eibl
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CP	Weissenberger-Eibl

Assessment
The module examination takes place in the form of partial examinations (according to §4, 1-3 SPO) on

1. the Entrepreneurship lecture (3 CP),
2. one of the seminars of the Chair of Entrepreneurship and Technology Management (3 CP or 6 CP) and, if applicable
3. another course listed in the module.

The seminars of the chair are

- Startup Experience
- Design Thinking
- Business Planning for Founders
- Entrepreneurship research (this can be credited mainly in the seminar module, but also in the entrepreneurship module)
- Joint Entrepreneurship School
- Entrepreneurship Seasonal School
- International Entrepreneurship and Brand Development

The latter three seminars take place irregularly, as they are offered as part of projects.

The assessment of success is described for each course in the module. For courses with 3 CP in the compulsory elective and supplementary courses, 1/2 of the overall grade results from the entrepreneurship lecture, 1/4 from one of the chair's seminars with 3 CP and 1/4 from another course with 3 CP permitted in the module. If a course with 6 CP is selected in the compulsory elective or supplementary offer, this is included in the overall grade with a weighting of 1/2. The overall grade is cut off after the first decimal place.

Prerequisites
None

Competence Goal
Students are familiar with the basics and contents of entrepreneurship and ideally are able to start a company during or after their studies. The courses are therefore structured sequentially in modules, although in principle they can also be attended in parallel. In this way, the skills are taught to generate business ideas, to develop inventions into innovations, to write business plans for start-ups and to successfully establish a company. In the lecture, the basics of entrepreneurship will be developed, in the seminars, individual contents will be deepened. The overall learning objective is to enable students to develop and implement business ideas.

Content
The lectures form the basis of the module and give an overview of the overall topic. The seminars deepen the phases of the foundation processes, in particular the identification of opportunities, the development of a value proposition (especially based on inventions and technical innovations), the design of a business model, business planning, the management of a start-up, the implementation of a vision as well as the acquisition on resources and the handling of risks. The lecture Entrepreneurship provides an overarching and connecting framework for this.

Additional Information
Please note: Seminars offered by Prof. Terzidis (or the members of his research group) are not eligible for crediting in a seminar module of the WiWi degree programs. Exception: Seminar "Entrepreneurship Research".

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations
None

M 6.39 Module: Environmental Economics [M-WIWI-101468]

Coordinators: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	2

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102650	Energy and Environment	3,5 CP	Karl
T-WIWI-100007	Transport Economics	4,5 CP	Mitusch, Szimba
T-WIWI-102615	Environmental Economics and Sustainability	3 CP	Walz
T-WIWI-102616	Environmental and Resource Policy	4 CP	Walz
T-BGU-111102	Environmental Law	3 CP	Smeddinck

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students

- understand the treatment of non-market resources as well as future resource shortages
- are able to model markets of energy and environmental goods
- are able to assess the results of government intervention
- know legal basics and are able to evaluate conflicts with regard to legal situation

Content
Environmental degradation and increasing resource use are global challenges, which have to be tackled on a worldwide level. The module addresses these challenges from the perspective of economics, and imparts the fundamental knowledge of environmental and sustainability economics, and environmental and resource policy to the students. Additional courses address environmental law, environmental pressure, and applications to the transport sector.

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations
Knowledge of microeconomics is a prerequisite. For this reason, successful participation in the course *Economics I (Microeconomics)* [2600012] or a comparable course is strongly recommended.

M 6.40 Module: Experimental Economics [M-WIWI-101505]

Coordinators: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	6

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-115061	Experimental Research in Economics and Information Systems	4,5 CP	Weinhardt
T-WIWI-105781	Incentives in Organizations	4,5 CP	Nieken
T-WIWI-102862	Predictive Mechanism and Market Design	4,5 CP	Reiß
T-WIWI-102863	Topics in Experimental Economics	4,5 CP	Reiß

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
Students

- are acquainted with the methods of Experimental Economics along with its strengths and weaknesses;
- understand how theory-guided research in Experimental Economics interacts with the development of theory;
- are provided with foundations in data analysis;
- design an economic experiment and analyze its outcome.

Content
The module Experimental Economics offers an introduction into the methods and topics of Experimental Economics. It also fosters and extends knowledge in theory-guided experimental economics and its interaction with theory development. Throughout the module, readings of selected papers are required.

Additional Information
The course "Predictive Mechanism and Market Design" is offered every second winter semester, e.g. WS2013 / 14, WS2015 / 16, ...

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations
Basic knowledge in mathematics, statistics, and game theory is assumed.

M 6.41 Module: Extracurricular Module in Engineering [M-WIWI-101404]

Coordinators: Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Business and Economics
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Level	Version
9 CP	graded	Once	1 term	4	5

Compulsory Elective Courses (Election: between 9 and 12 credits)			
T-WIWI-106291	PH APL-ING-TL01	3 CP	
T-WIWI-106292	PH APL-ING-TL02	3 CP	
T-WIWI-106293	PH APL-ING-TL03	3 CP	
T-WIWI-106294	PH APL-ING-TL04 ub	0 CP	
T-WIWI-106295	PH APL-ING-TL05 ub	0 CP	
T-WIWI-106296	PH APL-ING-TL06 ub	0 CP	
T-WIWI-108384	PH APL-ING-TL07	3 CP	

Assessment
The assessment of the module is determined by the respective module corrdinator. It can either be in the form of a general exam or partial exams, and must contain at least 9 credit points (max. 12 credits) and at least 6 hours per week (max. 8 hours per week). The examination may contain presentations, experiments, laboratories, term papers, etc. At least 50 percent of the module examination has to be in the form of a written or an oral examination (according to Section 4 (2), 1 or 2 of the examination regulation).

The formation of the overall grade of the module will be determined by the respective module coordinator.

Prerequisites
The current regulations and guidance on the procedure for applying for an extracurricular module in engineering are explained in detail at https://www.wiwi.kit.edu/APIng-Modul.php.

Competence Goal
Through the extracurricular engineering module, the student is able to deal with technical topics and issues in depth.

The concrete learning objectives are coordinated with the respective module supervisor of the module.

Workload
The total workload for this module is about 270 hours (9 credits). The distribution is based on the credit points of the courses completed as part of the module.

M 6.42 Module: Facility Management in Hospitals for Industrial Engineering [M-BGU-106453]

Coordinators: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	1 term	German	4	2

Election Notes
Module components in extent of min. 3 CP has to be selected.

Mandatory			
T-BGU-108004	Facility Management in Hospitals	6 CP	Lennerts
Comnpulsory Elective (Election: at most 2 items as well as at least 3 credits)			
T-BGU-111218	Upgrading of Existing Buildings	3 CP	Lennerts
T-BGU-111211	Energetic Refurbishment	1,5 CP	Lennerts, Schneider
T-BGU-111212	Facility and Real Estate Management II	1,5 CP	Lennerts

Assessment
- module components T-BGU-108004 with examination of another type according to § 4 Par. 2 No. 3

according to selected course:

- module components T-BGU-111218 with written examination according to § 4 Par. 2 No. 1
- module components T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- module components T-BGU-111212 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls, see module components

Prerequisites
none

Competence Goal
Students can explain the theoretical principles of facility management. They are able to analyze and optimize real estate-specific, facility and engineering processes of real estate.

Content

- Facility Management in Hospitals: facility management processes in hospitals, strategic planning and cost structure of selected facility management services, sustainable hospitals, master planning, room and function program and layout planning of hospitals, OR simulation and hygiene in hospitals
- Construction in Existing Buildings: maintenance strategies, service life and wear and tear of components, budgeting of maintenance costs, condition assessment and action planning, special procedures in existing buildings, monument protection and preservation
- Energy-efficient Refurbishment: fundamentals of building physics, improving the energy efficiency of the building envelope, improving building technology and cost-effectiveness, forms of energy and local energy conversion (e.g. photovoltaics, geothermal energy, heat pumps, etc.), calculating the energy requirements of buildings, energy assessment of buildings in accordance with the GEG
- Facility and Real Estate Management II: outsourcing and procurement regulations in facility management, data collection, transition, CAFM in facility management, presentation of measurement criteria for SLA and KPI and their digitalization

Module Grade Calculation
grade of the module is CP weighted average of grades of the partial exams

Additional Information
as from winter term 2025/26, the module component Project Development with Case Study (T-BGU-111217) will not be offered anymore as an option

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Facility Management in Hospitals lecture/exercise: 60 h

according to selected courses or examinations respectively:

- Upgrading of Existing Buildings lecture/exercise: 45 h
- Energetic Refurbishment II lecture: 15 h
- Facility and Real Estate Management II lecture: 15 h

independent study:

- preparation and follow-up lecture/exercises Facility Management in Hospitals: 45 h
- preparation of term paper Facility Management in Hospitals (partial examination, compulsory): 75 h

according to selected courses or examinations respectively:

- preparation and follow-up lecture/exercises Upgrading of Existing Buildings: 15 h
- examination preparation Upgrading of Existing Buildings (selectable partial examination): 30 h
- preparation and follow-up lectures Energetic Refurbishment II: 15 h
- examination preparation Energetic Refurbishment II (selectable partial examination): 15 h
- preparation and follow-up lectures Facility and Real Estate Management II: 15 h
- examination preparation Facility and Real Estate Management II (selectable partial examination): 15 h

total: 270 h

Recommendations
none

M 6.43 Module: Finance 1 [M-WIWI-101482]

Coordinators: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	1

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102643	Derivatives	4,5 CP	Uhrig-Homburg
T-WIWI-102621	Valuation	4,5 CP	Ruckes
T-WIWI-102647	Asset Pricing	4,5 CP	Ruckes, Uhrig-Homburg

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- has core skills in economics and methodology in the field of finance
- assesses corporate investment projects from a financial perspective
- is able to make appropriate investment decisions on financial markets

Content
The courses of this module equip the students with core skills in economics and methodology in the field of modern finance. Securities which are traded on financial and derivative markets are presented, and frequently applied trading strategies are discussed. A further focus of this module is on the assessment of both profits and risks in security portfolios and corporate investment projects from a financial perspective.

Workload
The total workload for this module is approx. 270 hours (9 credits). The distribution is based on the credit points of the courses in the module. The workload for courses with 4.5 credits is approx. 135 hours.

The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module for an average performance.

M 6.44 Module: Finance 2 [M-WIWI-101483]

Coordinators: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	11

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CP	Ruckes
T-WIWI-114979	Advanced Quantitative Finance	4,5 CP	Thimme
T-WIWI-102647	Asset Pricing	4,5 CP	Ruckes, Uhrig-Homburg
T-WIWI-110995	Bond Markets	4,5 CP	Uhrig-Homburg
T-WIWI-110997	Bond Markets - Models & Derivatives	3 CP	Uhrig-Homburg
T-WIWI-110996	Bond Markets - Tools & Applications	1,5 CP	Uhrig-Homburg
T-WIWI-109050	Corporate Risk Management	4,5 CP	Ruckes
T-WIWI-102643	Derivatives	4,5 CP	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CP	Weinhardt
T-WIWI-102900	Financial Analysis	4,5 CP	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CP	Ruckes
T-WIWI-102646	International Finance	3 CP	Uhrig-Homburg
T-WIWI-102621	Valuation	4,5 CP	Ruckes

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Students may only start the module *Finance 2* after they have successfully completed the module *Finance 1*. Exceptions are subject to approval by the examination committee; for this purpose, students must contact the examination office of the KIT Faculty of Economics and Management.

Competence Goal
The student is in a position to discuss, analyze and provide answers to advanced economic and methodological issues in the field of modern finance.

Content
The module Finance 2 is based on the module Finance 1. The courses of this module equip the students with advanced skills in economics and methodology in the field of modern finance on a broad basis.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.45 Module: Finance 3 [M-WIWI-101480]

Coordinators: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	11

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CP	Ruckes
T-WIWI-114979	Advanced Quantitative Finance	4,5 CP	Thimme
T-WIWI-102647	Asset Pricing	4,5 CP	Ruckes, Uhrig-Homburg
T-WIWI-110995	Bond Markets	4,5 CP	Uhrig-Homburg
T-WIWI-110997	Bond Markets - Models & Derivatives	3 CP	Uhrig-Homburg
T-WIWI-110996	Bond Markets - Tools & Applications	1,5 CP	Uhrig-Homburg
T-WIWI-109050	Corporate Risk Management	4,5 CP	Ruckes
T-WIWI-102643	Derivatives	4,5 CP	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CP	Weinhardt
T-WIWI-102900	Financial Analysis	4,5 CP	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CP	Ruckes
T-WIWI-102646	International Finance	3 CP	Uhrig-Homburg
T-WIWI-102621	Valuation	4,5 CP	Ruckes
T-WIWI-110933	Web App Programming for Finance	4,5 CP	Thimme

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Students may only start the module *Finance 3* after they have successfully completed the modules *Finance 1* and *Finance 2*. Exceptions are subject to approval by the examination committee; for this purpose, students must contact the examination office of the KIT Faculty of Economics and Management.

Competence Goal
The student is in a position to discuss, analyze and provide answers to advanced economic and methodological issues in the field of modern finance.

Content
The courses of this module equip the students with advanced skills in economics and methodology in the field of modern finance on a broad basis.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.46 Module: Foundations for Advanced Financial -Quant and -Machine Learning Research [M-WIWI-105894]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	see Annotations	1 term	English	4	1

Mandatory			
T-WIWI-111846	Fundamentals for Financial -Quant and -Machine Learning Research	9 CP	Ulrich

Assessment
The module examination is an alternative exam assessment with a maximum score of 100 points to be achieved. These points are distributed over 4 worksheets to be submitted during the semester. The worksheets cover the respective material of the module and are handed out, worked on and assessed in lecture weeks 3 (10 points), 6 (20 points), 9 (30 points) and 12 (40 points).

The module-wide exam (all 4 worksheets) must be taken in the same semester.

The worksheets are a mixture of analytical tasks and programming tasks with financial data.

Competence Goal
This MSc module teaches students fundamental stats and analytics concepts, as well necessary financial economic intuition, necessary to identify, design and execute interesting research questions in quant finance and financial machine learning.
Topics include: Maximum Likelihood learning of arma-garch models, expectation maximization learning applied to stochastic volatility and valuation models, Kalman filter techniques to learn latent states, estimation of affine jump diffusion models with options and higher-order moments, stochastic calculus, dynamic modeling of asset markets (bond, equity, options), equilibrium determination of risk premiums, risk premiums for higher moment risk, risk decomposition (fundamental vs idiosyncratic), option-implied return distributions, mixture-density-networks and neural nets.

Content
Learning Objectives: Skills and understanding of how to successfully set-up, execute and interpret financial data driven research with the following methods: MLE, Kalman Filter, Expectation Maximization, Option Pricing, dynamic asset pricing theory, backward-looking historical return densities, forward-looking options-implied return densities, mixture-density-network, neural networks. Programming is not taught in this course, yet, some graded and non-graded exercises might make heavy use of software based data analysis. See the course's pre-requisites and comments in the modul handbook.

Additional Information

- Strongly recommended to have good knowledge in financial econometrics (MLE, OLS, GLS, ARMA-GARCH), mathematics (differential equations, difference equations and optimization), investments (CAPM, factor models), asset pricing (SDF, SDF pricing), derivatives (Black-Scholes, risk-neutral pricing), and programming of statistical concepts (Java or R or Python or Matlab or C or ...)
- Strongly recommended to have a strong interest for interdisciplinary research work in statistics, programming, applied math and financial economics.
- Students lacking the prior knowledge might find the resources of the Chair helpful: www.youtube.com/c/cram-kit.

Workload
The total workload for this course is approximately 270 hours. This is for a student with the appropriate prior knowledge in financial econometrics, finance, mathematics and programming. Students without programming experience of statistical concepts will need to invest extra time. Students who have struggled in math- or programming- or finance- oriented classes, will find this course very challenging. Please check the pre-requisites and comments in the module handbook.

Teaching and Learning Methods
Lecture and exercise.

M 6.47 Module: Fundamentals of Transportation [M-BGU-101064]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each summer term	2 terms	German	4	7

Election Notes
Characteristics of Transportation Systems [T-BGU-106609] is compulsory module component;
two further compulsory elective module components have to be selected

Compulsory Examination (Election: 1 item as well as 3 credits)			
T-BGU-106609	Characteristics of Transportation Systems	3 CP	Vortisch
Electives (Election: 2 items as well as 6 credits)			
T-BGU-106611	Freight Transport	3 CP	Szimba, Vortisch
T-BGU-106301	Long-Distance and Air Traffic	3 CP	Vortisch
T-BGU-101005	Tendering, Planning and Financing in Public Transport	3 CP	Vortisch
T-BGU-100014	Seminar in Transportation	3 CP	Kagerbauer, Vortisch
T-BGU-112552	Seminar on Modeling and Simulation in Transportation	3 CP	Kagerbauer, Vortisch
T-BGU-103425	Mobility Services and New Forms of Mobility	3 CP	Kagerbauer
T-BGU-103426	Strategic Transport Planning	3 CP	Waßmuth
T-BGU-106608	Information Management for Public Mobility Services	3 CP	Vortisch
T-BGU-111057	Sustainability in Mobility Systems	3 CP	Kagerbauer
T-BGU-114772	Seminar on Transport Policy	3 CP	Vortisch

Assessment
- module component T-BGU-106609 with written examination according to § 4 Par. 2 No. 1

according to selected course:

- module component T-BGU-106611 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-106301 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-101005 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-100014 with examination of another type according to § 4 Par. 2 No. 3
- module component T-BGU-112552 with examination of another type according to § 4 Par. 2 No. 3
- module component T-BGU-103425 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-103426 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-106608 with examination of an other type according to § 4 Par. 2 No. 3
- module component T-BGU-111057 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-114772 with examination of another type according to § 4 Par. 2 No. 3

details about the learning controls, see module components

Prerequisites
None

Competence Goal
The student

- has basic knowledge in the field of transport studies from the perspective of professional practice,
- knows the decision-relevant aspects of transport studies from the perspective of management, politics and consulting,
- is able to analyze and evaluate transport projects from both perspectives.

Content
The subject of transport studies deals with issues relating to the transport sector, ranging from planning concepts based on society as a whole to technical problems of transport. Teaching is interdisciplinary and ranges from methodological principles (analytical approaches) to complex simulations. This module is aimed at those students who wish to focus initially on the field of transportation. This area can be further deepened with the module Transportation Modelling and Traffic Management [WI4INGBGU16]. An interest in transport planning and the transport sector is a prerequisite.

Module Grade Calculation
grade of the module is CP weighted average of grades of the partial exams

Additional Information
The module Transportation Modelling and Traffic Management [WI4INGBGU16] is also offered and recommended to deepen knowledge.

As from the winter term 2025/26, Transportation Systems [T-BGU-106610] will no longer be an elective option. Characteristics of Transportation Systems [T-BGU-106609] is therefore compulsory. Addtionally, the Seminar on Transportation Policy [T-BGU-114772] is available as an elective option in the compulsory elective area.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Characteristics of Transportation Systems lecture: 30 h

according to selected courses or examinations respectively:

- Freight Transport lecture/exercise: 30 h
- Long-Distance and Air Traffic lecture: 30 h
- Tendering, Planning and Financing in Public Transport lecture: 30 h
- Seminar in Transportation: 30 h
- Seminar on Modeling and Simulation in Transportation: 30 h
- Mobility Services and New Forms of Mobility lecture/exercise: 30 h
- Strategic Transport Planning lecture: 30 h
- Information Management for Public Mobility Services lecture/exercise: 30 h
- Sustainability in Mobility Systems lecture: 30 h
- Seminar on Transport Policy: 30 h

independent study:

- preparation and follow-up lectures Characteristics of Transportation Systems: 30 h
- examination preparation Characteristics of Transportation Systems (partial examination, compulsory): 30 h

according to selected courses or examinations respectively:

- preparation and follow-up lecture/exercises Freight Transport: 30 h
- examination preparation Freight Transport (selectable partial examination): 30 h
- preparation and follow-up lectures Long-Distance and Air Traffic: 30 h
- examination preparation Long-Distance and Air Traffic (selectable partial examination): 30 h
- preparation and follow-up lectures Tendering, Planning and Financing in Public Transport: 30 h
- examination preparation Tendering, Planning and Financing in Public Transport (selectable partial examination): 30 h
- preparation of seminar paper in Transportation and presentation (selectable partial examination): 60 h
- work on a practical problem in the Seminar on Modeling and Simulation in Transportation (selectable partial examination): 60 h
- preparation and follow-up lecture/exercises Mobility Services and New Forms of Mobility: 30 h
- examination preparation Mobility Services and New Forms of Mobility (selectable partial examination): 30 h
- preparation and follow-up lectures Strategic Transport Planning: 30 h
- examination preparation Strategic Transport Planning (selectable partial examination): 30 h
- preparation and follow-up lecture/exercises Information Management for Public Mobility Services: 30 h
- preparation accompanying exercises Information Management for public Mobility Services (selectable partial examination): 30 h
- preparation and follow-up lectures Sustainability in Mobility Systems: 30 h
- examination preparation Sustainability in Mobility Systems (selectable partial examination): 30 h
- preparation and follow-up meetings Seminar on Transport Policy: 30 h
- preparation of presentation Seminar on Transport Policy (selectable partial examination): 30 h

total: 270 h

Recommendations
None

M 6.48 Module: Generation and Transmission of Renewable Power [M-ETIT-101164]

Coordinators: Dr.-Ing. Bernd Hoferer
Prof. Dr.-Ing. Thomas Leibfried

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	5

compulsory optional subject (Election: at least 9 credits)			
T-ETIT-110883	Electric Power Transmission & Grid Control	6 CP	Leibfried
T-ETIT-101915	High-Voltage Test Technique	4 CP	Badent

Assessment
Success controll takes place in form of examinations on the selected courses, which together fulfill the minimum requirement of credit points. The success controlls are described for each module component. The overall grade for the module is calculated from the LP-weighted grades of the two examinations and cut off after the first decimal place.

Prerequisites
The module "M-ETIT-101163 Hochspannungstechnik" must be passed.

Competence Goal
The student

- has wide knowledge of electrical power engineering,
- is capable to analyse and develop electrical power engineering systems.

Content
The module deals with wide knowledge about the electrical power engineering. This ranges from the electric power equipment networks in terms of function, structure and interpretation on the calculation of electrical power networks to special areas such as the FACTS elements or power transformers.

M 6.49 Module: Global Production and Logistics [M-MACH-101282]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	9

Mandatory			
T-MACH-114800	Global Production	5 CP	Lanza
T-MACH-115017	Global Logistics	4 CP	Furmans

Assessment
Oral exams: duration approx. 5 min per credit point

Written exams: duration approx. 20 - 25 min per credit point

Amount, type and scope of the success control can vary according to the individually choice.

Prerequisites
None

Competence Goal
The students

- are able to analyze the main topics of global production and logistics.
- can explain the main topics about planning and operations of global supply chains and are able to use simple models for planning.
- are capable to name the main topics about planning of global production networks.

Content
The module Global Production and Logistics provides comprehensive and well-founded basics for the main topics of global production and logistics. The lectures aim to show opportunities and market conditions for global enterprises. Part 1 focuses on economic backgrounds, opportunities and risks of global production. Part 2 focuses on the structure of international logistics, their modeling, design and analysis. The threats in international logistics are discussed in case studies.

Additional Information
The module is offered in English.

Workload
The work load is about 270 hours, corresponding to 9 credit points.

Teaching and Learning Methods
Lectures, seminars, workshops, excursions

M 6.50 Module: High-Voltage Technology [M-ETIT-101163]

Coordinators: Dr.-Ing. Bernd Hoferer
Prof. Dr.-Ing. Thomas Leibfried

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	2

Mandatory			
T-ETIT-110266	High-Voltage Technology	6 CP	Leibfried, Suriyah
T-ETIT-100723	Electronics and EMC	3 CP	Sack

Competence Goal
The student

- has wide knowledge of electrical power engineering,
- is capable to analyse and develop electrical power engineering systems.
- know coupling mechanisms and possible coupling paths for interference signals in electronic circuits and systems, as well as measures for interference suppression and for the functionally reliable construction of such systems.

M 6.51 Module: Incentives, Interactivity & Decisions in Organizations [M-WIWI-105923]

Coordinators: Prof. Dr. Petra Nieken
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	5

Elective Offer (Election:)			
T-WIWI-111912	Advanced Topics in Digital Management	3 CP	Nieken
T-WIWI-111913	Advanced Topics in Human Resource Management	3 CP	Nieken
T-WIWI-113095	Behavioral Lab Exercise	4,5 CP	Nieken, Scheibehenne
T-WIWI-113465	Designing Interactive Systems: Human-AI Interaction	4,5 CP	Mädche
T-WIWI-114174	Economic Decision Making	4,5 CP	Scheibehenne
T-WIWI-115061	Experimental Research in Economics and Information Systems	4,5 CP	Weinhardt
T-WIWI-105781	Incentives in Organizations	4,5 CP	Nieken
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CP	Weinhardt
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CP	Hoffmann, Pfeiffer

Assessment
The assessment is carried out as partial exams of the courses in this module. The assessment procedures are described for each course in the module separately.

The overall grade of the module is the average of grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Please refer to the course descriptions for potential restrictions regarding an individual course.

Competence Goal
The student

- understands and analyses challenges and objectives within organizations
- applies economic models and empirical methods to analyze and solve challenges with a focus on the workplace and future of work
- understands the impact of digitalization and new information and communication technology on the work life and management decisions
- knows how to apply scientific research methods and understands the underlying problems

Content
The module „Incentives, Interactivity & Decisions in Organizations" offers an interdisciplinary approach to study incentive structures, the role of interactivity in information systems, and decision making in organizations. The module specifically focuses on topics related to the workplace and the future of work in organizations. The topics range from designing incentive systems and interactive systems to leadership, decision making, as well as understanding human behavior. All courses in the module foster active participation and allow students to learn state-of-the-art research methods and apply them to real-world challenges.

Workload
Total workload for 9 credits: approx. 270 hours.

Recommendations
Knowledge of Human Resource Management, microeconomics, game theory, and statistics is recommended.

M 6.52 Module: Industrial Production II [M-WIWI-101471]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	1 term	German/English	4	8

Mandatory			
T-WIWI-114618	Design and Operation of Industrial Plants and Processes	5,5 CP	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CP	Bosch, Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CP	Schultmann
T-WIWI-103134	Project Management	3,5 CP	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-114057	Circular Economy – Challenges and Potentials	3,5 CP	Schultmann
T-WIWI-102634	Emissions into the Environment	3,5 CP	Karl
T-WIWI-112103	Global Manufacturing	3,5 CP	Sasse
T-WIWI-113107	Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context	3,5 CP	Schultmann

Assessment
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course "Design and Operation of Industrial Plants and Processes" and one further single course of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course "Design and Operation of Industrial Plants and Processes" and at least one additional activity are compulsory and must be examined.

Competence Goal

- Students shall be able to describe the tasks of tactical production management with special attention drawn upon industrial plants.
- Students shall understand the relevant tasks in plant management (projection, realisation and supervising tools for industrial plants).
- Students shall be able to describe the special need of a techno-economic approach to solve problems in the field of tactical production management.
- Students shall be proficient in using selected techno-economic methods like investment and cost estimates, plant layout, capacity planning, evaluation principles of production techniques, production systems as well as methods to design and optimize production systems.
- Students shall be able to evaluate techno-economical approaches in planning tactical production management with respect to their efficiency, accuracy and relevance for industrial use.

Content

- Planning and Management of Industrial Plants: Basics, circulation flow starting from projecting to techno-economic evaluation, construction and operating up to plant dismantling.

Additional Information
Apart from the core course the courses offered are recommendations and can be replaced by courses from the Module Industrial Production III.

Workload
Total effort will account to 270 hours (9 credit points) and can be allocated according to the credit point rating. Therefore, a course with 3.5 credits requires an effort of approximately 105h and a course with 5.5 credits 165h.

The total effort for each course consists of attending lectures and tutorials, examination times and the time an average student needs to prepare himself in order to pass the exam with an average grade.

M 6.53 Module: Industrial Production III [M-WIWI-101412]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each summer term	1 term	German/English	4	6

Mandatory			
T-WIWI-102632	Production and Logistics Management	5,5 CP	Schultmann
Supplementary Courses from Module Industrial Production II (Election: at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CP	Karl
T-WIWI-112103	Global Manufacturing	3,5 CP	Sasse
T-WIWI-113107	Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context	3,5 CP	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-114057	Circular Economy – Challenges and Potentials	3,5 CP	Schultmann
T-WIWI-103134	Project Management	3,5 CP	Schultmann
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CP	Schultmann
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CP	Bosch, Göbelt

Assessment
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course *Production and Logistics Management* [2581954] and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course *Production and Logistics Management* [2581954] and at least one additional activity are compulsory and must be examined.

Competence Goal

- Students describe the tasks concerning general problems of an operative production and logistics management.
- Students describe the planning tasks of supply chain management.
- Students use proficiently approaches to solve general planning problems.
- Students explain the existing interdependencies between planning tasks and applied methods.
- Students describe the mail goals and set-up of software supporting tools in production and logistics management (i.e. APS, PPS-, ERP- and SCM Systems).
- Students discuss the scope of these software tools and their general disadvantages.

Content

- Planning tasks and exemplary methods of production planning and control in supply chain management.
- Supporting software tools in production and logistics management (APS, PPS- and ERP Systems).
- Project management in the field of production and supply chain management.

Additional Information
Apart from the core course the courses offered are recommendations and can be replaced by courses from the Module Industrial Production II.

Workload
The total amount of work for this module is approx. 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module.

The total number of hours per course results from the effort required to attend the lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.54 Module: Informatics [M-WIWI-101472]

Coordinators: Dr.-Ing. Tobias Käfer
Prof. Dr.-Ing. Sanja Lazarova-Molnar
Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Alexey Vinel
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Business and Economics

Part of: Informatics

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	22

Compulsory Elective Area (Election:)			
T-WIWI-113363	Collective Perception in Autonomous Driving	4,5 CP	Vinel
T-WIWI-102680	Computational Economics	4,5 CP	Shukla
T-WIWI-112690	Cooperative Autonomous Vehicles	4,5 CP	Vinel
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CP	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CP	Oberweis
T-WIWI-114951	Advanced Topics in Digital Twins	4,5 CP	Lazarova-Molnar
T-WIWI-113059	Human Factors in Autonomous Driving	4,5 CP	Vinel
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CP	Volkamer
T-WIWI-113968	Management of IT-Projects	4,5 CP	Alpers
T-WIWI-102666	Knowledge Discovery	4,5 CP	Käfer
T-WIWI-114863	Knowledge-Driven Artificial Intelligence	4,5 CP	Sack
T-WIWI-106340	Machine Learning 1 - Basic Methods	4,5 CP	Zöllner
T-WIWI-106341	Machine Learning 2 - Advanced Methods	4,5 CP	Zöllner
T-WIWI-112685	Modeling and Simulation	4,5 CP	Lazarova-Molnar
T-WIWI-102697	Business Process Modelling	4,5 CP	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CP	Shukla
T-WIWI-109799	Process Mining	4,5 CP	Schreiber
T-WIWI-110848	Semantic Web Technologies	4,5 CP	Käfer
T-WIWI-102895	Software Quality Management	4,5 CP	Oberweis
Seminars and Advanced Labs (Election: between 0 and 1 items)			
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CP	Professorenschaft des Instituts AIFB
T-WIWI-112914	Advanced Lab Realization of Innovative Services (Master)	4,5 CP	Oberweis
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CP	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	5 CP	Zöllner
T-WIWI-109983	Project Lab Machine Learning	5 CP	Zöllner

Assessment

The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites

It is only allowed to choose one lab.

Competence Goal
The student

- has the ability to master methods and tools in a complex discipline and to demonstrate innovativeness regarding the methods used,
- knows the principles and methods in the context of their application in practice,
- is able to grasp and apply the rapid developments in the field of computer science, which are encountered in work life, quickly and correctly, based on a fundamental understanding of the concepts and methods of computer science,
- is capable of finding and defending arguments for solving problems.

Content
The thematic focus will be based on the choice of courses in the areas of Applied Technical Cognitive Systems, Business Information Systems, Critical Information Infrastructures, Information Service Engineering, Security - Usability - Society or Web Science.

Workload
The total workload for this module is approximately 270 hours. The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module.

M 6.55 Module: Information Engineering [M-WIWI-101411]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	9

Supplementary Courses (Election:)			
T-WIWI-107501	Energy Market Engineering	4,5 CP	Weinhardt
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CP	Weinhardt
T-WIWI-113727	Special Topics in Information Systems	4,5 CP	Weinhardt

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- understands and analyzes the central role of information as an economic good, a production factor, and a competitive factor,
- identifies, evaluates, prices, and markets information goods,
- analyze and evaluate existing markets regarding the missing incentives and the optimal solution of a given market mechanism, respectively,
- develop solutions in teams.

Content
In the courses of the module the student can deepen his knowledge on the one hand on the design and operation of markets and on the other hand on the impact of digital goods in network industries regarding the pricing policies, business strategies and regulation issues. If choosen, the course Special Topics in Information Engineering & Management additionally provides an opportunity of practical research in the aforementioned range of subjects.

Additional Information
All practical Seminars offered at the IM can be chosen for *Special Topics in Information Systems*. Please update yourself on www.iism.kit.edu/im/lehre.

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

M 6.56 Module: Information Systems in Organizations [M-WIWI-104068]

Coordinators: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	5

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CP	Mädche
T-WIWI-113465	Designing Interactive Systems: Human-AI Interaction	4,5 CP	Mädche
T-WIWI-114210	(Gen)AI-based Automation in Organizations	4,5 CP	Mädche
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CP	Mädche

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- has a comprehensive understanding of conceptual and theoretical foundations of informations systems in organizations
- is aware of the most important classes of information systems used in organizations:. process-centric, information-centric and people-centric information systems.
- knows the most important activities required to execute in the pre-implementation, implementation and post-implementation phase of information systems in organizations in order to create business value
- has a deep understanding of key capabilities of business intelligence systems and/or interactive information systems used in organizations

Content
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, companies have to rethink their way of doing business, from an internal as well as an external digitalization perspective.

This module focuses on the internal digitalization perspective. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for information systems in organizations. The students get the necessary knowledge to guide the successful digitalization of organizations. Each lecture in the module is accompanied with a capstone project that is carried out in cooperation with an industry partner.

Additional Information
New module starting summer term 2018.

Workload
The total workload for this module is approximately 270 hours.

M 6.57 Module: Innovation Management [M-WIWI-101507]

Coordinators: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	14

Mandatory			
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CP	Weissenberger-Eibl
Compulsory Elective Courses (Election: 1 item)			
T-WIWI-114977	Digital Transformation of Public Administration	3 CP	Bauer
T-WIWI-113663	Development of Sustainable, Digital Business Models	3 CP	Weissenberger-Eibl
T-WIWI-111823	Successful Transformation Through Innovation	3 CP	Busch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CP	Weissenberger-Eibl
T-WIWI-110263	Methods in Innovation Management	3 CP	Weissenberger-Eibl
T-WIWI-114184	Pioneering Leadership in German SMEs	3 CP	Weissenberger-Eibl
T-WIWI-114748	Science Communication in the Innovation Process	3 CP	Schwind
Supplementary Courses (Election: 1 item)			
T-WIWI-102866	Design Thinking	3 CP	Terzidis
T-WIWI-114977	Digital Transformation of Public Administration	3 CP	Bauer
T-WIWI-102864	Entrepreneurship	3 CP	Terzidis
T-WIWI-111823	Successful Transformation Through Innovation	3 CP	Busch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CP	Weissenberger-Eibl
T-WIWI-110263	Methods in Innovation Management	3 CP	Weissenberger-Eibl
T-WIWI-114184	Pioneering Leadership in German SMEs	3 CP	Weissenberger-Eibl
T-WIWI-114748	Science Communication in the Innovation Process	3 CP	Schwind

Assessment
The module examination takes the form of partial examinations (according to §4(2), 1-3 SPO) on the core course and other courses of the module totaling at least 9 CP. The assessment of success is described for each course of the module.

The overall grade is based 50% on the lecture "Innovation Management: Concepts, Strategies and Methods", 25% on one of the seminars of the Chair of Innovation and Technology Management and 25% on another course permitted in the module. The overall grade is cut off after the first decimal place.

Prerequisites
The lecture “Innovation Management: Concepts, Strategies and Methods” and one of the seminars of the chair for Innovation and Technology Management are compulsory. The third course can be chosen from the courses of the module.

Competence Goal
Students develop a comprehensive understanding of the innovation process and its conditionality. There is an additional focus on the concepts and processes which are of particular relevance with regard to shaping the entire process. Various strategies and methods are then taught based on this.

After completing the module, students should have developed a systemic understanding of the innovation process and be able to shape this by developing and applying suitable methods.

Content
The Innovation Management: Concepts, Strategies and Methods lecture course teaches concepts, strategies and methods which help students to form a systemic understanding of the innovation process and how to shape it. Building on this holistic understanding, the seminar courses then go into the subjects in greater depth and address specific processes and methods which are central to innovation management.

Additional Information
Seminars offered by Prof. Terzidis (or the members of his research group) are not eligible for crediting in a seminar module of the WiWi degree programs. Exception: Seminar "Entrepreneurship Research".

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations
None

M 6.58 Module: Integrated Production Planning [M-MACH-101272]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each summer term	1 term	German	4	3

Mandatory			
T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0	9 CP	Lanza

Assessment
Written Exam (120 min)

Prerequisites
none

Competence Goal
The students

- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning they have learned about to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.

Content
Within this engineering sciences-oriented module the students will get to learn principle aspects of organization and planning of production systems.

Workload
regular attendance: 63 hours
self-study: 207 hours

Teaching and Learning Methods
Lecture, exercise, excursion

M 6.59 Module: Intellectual Property Law [M-INFO-101215]

Coordinators: N.N.
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules 2 (Law and Sociology)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	5

Intellectual Property Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-101308	Copyright	3 CP	N.N.
T-INFO-101313	Trademark and Unfair Competition Law	3 CP	Matz
T-INFO-101307	Internet Law	3 CP	N.N.
T-INFO-108462	Selected Legal Issues of Internet Law	3 CP	N.N.
T-INFO-101310	Patent Law	3 CP	Straßburger

Assessment
see partial achievements

Prerequisites
None

Competence Goal
The student

- has detailed knowledge of the main intellectual property rights,
- analyzes and evaluates complex issues and leads them to a legal solution,
- translates the legal principles into contracts on the use of intellectual property and solves more complex infringement cases
- knows and understands the main features of registration procedures and has a broad overview of legal issues raised by the Internet.
- analyzes, assesses and evaluates relevant legal issues from a legal, information technology and legal policy perspective, economic and legal policy perspectives

Content
The module provides knowledge in the core areas of intellectual property law and core topics of internet law. It explains the requirements and the necessary procedure for protecting inventions and industrial marks nationally and internationally. In addition, the necessary know-how is taught to use intellectual property rights and to defend intellectual property rights against attacks by third parties.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is based on the credits of the courses of the module. The workload for courses with 3 credits is about 90 hours.The total number of hours per course results from the effort required to attend the lectures as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.60 Module: Lean Management in Construction [M-BGU-101884]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	2 terms	German	4	4

Election Notes
The course Project Management in Construction and Real Estate Industry II is only allowed to be selected if the selectable course Project Management in Construction and Real Estate Industry I has been passed in the context of another module.

Mandatory			
T-BGU-108000	Lean Construction	4,5 CP	Haghsheno
T-BGU-101007	Project Paper Lean Construction	1,5 CP	Haghsheno
Electives (Election: between 1 and 2 items as well as between 3 and 4,5 credits)			
T-BGU-111921	Turnkey Construction	3 CP	Haghsheno
T-BGU-111922	Civil Engineering Structures and Regenerative Energies	3 CP	Haghsheno
T-BGU-103427	Site Management	1,5 CP	Haghsheno
T-BGU-111211	Energetic Refurbishment	1,5 CP	Lennerts, Schneider
T-BGU-103432	Project Management in Construction and Real Estate Industry I	3 CP	Haghsheno
T-BGU-103433	Project Management in Construction and Real Estate Industry II	3 CP	Haghsheno

Assessment
- module component T-BGU-108000 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-101007 with examination of another type according to § 4 Par. 2 No. 3

according to selected course:

- module component T-BGU-111921 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-111922 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-103432 with examination of another type according to § 4 Par. 2 No. 3
- module component T-BGU-103433 with examination of another type according to § 4 Par. 2 No. 3

details about the learning controls, see module components

Prerequisites
none

Competence Goal
Students can explain the theoretical principles of Lean Construction. They can also choose the right process management approach for a project, adapting and improving it as necessary. Furthermore, they are able to identify and analyze problems in construction projects from a process perspective. They can explain the different tools of Lean Construction and select, combine and apply them according to the problem.

Content

- Lean Construction (incl. Lean Construction project work): In this module, the theoretical basics of Lean Construction are presented at the beginning and deepened through learning simulations and exercises. Subsequently, the Last Planner System™, value stream mapping and cooperative contract forms, among others, are examined in depth. Aspects such as construction site logistics, cost and quality management and planning management from a lean perspective will also be discussed. In the exercise, students work in small groups on selected topics based on provided literature and analyze them in the context of the knowledge from the lecture. The results of the small group work are compiled in a written paper and presented at the end of the lecture. To consolidate and reflect on the learning objective, a joint follow-up of the small group work will take place, in which the individual works will be placed in an overall context.
- Turnkey Construction: In the subject area of turnkey construction besides the detailed design of shell construction, technical support and technical building services, there is also an explanation of the related basic knowledge in engineering. Also, basics of the technical support belong to the curriculum, e.g., heating installations, ventilation systems, A/C, electric installations. Most of all, there is a focus on regenerative energies. Furthermore, the explanation of the processes in turnkey construction, from design and construction permit to final acceptance of work, is part of the lecture.
- Civil Engineering Structures and Regenerative Energies: In the subject area of civil engineering structures and regenerative energies, besides basic knowledge in construction, there is also a focus on production methods for the construction and maintenance of the selected civil engineering structures. Adding to conventional construction methods there are topics like additive manufacturing in solid construction. This also includes the view on hydraulic constructions (e.g. water locks), waste disposal (e.g. waste disposal sites) and infrastructure constructions (e.g. steel composite bridge). Also, there is a focus on regenerative energies (e.g. wind power stations).
- Site Management: The course site management presents the work of foreman, site manager, and project manager and contains significant aspects of management processes of the construction site. In addition to performance reporting, work costing and site management, the technical, legal and economic tasks of the site manager as well as communication and correspondence on the construction site will be highlighted. In addition, accident prevention regulations, active and passive protection measures as well as the organization of the labor protection during operation and on site are discussed.
- Energy Refurbishment: fundamentals of building physics, energy-related improvement of the building envelope, improvement of building services engineering and economic efficiency, energy sources and local energy conversion (e.g., photovoltaics, geothermal energy, heat pumps, etc.), calculation of the energy demands of buildings, energy performance assessment of buildings according to GEG.
- Project Management in Construction and Real Estate Industry I: In Part I, selected topics in the field of project management in the construction and real estate industry are examined in depth (including project preparation, procurement models, awarding processes, project organization, contract models, quality/schedule/cost management, risk management, project culture, digitalization).
- Project Management in Construction and Real Estate Industry II: In part II, selected topics in the field of project management in the construction and real estate industry are examined in depth (including project preparation, procurement models, awarding processes, project organization, contract models, quality/deadline/cost management, risk management, project culture, digitization).

Module Grade Calculation
grade of the module is CP weighted average of grades of the partial exams

Additional Information
The number of participants in the course 'Lean Construction' is limited to 50. Registration modalities will be published in time on the institute's homepage or in the corresponding ILIAS course. Students of Profile 2 'Project Management and Lean Construction' in the degree program 'Technology and Management in Construction Management' always receive a confirmation of participation (basic module). Any necessary selection for the remaining places will be made with priority given to students from Civil Engineering (study focus module), Technology and Management in Construction Management (specialization module) and Industrial Engineering (elective module in Engineering Sciences), taking into account the degree program and the student's progress.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Lean Construction lecture/exercise: 60 h

according to selected courses or examinations respectively:

- Turnkey Construction lecture/exercise: 30 h
- Civil Engineering Structures and Regenerative Energies lecture/exercise: 30 h
- Site Management lecture: 15 h
- Energetic Refurbishment lecture: 15 h
- Project Management in Construction and Real Estate Industry I lecture/exercise: 30 h
- Project Management in Construction and Real Estate Industry II lecture/xercise: 30 h

independent study:

- preparation and follow-up lectures, exercises Lean Construction: 30 h
- preparation of project report Lean Construction (partial examination, compulsory): 30 h
- examination preparation Lean Construction (partial examination, compulsory): 60 h

according to selected courses or examinations respectively:

- preparation and follow-up lecture/exercises Turnkey Construction: 30 h
- examination preparation Turnkey Construction (selectable partial examination): 30 h
- preparation and follow-up lecture/exercises Civil Engineering Structures and Regenerative Energies: 30 h
- examination preparation Civil Engineering Structures and Regenerative Energies (selectable partial examination): 30 h
- preparation and follow-up lectures Site Management: 15 h
- examination preparation Site Management (selectable partial examination): 15 h
- preparation and follow-up lectures Energetic Refurbishment: 15 h
- examination preparation Energetic Refurbishment (selectable partial examination): 15 h
- preparation and follow-up lecture/exercises Project Management in Construction and Real Estate Industry I: 30 h
- examination preparation Project Management in Construction and Real Estate Industry I (selectable partial examination): 30 h
- preparation and follow-up lecture/exercises Project Management in Construction and Real Estate Industry II: 30 h
- examination preparation Project Management in Construction and Real Estate Industry II (selectable partial examination): 30 h

total: 270 h

Recommendations
It is recommend to take the module Fundamentals of construction [WI3INGBGU3] from the Bachelor's degree program.

Literature
Gehbauer, F. (2013) Lean Management Im Bauwesen. Skript des Instituts für Technologie und Management im Baubetrieb, Karlsruher Institut für Technologie (KIT).
Liker, J. & Meier, D. (2007) Praxisbuch, der Toyota Weg: für jedes Unternehmen. Finanzbuch Verlag.
Rother, M., Shook, J., & Wiegand, B. (2006). Sehen lernen: mit Wertstromdesign die Wertschöpfung erhöhen und Verschwendung beseitigen. Lean Management Institut.

M 6.61 Module: Logistics and Supply Chain Management [M-MACH-105298]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each summer term	1 term	English	4	4

Mandatory			
T-MACH-110771	Logistics and Supply Chain Management	9 CP	Furmans

Assessment
The success control takes place in the form of an examination performance of a different kind. This is composed as follows:

- 50% assessment of a written examination (60 min) during the semester break
- 50% assessment of an oral examination (approx. 20 min) during the semester break

To pass the examination, both examination performances must be passed.

Prerequisites
None

Competence Goal
The student

- has comprehensive and well-founded knowledge of the central challenges in logistics and supply chain management, an overview of various practical issues and the decision-making requirements and models in supply chains,
- can model supply chains and logistics systems using simple models with sufficient accuracy,
- identifies cause-effect relationships in supply chains,
- is able to evaluate supply chains and logistics systems based on the methods they have mastered.

Content
Logistics and Supply Chain Management provides comprehensive and well-founded fundamentals for the crucial issues in logistics and supply chain management. Within the scope of the lectures, the interaction of different design elements of supply chains is emphasized. For this purpose, qualitative and quantitative description models are used. Methods for mapping and evaluating logistics systems and supply chains are also covered. The lecture contents are enriched by exercises and case studies and partially the comprehension of the contents is provided by case studies. The interacting of the elements will be shown, among other things, in the supply chain of the automotive industry.

Module Grade Calculation
grade of the module is grades of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture: 60 h

independent study:

- preparation and follow-up lectures: 90 h
- preparation of case studies: 60 h
- examination preparation: 60 h

total: 270 h

Recommendations
none

Teaching and Learning Methods
Lectures, tutorials, case studies.

Literature

Knut Alicke: Planung und Betrieb von Logistiknetzwerken: Unternehmensübergreifendes Supply Chain Management, 2003

Dieter Arnold et. al.: Handbuch Logistik, 2008

Marc Goetschalkx: Supply Chain Engineering, 2011

M 6.62 Module: Machine Tools and Industrial Handling [M-MACH-101286]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	1 term	German	4	5

Mandatory			
T-MACH-110963	Machine Tools and High-Precision Manufacturing Systems	9 CP	Fleischer

Assessment
Oral exam (approx. 45 minutes)

Prerequisites
None

Competence Goal
The students

- are able to assess the use and application of machine tools and high-precision manufacturing systems and to differentiate between them in terms of their characteristics and design.
- can describe and discuss the essential elements of machine tools and high-precision manufacturing systems (frame, main spindle, feed axes, peripheral equipment, control unit).
- are able to select and dimension the essential components of machine tools and high-precision manufacturing systems.
- are capable of selecting and evaluating machine tools and high-precision manufacturing systems according to technical and economic criteria.

Content
The module gives an overview of the construction, use and application of machine tools and high-precision manufacturing systems. In the course of the module a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools and high-precision manufacturing systems is conveyed. First, the main components of the systems are systematically explained and their design principles as well as the integral system design are discussed. Subsequently, the use and application of machine tools and high-precision manufacturing systems will be demonstrated using typical machine examples. Based on examples from current research and industrial applications, the latest developments are discussed, especially concerning the implementation of Industry 4.0 and artificial intelligence.
Guest lectures from industry round off the module with insights into practice.

The individual topics are:

- Structural components of dynamic manufacturing Systems
- Feed axes: High-precision positioning
- Spindles of cutting machine Tools
- Peripheral Equipment
- Machine control unit
- Metrological Evaluation
- Maintenance strategies and condition Monitoring
- Process Monitoring
- Development process for machine tools and high-precision manufacturing Systems
- Machine examples

Workload
regular attendance: 63 hours
self-study: 207 hours

Teaching and Learning Methods
Lecture, exercise, excursions

M 6.63 Module: Management Accounting [M-WIWI-101498]

Coordinators: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	see Annotations	2 terms	English	4	3

Mandatory			
T-WIWI-102800	Management Accounting 1	4,5 CP	Wouters
T-WIWI-102801	Management Accounting 2	4,5 CP	Wouters

Assessment
The course "Management Accounting 1" and the corresponding assessment for first-time examinees will be offered for the last time in the **summer semester 2026**.

The course "Management Accounting 2" and the corresponding assessment for first-time examinees will be offered for the last time in the **winter semester 2026/2027**.

The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
If the module has already been completed in the Bachelor's program, it may not be taken again in the Master's program.

Competence Goal
Students
- are familiar with various management accounting methods,
- can apply these methods for cost estimation, profitability analysis, and product costing,
- are able to analyze short-term and long-decisions with these methods,
- have the capacity to devise instruments for organizational control.

Content
The module consists of two courses "Management Accounting 1" and "Management Accounting 2". The emphasis is on structured learning of management accounting techniques.

Additional Information
The course "Management Accounting 1" and the corresponding assessment for first-time examinees will be offered for the last time in the **summer semester 2026**.

The course "Management Accounting 2" and the corresponding assessment for first-time examinees will be offered for the last time in the **winter semester 2026/2027**.

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

M 6.64 Module: Manufacturing Technology [M-MACH-101276]

Coordinators: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	1 term	German	4	7

Mandatory			
T-MACH-113570	Additive Manufacturing Processes	4 CP	Zanger
T-MACH-114058	Process Design for Machining of Metallic Components	4 CP	Schulze
T-MACH-114686	Overview of Manufacturing Technologies für Industrial Engineers	1 CP	Schulze

Assessment
Siehe einzelne Teilleistungen

Prerequisites
None

Competence Goal
The students

- can name different manufacturing processes, can describe their specific characteristics and are capable to depict the general function of manufacturing processes and are able to assign manufacturing processes to the specific main groups.
- are enabled to identify correlations between different processes and to select a process depending on possible applications.
- are capable to describe the theoretical basics for the manufacturing processes they got to know within the scope of the course and are able to compare the processes.
- are able to correlate based on their knowledge in materials science the processing parameters with the resulting material properties by taking into account the microstructural effects.
- are qualified to evaluate different processes on a material scientific basis.

Content
Within this engineering sciences-oriented module the students will get to learn principle aspects of manufacturing technology. Further information can be found at the description of the lectures.

Workload
regular attendance: 63 hours
self-study: 207 hours

M 6.65 Module: Market Engineering [M-WIWI-101446]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	10

Mandatory			
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CP	Weinhardt
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-102613	Auction Theory	4,5 CP	Ehrhart
T-WIWI-113160	Digital Democracy	4,5 CP	Fegert
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CP	Weinhardt
T-WIWI-107501	Energy Market Engineering	4,5 CP	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CP	Weinhardt
T-WIWI-115061	Experimental Research in Economics and Information Systems	4,5 CP	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CP	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CP	Weinhardt

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The students

- know the design criterias of market mechanisms and the systematic approach to create new markets,
- understand the basics of the mechanism design and auction theory,
- analyze and evaluate existing markets regarding the missing incentives and the optimal solution of a given market mechanism, respectively,
- develop solutions in teams.

Content
This module explains the dependencies between the design von markets and their success. Markets are complex interaction of different institution and participants in a market behave strategically according to the market rules. The development and the design of markets or market mechanisms has a strong influence on the behavior of the participants. A systematic approach and a thorough analysis of existing markets is inevitable to design, create and operate a market place successfully. the approaches for a systematic analysis are explained in the mandatory course *Market Engineering* [2540460] by discussing theories about mechanism design and institutional economics. The student can deepen his knowledge about markets in a second course.

Workload
The total workload for this module is approx. 270 hours (9 credits). The distribution is based on the credit points of the courses in the module. The workload for courses with 4.5 credits is approx. 135 hours for courses with 5 credits approx. 150 hours.

The total number of hours per course results from the time required to attend the lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

Recommendations
None

M 6.66 Module: Marketing and Sales Management [M-WIWI-105312]

Coordinators: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each summer term	1 term	English	4	10

Compulsory Elective Courses (Election:)			
T-WIWI-112693	Digital Marketing	4,5 CP	Kupfer
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CP	Klarmann, Konhäuser
T-WIWI-114174	Economic Decision Making	4,5 CP	Scheibehenne
T-WIWI-107720	Market Research	4,5 CP	Klarmann
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	3 CP	Kupfer
T-WIWI-102883	Pricing	4,5 CP	Klarmann
T-WIWI-114893	International Entrepreneurship and Brand Development	6 CP	Kupfer, Terzidis

Assessment
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- have an advanced knowledge about central marketing contents
- have a fundamental understanding of the marketing instruments
- know and understand several strategic concepts and how to implement them
- are able to implement their extensive marketing knowledge in a practical context
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the Marketing department

Content
This module provides students with a profound understanding of key principles and concepts of marketing management and enables them to independently analyze, develop, and critically reflect on marketing and sales strategies. The focus is on combining theoretical knowledge with its practical application in various contexts, from digital markets and B2B environments to international brand development.

Students work on realistic case studies and application-oriented projects, present their ideas in group settings, and receive continuous feedback. Complemented by collaboration with external partners and the use of qualitative and quantitative market research methods, students learn to make data-driven and strategic marketing decisions.

The module consists of the following courses: Digital Marketing, Digital Marketing and Sales in B2B, International Entrepreneurship and Brand Development, Market Research, Online Concepts for Local Retailers in Karlsruhe, and Pricing. The choice of options within the module allows students to set individual priorities.

Workload
The total workload for this module is approximately 270 hours.

M 6.67 Module: Master's Thesis [M-WIWI-101659]

Coordinators: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Business and Economics
Part of: Master's Thesis

Credits	Grading	Recurrence	Duration	Language	Level	Version
30 CP	graded	Each term	1 term	German	4	1

Mandatory			
T-WIWI-103142	Master's Thesis	30 CP	Studiendekan der KIT-Fakultät für Informatik, Studiendekan des KIT-Studienganges

Assessment
The Master's thesis is a written piece of work that demonstrates that the student is able to work on a problem from their subject in an academic manner. It is regulated in detail in § 14 SPO 2015.

The thesis is supervised and assessed by at least two KIT examiners. At least one of the examiners must be a professor, and usually an examiner at Department of Economics and Management.

The regular completion period is six months. Upon justified request by the student, the Examination Board may extend the completion time by a maximum of three months. If the Master's thesis is not completed and submitted to the examiner by the deadline, it will be assessed as "insufficient", unless the candidate is not responsible for this failure (e.g. maternity leave). In addition to the written work on the topic, a presentation can be agreed as an obligatory and grade-relevant part of the thesis. Depending on the agreement, this can take place before submission or after submission on an agreed date. The preparation time for the presentation does not count towards the processing time for the written part, unless it has been included in the overall workload of the final project.

The thesis may be written in English with the consent of the examiner. Other languages require the consent of the examiner and the approval of the examination board.

The candidate may only return the topic of the Master's thesis once and only within the first month of registration.

If the thesis is not passed, it may be repeated once. A new topic must be issued. The same topic may not be repeated. This also applies to comparable topics. In case of doubt, the examination board will decide. The new topic may again be supervised by the examiners of the first thesis.

This regulation also applies analogously after an official withdrawal from a registered topic.

The module grade is the grade for the Master's thesis.

Prerequisites
Proof of at least 50% of the credit points to be achieved via module examinations must be provided.

A written declaration from the examiner regarding the supervision of the thesis must be submitted.

The Master's thesis must bear the following declaration in German:

„Ich versichere wahrheitsgemäß, die Arbeit selbstständig verfasst, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde sowie die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet zu haben."

If this declaration is not included, the thesis will not be accepted.

The institute-specific regulations for the supervision of the Master's thesis must be observed.

Competence Goal
The student can independently handle a complex and unfamiliar subject based on scientific criteria and on the current state of research.

He/she is in a position to critically analyze and structure the researched information as well as derive principles and regularities. He/she knows how to apply the thereby achieved results to solve the task at hand. Taking into account this knowledge and his/her interdisciplinary knowledge, he/she can draw own conclusions, derive improvement potentials, propose and implement science-based decisions.

This is basically also done under consideration of social and/or ethical aspects.

He/she can interpret, evaluate and if required, graphically present the obtained results.

He/she is in a position to sensibly structure a research paper, document them and clearly communicate the results in scientific form.

Content
See German version.

Additional Information
See German version.

Workload
A total of approx. 900 hours is expected for the preparation and presentation of the Master's thesis. In addition to writing the thesis, this figure includes all necessary activities such as literature research, familiarization with the topic, familiarization with any necessary tools, conducting studies/experiments, supervision meetings, etc.

M 6.68 Module: Material Flow in Networked Logistic Systems [M-MACH-101278]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	9

Mandatory			
T-MACH-113914	Mathematical Methods for Production Systems	6 CP	Baumann, Furmans
Material flow in interconnected logistics systems (Election:)			
T-MACH-112213	Applied material flow simulation	4,5 CP	Baumann
T-MACH-113950	Dimensioning of Material Flow Systems in Production and Logistics	4 CP	Furmans
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CP	Kramer, Schönung
T-MACH-115017	Global Logistics	4 CP	Furmans
T-MACH-105187	IT-Fundamentals of Logistics	4 CP	Thomas
T-MACH-105174	Warehousing and Distribution Systems	4 CP	Furmans
T-MACH-105171	Safety Engineering	4 CP	Kany

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- acquires in-depth knowledge on the main topics of logistics, gets an overview of different logistic questions in practice,
- is able to evaluate logistic systems by using the learnt methods,
- is able to analyze and explain the phenomena of industrial material and value streams.

Content
The module *Material Flow in networked Logistic Systems* provides in-depth basics for the main topics of logistics and industrial material and value streams. The obligatory lecture focuses on queuing methods to model production systems. To gain a deeper understanding, the course is accompanied by exercises.

Workload
Regular attendance: 270 hours (9 credits). Lectures with 180 hours attendance 6 credits. Lectures with 120 hours 4 credits.

Teaching and Learning Methods
Lecture, tutorial.

M 6.69 Module: Mathematical Programming [M-WIWI-101473]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: Operations Research
Compulsory Elective Modules 1 (Operations Research)
Compulsory Elective Modules 2 (Operations Research)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	8

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102719	Mixed Integer Programming I	4,5 CP	Stein
T-WIWI-102726	Global Optimization I	4,5 CP	Stein
T-WIWI-103638	Global Optimization I and II	9 CP	Stein
T-WIWI-102856	Convex Analysis	4,5 CP	Stein
T-WIWI-111587	Multicriteria Optimization	4,5 CP	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CP	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CP	Stein
T-WIWI-102855	Parametric Optimization	4,5 CP	Stein
Supplementary Courses (Election: at most 2 items)			
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CP	Rebennack
T-WIWI-102720	Mixed Integer Programming II	4,5 CP	Stein
T-WIWI-102727	Global Optimization II	4,5 CP	Stein
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CP	Nickel
T-WIWI-106549	Large-scale Optimization	4,5 CP	Rebennack
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CP	Grothe
T-WIWI-103124	Multivariate Statistical Methods	4,5 CP	Grothe
T-WIWI-102725	Nonlinear Optimization II	4,5 CP	Stein
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CP	Nickel
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CP	Rebennack

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Mixed Integer Programming I", "Multicriteria Optimization", "Convex Analysis", "Parametric Optimization", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
The student

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content
This module provides an advanced education in mathematical foundations and sophisticated methods of optimization. It addresses complex decision-making situations where optimal solutions must be found under constraints, covering a wide range of specialized optimization classes.

The core content includes:

- **Global and Nonlinear Optimization**: Handling problems with non-convex structures where local optima are not necessarily global solutions. Teaching of methods for determining global optima.
- **Mixed-Integer Optimizatio**n: Modeling and solving problems where both continuous and integer (discrete) variables occur, which is essential for many applications from engineering and economics.
- **Multicriteria Optimization**: Methods for solving problems with multiple, often conflicting objectives (Pareto optimization).

Students learn both the mathematical modeling of complex systems and the application and implementation of modern solution algorithms to efficiently handle real-world optimization problems.

Additional Information
The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload
The total workload for this module is approximately 270 hours.

M 6.70 Module: Microeconomic Theory [M-WIWI-101500]

Coordinators: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	4

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CP	Brumm, Mitusch
T-WIWI-102861	Advanced Game Theory	4,5 CP	Ehrhart, Puppe, Reiß
T-WIWI-102613	Auction Theory	4,5 CP	Ehrhart
T-WIWI-105781	Incentives in Organizations	4,5 CP	Nieken
T-WIWI-113264	Matching Theory	4,5 CP	Puppe
T-WIWI-102859	Social Choice Theory	4,5 CP	Puppe

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- are able to model practical microoeconomic problems mathematically and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs.

Here is an example of a positive question: what firm decisions does a specific regulatory policy result in under imperfect competition? An example of a normative question would be: which voting rule has appealing properties?

Content
The module teaches advanced concepts and content in microeconomic theory. Thematically, it offers a formally rigorous treatment of game theory and exemplary applications, such as strategic interaction on markets and non-/cooperative bargaining ("Advanced Game Theory"), as well as specialized courses dedicated to auctions ("Auktionstheorie") and incentive systems in organizations ("Incentives in Organizations"). Moreover, it offers the opportunity to delve deeper into the mathematical theory of voting and collective decision making, i.e. the systematic aggregation of preferences and judgments ("Social Choice Theory").

Workload
Attendance time: 90 h

Self-study: approx. 100 h

Exam preparation: approx. 80 h

Total: 270 h

M 6.71 Module: Microfabrication [M-MACH-101291]

Coordinators: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	4

Mandatory			
T-MACH-102166	Fabrication Processes in Microsystem Technology	3 CP	Bade
Mikrofertigung (Ergänzungsbereich) (Election: at least 6 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CP	Last
T-MACH-100530	Physics for Engineers	6 CP	Nesterov-Müller
T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications	3 CP	Worgull
T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications	3 CP	Worgull
T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics	3 CP	Worgull
T-MACH-105556	Practical Course Polymers in MEMS	3 CP	Worgull
T-MACH-109122	X-ray Optics	4 CP	Last
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	3 CP	Last
T-MACH-114015	Energy Efficient and Sustainable Tribological Systems (in German)	3 CP	Dienwiebel
T-MACH-114016	Energy Efficient and Sustainable Tribological Systems	3 CP	Dienwiebel

Assessment
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- gains advanced knowledge concerning fabrication techniques in micrometer scale
- aquires knowledge in up-to-date developing research
- can detect and use causal relation in microfabrication process chains.

Content
This engineering module allows the student to gain advanced knowledge in the area of microfabrication. Different manufacturing methods are described and analyzed in an advanced manner. Necessary interdisciplinary knowledge from physics, chemistry, materials science and also up-to-date developments (nano and x-ray optics) in micro fabrication is offered.

Workload
270 hours

M 6.72 Module: Microoptics [M-MACH-101292]

Coordinators: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	5

Mikrooptik (Election: at least 9 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CP	Last
T-MACH-101910	Microactuators	3 CP	Kohl
T-ETIT-100741	Laser Physics	4 CP	Eichhorn
T-MACH-109122	X-ray Optics	4 CP	Last
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	3 CP	Last
T-ETIT-114418	Integrated Photonics	6 CP	Koos

Assessment
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- basic knowlegde for the applications of microoptical systems
- understanding fabrication processes of microoptical elements & systems
- analyzing strengths and weaknesses of lithography processes
- knowledge on the basics of optical sources and detectors and their use in technical systems
- fundamental knowledge on different lasers and their design
- knowlegde on X-ray imaging methodes

Content
Optical imaging, measuring and sensor systems are a base for modern natural sciences. In particular life sciences and telecommunications have an intrinsic need for the application of optical technologies. Numerous fields of physics and engineering, e.g. astronomy and material sciences, require optical techniques. Micro optical systems are introduced in medical diagnostics and biological sensing as well as in products of the daily life.

In this module, an introduction to the basics of optics is provided; optical effects are presented with respect to their technical use.

Optical elements and instruments are presented. Fabrication processes of micro optical systems and elements, in particular lithography, are discussed.

In addition X-ray optics and X-ray imaging systems are presented as well as elements of optical telecommunication. A closer look on the physics behind lasers, being one of the most important technical light sources, is provided. As high end technology and clean room equipment is present in all the lectures of this module, the students will have a hands-on training with several experiments in micro optics.

Workload
270 hours

M 6.73 Module: Microsystem Technology [M-MACH-101293]

Coordinators: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	3

Mandatory			
T-MACH-105182	Introduction to Microsystem Technology I	3 CP	Badilita, Jouda, Korvink
Mikrosystemtechnik (Ergänzungsbereich) (Election: at least 6 credits)			
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CP	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CP	Guber
T-MACH-105183	Introduction to Microsystem Technology II	3 CP	Badilita, Korvink
T-MACH-101910	Microactuators	3 CP	Kohl
T-MACH-102152	Novel Actuators and Sensors	4 CP	Kohl, Sommer
T-ETIT-101907	Optoelectronic Components	4 CP	Huber-Loyola
T-MACH-100530	Physics for Engineers	6 CP	Nesterov-Müller
T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications	3 CP	Worgull
T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications	3 CP	Worgull
T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics	3 CP	Worgull
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CP	Last
T-MACH-111807	Introduction to Bionics	3 CP	Hölscher

Assessment
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

Workload
270 hours

M 6.74 Module: Modeling the Dynamics of Financial Markets [M-WIWI-106660]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each summer term	1 term	English	4	1

Mandatory			
T-WIWI-113414	Modeling the Dynamics of Financial Markets	9 CP	Ulrich

Assessment
The module examination takes the form of a one-hour written comprehensive examination on the courses "Dynamic Capital Market Theory", "Essentials for Dynamic Financial Machine Learning" and "Exercises, Python, Research Frontier in Dynamic Capital Markets".

Competence Goal
Dynamic Capital Market Theory:

Professional competence:

- Understanding of the principles of Dynamic Asset Pricing Theory
- Mastery of concepts such as stochastic calculus and dynamic modeling in discrete and continuous time
- Application of dynamic programming theory to portfolio and investment decisions
- Knowledge of pricing bonds, stocks, futures and options markets.

Interdisciplinary skills:

- Develop analytical skills for working on and solving complex problems in finance
- Ability to apply theoretical models to real financial market scenarios.

Essentials for Dynamic Financial Machine Learning:

Professional Competence:

- Competencies in Multivariate Time Series Modeling and Dynamic Volatility Modeling.
- Skills in dealing with big financial data.
- Knowledge in the estimation of risk premia and the application of Kalman Filtering.

Interdisciplinary skills:

- Analytical skills in applying machine learning algorithms to dynamic financial market data.
- Development of problem-solving skills through the practical application of Python in financial data analysis.

Content
Dynamic Capital Market Theory:

The course "Dynamic Capital Market Theory" offers an introduction to the modeling of dynamic capital markets. Portfolio holdings and asset prices move dynamically across time and states. This course teaches basic financial economic thinking to help understand why this is the case and how to optimally act in such environments.
Next to the asset pricing focus, the second focus of the course is on optimal portfolio choice (robo advisory). For that, this course develops the theory of dynamic programming in discrete and continuous time and applies it to solve portfolio choice and corporate investment decisions. These concepts are key for financial engineering and the machine learning branch of Reinforcement Learning.

Students obtain proficiency in the following topics:

- Dynamic Valuation and Optimal Dynamic Asset Allocation
- Dynamic modeling in discrete time and continuous time
- Stochastic Calculus
- Markov Decision Processes and Dynamic Programming in discrete time and continuous time
- Pricing of bonds, equity, futures and options

Lectures (2 SWS) develop all concepts on the whiteboard.

Essentials for Dynamic Financial Machine Learning:

The course "Essentials for Dynamic Financial Machine Learning" teaches students to work with financial data, algorithms and statistical concepts.
Students are exposed to algorithms to learn key quantities of dynamic capital markets, such as time-varying risk premia, time-varying volatility and unobserved realizations of random states. The course covers the following concepts:

- Multivariate time series modeling
- Dynamic volatility modeling
- Handling big financial data
- Estimating risk premia
- Kalman Filtering

Weekly lectures (2 SWS) develop all algorithmic material on the whiteboard.

Exercises, Python, Research Frontier in Dynamic Capital Markets:

This course provides hands-on experience in implementing concepts from dynamic capital market theory and financial machine learning using Python. Students will develop practical skills in coding and data analysis that complement the theoretical knowledge gained in the companion courses. The course covers:

- Introduction to Python for financial applications Data manipulation and visualization with pandas and matplotlib.
- Implementing dynamic portfolio optimization algorithms.
- Coding stochastic processes and simulations.
- Building and testing time series models.
- Applying machine learning techniques to financial data.
- Developing Reinforcement Learning algorithms for trading strategies.
- Implementing and backtesting option pricing models.
- Creating interactive financial dashboards

Weekly computer lab sessions (2 SWS) will guide students through coding exercises and problem sets that directly relate to topics covered in "Dynamic Capital Market Theory" and "Essentials for Dynamic Financial Machine Learning". Students will work on individual and group projects, applying their programming skills to real-world financial problems and current research questions in dynamic capital markets.
This course forms an integral part of the module, complementing the theoretical components with practical implementation skills essential for modern quantitative finance.

Workload
Total workload for 9 credit points: approx. 270 hours. The exact distribution is based on the credit points of the courses in the module:

- Dynamic Capital Market Theory: 3 CP
- Essentials for Dynamic Financial Machine Learning: 3 CP
- Exercises, Python, Research Frontier in Dynamic Capital Markets: 3 CP

The total number of hours per course is determined by the amount of time spent attending the lectures and tutorials, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

Recommendations
Recommendation: Knowledge in the fields of Advanced Statistics, Deep Learning, Financial Economics, Differential Equations, Optimization.

Teaching and Learning Methods
The module consists of two weekly lectures and respective tutorials:

1. **Dynamic Capital Market Theory** and
2. **Essentials for Dynamic Financial Machine Learning**.
3. **Exercises, Python, Research Frontier in Dynamic Capital Markets**

M 6.75 Module: Modern Mobility on Rails and Roads [M-MACH-106496]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	2

Modern Mobility on Rail and Road (Election: 2 items)			
T-MACH-113016	Digitization in the Railway System	4,5 CP	Cichon
T-MACH-113069	Vehicle Systems for Urban Mobility	4,5 CP	Cichon
T-MACH-113068	Innovation and Project Management in Rail Vehicle Engineering	4,5 CP	Cichon

Competence Goal

- Students will have a basic understanding of train protection and its technical implementation in Germany, the functioning of the European Train Control System (ETCS) and its planning as well as Automated Train Operation. They can explain the knowledge they have learned (terms, relationships) in context and apply it to practical issues. Furthermore, students will be able to classify the operational and technical advantages and disadvantages in the context of the digitalization of the rail network in Germany and take future challenges into account. students will be able to discuss the technical aspects and areas of application of ETCS at the various levels and give a basic outline of balise planning for ETCS Level 2. Digital planning approaches such as PlanPro as well as measurement and test runs are known and can be categorized.
- Students gain a basic understanding of the key transport, transport policy and technological contexts of urban mobility. Based on this basic understanding, various public transport vehicle concepts in the urban and regional environment are analyzed, compared and the optimal range of applications discussed. In addition to established public transport systems, special attention is paid to innovative mobility solutions. In particular, the aim is to create an understanding of how sustainable, systemic mobility solutions should be designed depending on the individual application.
- In this course, students will learn the basics of innovation and project management in the context of rail vehicle development. Creativity techniques are applied to the challenges of the rail system in a practical way, such as aspects of sustainability. Students will also learn about the various organizational, systemic, economic and technological challenges of a project and project management.

M 6.76 Module: Nanotechnology [M-MACH-101294]

Coordinators: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	6

Mandatory			
T-MACH-111814	Introduction to Nanotechnology	4 CP	Hölscher
Nanotechnologie (Ergänzungsbereich) (Election: at least 5 credits)			
T-MACH-111807	Introduction to Bionics	3 CP	Hölscher
T-MACH-102152	Novel Actuators and Sensors	4 CP	Kohl, Sommer
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CP	Last
T-ETIT-100740	Quantum Functional Devices and Semiconductor Technology	3 CP	Koos
T-MACH-105695	Selected topics of system integration for micro- and nanotechnology	4 CP	Gengenbach, Hagenmeyer, Koker, Sieber
T-MACH-108809	Micro- and Nanosystem Integration for Medical, Fluidic and Optical Applications	4 CP	Gengenbach, Koker, Sieber
T-MACH-111030	Micro- and nanotechnology in implant technology	4 CP	Ahrens, Doll
T-PHYS-102282	Nano-Optics	8 CP	Naber
T-PHYS-102504	Simulation of Nanoscale Systems, without Seminar	6 CP	Wenzel
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	3 CP	Last
T-MACH-114552	System Integration in Micro- and Nanotechnology I	4 CP	Gengenbach
T-MACH-114553	System Integration in Micro- and Nanotechnology II	4 CP	Gengenbach
T-MACH-114015	Energy Efficient and Sustainable Tribological Systems (in German)	3 CP	Dienwiebel
T-MACH-114016	Energy Efficient and Sustainable Tribological Systems	3 CP	Dienwiebel

Assessment
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- has detailed knowledge in the field of nanotechnology
- is able to evaluate the specific characteristics of nanosystems.

Content
The module deals with the most important principles and fundamentals of modern nanotechnology. The compulsory module “Introduction to Nanotechnology” introduces the basics of nanotechnology and nanoanalytics. The specific phenomena and properties found in nanoscale systems are the main topic of the module.

Workload
270 hours

Teaching and Learning Methods
Lectures

M 6.77 Module: Natural Hazards and Risk Management [M-WIWI-104837]

Coordinators: apl. Prof. Dr. Michael Kunz
Organisation: KIT Department of Business and Economics
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	2

Compulsory Elective Courses (Election: at least 9 credits)			
T-BGU-101499	Introduction to Hydrogeology	5 CP	Goldscheider
T-BGU-108943	Engineering Hydrology	3 CP	Loritz, Villinger
T-BGU-111275	Integrated Design Project in Water Resources Management	6 CP	Ehret, Seidel
T-BGU-101859	Morphodynamics	3 CP	Rodrigues Pereira da Franca
T-BGU-106620	Examination Prerequisite Environmental Communication	0 CP	Kämpf
T-BGU-101676	Environmental Communication	4 CP	Kämpf

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
See German version

Content
See German version

Additional Information
Students, who successfully completed both modules “Understanding and Prediction of Disasters” I and II (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.78 Module: Network Economics [M-WIWI-101406]

Coordinators: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	3

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-100005	Competition in Networks	4,5 CP	Mitusch
T-WIWI-100007	Transport Economics	4,5 CP	Mitusch, Szimba
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CP	Brumm, Mitusch
T-WIWI-102712	Regulation Theory and Practice	4,5 CP	Mitusch
T-WIWI-113147	Telecommunications and Internet – Economics and Policy	4,5 CP	Mitusch

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students

- have acquired the basic knowledge for a future job in a network company or in a regulatory agency, ministry etc.
- recognize the specific characterizations of network sectors, know fundamental methods for an economic analysis of network sectors and recognize the interfaces for an interdisciplinary cooperation of economists, engineers and lawyers
- understand the interactions between infrastructures, control systems, and the users of networks, especially concerning their implications on investments, price setting and competitive behavior, and they can model or simulate exemplary applications
- can assess the necessity of regulation of natural monopolies and identify regulatory measures that are important for networks.

Content
The module is concerned with network or infrastructure industries in the economy, e.g. telecommunication, traffic and energy sectors. These sectors are characterized by close interdependencies of operators and users of infrastructure as well as on states. States intervene in various forms, by the public and regulation authorities, due to the importance of network industries and due to limited abilities of markets to work properly in these industries. The students are supposed to develop a broad knowledge of these sectors and of the political options available.

Workload
Total workload for 9 credit points: approx. 270 hours

The exact distribution is based on the credit points of the courses in the module.

Recommendations
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

M 6.79 Module: Operations Research in Supply Chain Management [M-WIWI-102832]

Coordinators: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Business and Economics
Part of: Operations Research
Compulsory Elective Modules 1 (Operations Research)
Compulsory Elective Modules 2 (Operations Research)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	10

Election Notes
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CP	Nickel
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CP	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CP	Nickel
Supplementary Courses (Election: at most 1 item)			
T-MACH-112213	Applied material flow simulation	4,5 CP	Baumann
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CP	Rebennack
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CP	Spieckermann
T-WIWI-102719	Mixed Integer Programming I	4,5 CP	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CP	Stein
T-WIWI-106549	Large-scale Optimization	4,5 CP	Rebennack
T-WIWI-111587	Multicriteria Optimization	4,5 CP	Stein
T-WIWI-114747	"Practical Seminar in Discrete Optimization: Implementing and Evaluating Solution Methods (with Python)"	4,5 CP	Bakker
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CP	Rebennack

Assessment
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of SCM and their respective optimization problems,
- is acquainted with classical location problem models (in planes, in networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

This module considers several areas of SCM. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of Supply Chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of supply chain management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Mangement, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Additional Information
Some lectures and courses are offered irregularly.

The planned lectures and courses for the next three years are announced online.

Workload
Total effort for 9 credits: ca. 270 hours

- Presence time: 84 hours
- Preparation/Wrap-up: 112 hours
- Examination and examination preparation: 74 hours

Recommendations
Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

M 6.80 Module: Optoelectronics and Optical Communication [M-MACH-101295]

Coordinators: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	3

Optoelektronik und Optische Kommunikationstechnik (Kernbereich) (Election: 1 item)			
T-ETIT-100639	Optical Transmitters and Receivers	6 CP	Freude
Optoelektronik und Optische Kommunikationstechnik (Ergänzungsbereich) (Election: at least 5 credits)			
T-MACH-102152	Novel Actuators and Sensors	4 CP	Kohl, Sommer
T-ETIT-101938	Communication Systems and Protocols	5 CP	Becker, Becker
T-ETIT-100741	Laser Physics	4 CP	Eichhorn
T-ETIT-100740	Quantum Functional Devices and Semiconductor Technology	3 CP	Koos
T-ETIT-114418	Integrated Photonics	6 CP	Koos

Assessment
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
Student has basic knowledge of optical communication systems and related device and fabrication technologies.

- He/she can apply this knowledge to specific problems.

Content
This module covers practical and theoretical aspects in the areas of optical communications and optoelectronics. System aspects of communication networks are complemented by fundamental principles and device technologies of optoelectronics as well as and microsystem fabrication technologies.

Workload
270 hours

M 6.81 Module: Principles of Food Process Engineering [M-CIWVT-101120]

Coordinators: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Level	Version
9 CP	graded	Each term	2 terms	4	3

Principles of Food Process Engineerung (Election: 1 item)			
T-CIWVT-111536	Process Engineering: Example Food Processing	6 CP	Gaukel
T-CIWVT-100152	Advanced Food Processing	3 CP	Gaukel
Elective Courses: Food Process Engineering (Election: between 3 and 8 credits)			
T-CIWVT-112174	Extrusion Technology in Food Processing	4 CP	
T-CIWVT-108801	Food Science and Functionality	4 CP	Seifert

Prerequisites
none

Competence Goal
See German version.

M 6.82 Module: Private Business Law [M-INFO-101216]

Coordinators: N.N.
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules 2 (Law and Sociology)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	6

Private Business Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-111405	Seminar: Commercial and Corporate Law in the IT Industry	3 CP	Nolte
T-INFO-101288	Corporate Compliance	3 CP	Herzig
T-INFO-102036	Computer Contract Law	3 CP	Menk
T-INFO-111436	Employment Law	3 CP	Hoff
T-INFO-111437	Tax Law	3 CP	Dietrich

Assessment
see partial achievements

Prerequisites
None

Competence Goal
The student

- has gained in-depth knowledge of German company law, commercial law and civil law;
- is able to analyze, evaluate and solve complex legal and economic relations and problems;
- is well grounded in individual labour law, collective labour law and commercial constitutional law, evaluates and critically assesses clauses in labour contracts;
- recognizes the significance of the parties to collective labour agreements within the economic system and has differentiated knowledge of labour disputes law and the law governing the supply of temporary workers and of social law;
- possesses detailed knowledge of national earnings and corporate tax law and is able to deal with provisions of tax law in a scientific manner and assesses the effect of these provisions on corporate decision-making.

Content
The module covers a range of special topics in corporate law, knowledge of which is essential in order to make sensible business decisions. Building on the knowledge previously acquired in private law, students gain practical insights into how contracts are drafted, as well as even more detailed knowledge of civil law and German commercial and company law. In addition, they will acquire solid knowledge of labor and tax law.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is based on the credits of the courses of the module. The workload for courses with 3 credits is about 90 hours.The total number of hours per course results from the effort required to attend the lectures as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.83 Module: Process Engineering in Construction [M-BGU-101110]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	2 terms	German	4	1

Mandatory			
T-BGU-101844	Process Engineering	3 CP	Schneider
Electives (Election: between 2 and 3 items as well as between 6 and 7,5 credits)			
T-BGU-101845	Construction Equipment	3 CP	Gentes
T-BGU-101832	Operation Methods for Foundation and Marine Construction	1,5 CP	Schneider
T-BGU-101801	Operation Methods for Earthmoving	1,5 CP	Schlick
T-BGU-101846	Tunnel Construction and Blasting Engineering	3 CP	Haghsheno
T-BGU-101847	Project Studies	3 CP	Gentes
T-BGU-101850	Disassembly Process Engineering	3 CP	Gentes

Assessment
- module component T-BGU-101844 with written examination according to § 4 Par. 2 No. 1

according to selected course:

- module component T-BGU-101845 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-101832 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-101801 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-101846 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-101847 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-101850 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls, see module components

Prerequisites
The course Verfahrenstechnik [6241704] is compulsory and must be examined.

Competence Goal
Students understand different processes and the related construction equipment, it's technology, capabilities and constraints. Students can define process solutions consisting of machinery and devices. They can evaluate existing processes through knowledge about process performance and operating conditions, and the can identify potential for improvement.

Content
Within the frame of this module, various construction und conditioning processes will be presented as well as performance calculations conducted. Students learn about the construction machinery and devices of these processes. Transmission, generation, conversion and controlling of power are explained with the help of various practical examples. Moreover, the module includes possibilities for an on-site familiarization.

Module Grade Calculation
grade of the module is CP weighted average of grades of the partial exams

Additional Information
None

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Process Engineering lecture: 30 h

according to the selected course and examination:

- Construction Equipment lecture: 30 h
- Operation Methods for Foundation and Marine Construction lecture: 15 h
- Operation Methods for Earthmoving lecture: 15 h
- Tunnel Construction and Blasting Engineering lecture: 30 h
- Project Studies lecture, exercise: 30 h
- Disassembly Process Engineering lecture, exercise: 30 h

independent study:

- preparation and follow-up lectures Process Engineering: 30 h
- examination preparation Process Engineering (partial examination, compulsory): 30 h

according to the selected course and examination:

- preparation and follow-up lectures Construction Equipment: 30 h
- examination preparation Construction Equipment (partial examination, selectable): 30 h
- preparation and follow-up lectures Operation Methods for Foundation and Marine Construction: 15 h
- examination preparation Operation Methods for Foundation and Marine Construction (partial examination, selectable): 15 h
- preparation and follow-up lectures Operation Methods for Earthmoving: 15 h
- examination preparation Operation Methods for Earthmoving (partial examination, selectable): 15 h
- preparation and follow-up lectures Tunnel Construction and Blasting Engineering: 30 h
- examination preparation Tunnel Construction and Blasting Engineering (partial examination, selectable): 30 h
- preparation and follow-up lectures, exercises Project Studies: 30 h
- examination preparation Project Studies (partial examination, selectable): 30 h
- preparation and follow-up lectures, exercises Disassembly Process Engineering: 30 h
- examination preparation Disassembly Process Engineering (partial examination, selectable): 30 h

total: 270 h

Recommendations
none

M 6.84 Module: Production Engineering [M-MACH-106590]

Coordinators: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	5

Production Engineering (Election: at least 9 credits)			
T-MACH-113985	Additive Manufacturing of Metallic Components	4 CP	Zanger
T-MACH-113647	Digitalization from Product Concept to Production	4 CP	Wawerla
T-MACH-114800	Global Production	5 CP	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CP	Schlichtenmayer
T-MACH-112115	Artificial Intelligence in Production	5 CP	Fleischer
T-MACH-105783	Learning Factory "Global Production"	6 CP	Lanza
T-MACH-108878	Laboratory Production Metrology	5 CP	Benfer, Lanza
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CP	Kienzle, Steegmüller
T-MACH-110984	Production Technology for E-Mobility	4 CP	Fleischer
T-MACH-113575	Project Course Additive Manufacturing: Design Optimization and Production of Metallic Components	4 CP	Zanger
T-MACH-102107	Quality Management	4 CP	Lanza
T-MACH-113031	Rapid Industrialization of Immature Products using the Example of Electric Mobility	4 CP	Bauer
T-MACH-112121	Seminar Application of Artificial Intelligence in Production	4 CP	Fleischer
T-MACH-105185	Control Technology	4 CP	Gönnheimer
T-MACH-114969	Strategic Decision-Making in Global Production Networks through Optimization and Simulation	4 CP	Lanza, Martin
T-MACH-105177	Metal Forming	4 CP	Herlan
T-MACH-102148	Gear Cutting Technology	4 CP	Klaiber

Assessment
Oral exams: duration approx. 5 min per credit point

Written exams: duration approx. 20 - 25 min per credit point

Amount, type and scope of the success control can vary according to the individually choice.

Prerequisites
The module M-MACH-101284 -Production Technology must not have been started.

Competence Goal
The students

- are able to apply the methods of production science to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Content
Within this module the students will get to know and learn about production science. Manifold lectures and excursions as part of several lectures provide specific insights into the field of production science.

Workload
The work load is about 270 hours, corresponding to 9 credit points.

Teaching and Learning Methods
Lectures, seminars, workshops, excursions

M 6.85 Module: Project Management in Construction [M-BGU-101888]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	2 terms	German	4	3

Election Notes
The course Project Management in Construction and Real Estate Industry II is only allowed to be selected if the selectable course Project Management in Construction and Real Estate Industry I has been passed.

Mandatory			
T-BGU-103432	Project Management in Construction and Real Estate Industry I	3 CP	Haghsheno
T-BGU-111921	Turnkey Construction	3 CP	Haghsheno
Electives (Election: between 1 and 2 items as well as between 3 and 4,5 credits)			
T-BGU-103427	Site Management	1,5 CP	Haghsheno
T-BGU-111211	Energetic Refurbishment	1,5 CP	Lennerts, Schneider
T-BGU-111922	Civil Engineering Structures and Regenerative Energies	3 CP	Haghsheno
T-BGU-103433	Project Management in Construction and Real Estate Industry II	3 CP	Haghsheno

Assessment
- module component T-BGU-103432 with examination of another type according to § 4 Par. 2 No. 3
- module component T-BGU-111921 with written examination according to § 4 Par. 2 No. 1

according to selected course:

- module component T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-111922 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-103433 with examination of another type according to § 4 Par. 2 No. 3

details about the learning controls, see module components

Prerequisites
none

Competence Goal
Students have basic and in-depth knowledge and skills in project management in the construction and real estate industry. They know the necessary skills for successful project management according to the ICB4 standard of the International Project Management Association (IPMA) in the areas of context, methods, personality and social issues. They will be able to apply selected project management content (especially project objectives and determination of requirements, project execution implementation strategies and award procedures, schedule management, cost management and quality management) and transfer project management methods to specific construction projects as part of a project setup. They are also familiar with the job description of project manager/project controller in the German construction and real estate industry and their corresponding tasks in a construction project. Furthermore, students will be able to collaborate effectively in teams and to present jointly developed content as a group (to a potential client) in the context of project work.

Content

- Project Management in Construction and Real Estate Industry I: In Part I, selected topics in the field of project management in the construction and real estate industry are examined in depth (including project preparation, procurement models, awarding processes, project organization, contract models, quality/schedule/cost management, risk management, project culture, digitalization).
- Turnkey Construction: In the subject area of turnkey construction besides the detailed design of shell construction, technical support and technical building services, there is also an explanation of the related basic knowledge in engineering. Also, basics of the technical support belong to the curriculum, e.g., heating installations, ventilation systems, A/C, electric installations. Most of all, there is a focus on regenerative energies. Furthermore, the explanation of the processes in turnkey construction, from design and construction permit to final acceptance of work, is part of the lecture.
- Site Management: The course site management presents the work of foreman, site manager, and project manager and contains significant aspects of management processes of the construction site. In addition to performance reporting, work costing and site management, the technical, legal and economic tasks of the site manager as well as communication and correspondence on the construction site will be highlighted. In addition, accident prevention regulations, active and passive protection measures as well as the organization of the labor protection during operation and on site are discussed.
- Energy Refurbishment: fundamentals of building physics, energy-related improvement of the building envelope, improvement of building services engineering and economic efficiency, energy sources and local energy conversion (e.g., photovoltaics, geothermal energy, heat pumps, etc.), calculation of the energy demands of buildings, energy performance assessment of buildings according to GEG.
- Civil Engineering Structures and Regenerative Energies: In the subject area of civil engineering structures and regenerative energies, besides basic knowledge in construction, there is also a focus on production methods for the construction and maintenance of the selected civil engineering structures. Adding to conventional construction methods there are topics like additive manufacturing in solid construction. This also includes the view on hydraulic constructions (e.g. water locks), waste disposal (e.g. waste disposal sites) and infrastructure constructions (e.g. steel composite bridge). Also, there is a focus on regenerative energies (e.g. wind power stations).
- Project Management in Construction and Real Estate Industry II: In part II, selected topics in the field of project management in the construction and real estate industry are examined in depth (including project preparation, procurement models, awarding processes, project organization, contract models, quality/deadline/cost management, risk management, project culture, digitization).

Module Grade Calculation
grade of the module is CP weighted average of grades of the partial exams

Additional Information
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Project Management in Construction and Real Estate Industry I lecture/exercise: 30 h
- Turnkey Construction lecture/exercise: 30 h

according to the selected course and examination:

- Site Management lecture: 15 h
- Energetic Refurbishment lecture: 15 h
- Civil Engineering Structures and Regenerative Energies lecture/exercise: 30 h
- Project Management in Construction and Real Estate Industry II lecture/exercise: 30 h

independent study:

- preparation and follow-up lecture/exercises Project Management in Construction and Real Estate Industry I: 30 h
- examination preparation Project Management in Construction and Real Estate Industry I (partial examination, compulsory): 30 h
- preparation and follow-up lecture/exercises Turnkey Construction: 30 h
- examination preparation Turnkey Construction (partial examination, compulsory): 30 h

according to the selected course and examination:

- preparation and follow-up lectures Site Management: 15 h
- examination preparation Site Management (selectable partial examination): 15 h
- preparation and follow-up lectures Energetic Refurbishment: 15 h
- examination preparation Energetic Refurbishment (selectable partial examination): 15 h
- preparation and follow-up lecture/exercises Civil Engineering Structures and Regenerative Energies: 30 h
- examination preparation Civil Engineering Structures and Regenerative Energies (selectable partial examination): 30 h
- preparation and follow-up lecture/exercises Project Management in Construction and Real Estate Industry II: 30 h
- examination preparation Project Management in Construction and Real Estate Industry II (selectable partial examination): 30 h

total: 270 h

Recommendations
see German version

Literature

Ahrens, H.; Bastian, K.; Muchowski, L. (Hrsg.) (2021): Handbuch – Projektsteurung, Baumanagement. Fraunhofer IRB Verlag.

Allison, M.; Ashcarft, H.; Cheng, R.; Klawens, S.; Pease, J. (2018): Integrated Project Delivery - An Action Guide for Leaders.

Ausschuss der Verbände und Kammern der Ingenieure und Architekten für die Honorarordnung e.V. (Hrsg.) (2020): Heft Nr. 9: Projektmanagement in der Bau- und Immobilienwirtschaft - Standards für Leistungen und Vergütung. Reguvis Fachmedien.

Breyer, W. (2017): Partnering Modelle - ein internationaler Vergleich. In: Planen, Errichten und Betreiben. Digitalisierung im Bau. 4. Internationaler BBB-Kongress. Hrsg. von Fritz Berner. BBB Professoren. Stuttgart: Institut für Baubetriebslehre, Universität Stuttgart, S. 163–177.

Eitelhuber, A. et al. (Hrsg.) (2008). Partnering in der Bau- und Immobili- enwirtschaft: Projektmanagement- und Vertragsstandards in Deutschland. Handbücher: Rechtswissenschaften und Verwaltung. Kohlhammer, Stuttgart. ISBN: 9783170198616.

Eschenbruch, K. (2009). Projektmanagement und Projektsteuerung für die Immobilien- und Bauwirtschaft. Die rechtlichen Grundlagen für Leistung, Vergütung, Nachträge, Haftung, Vergabe und Vertragsgestaltung – Kom- mentar zum Vertragsmusterrecht und Leistungsbild Bund – mit Vertrags- mustern aus der Praxis für öffentliche und private Auftraggeber. 3. Aufl., Werner, Neuwied. ISBN: 978-3-8041-1467-8.

Fiedler, M. (2018): Lean Construction – Das Managementhandbuch – Agile Methoden und Lean Management im Bauwesen. Springer, Berlin, Heidelberg.

Girmscheid, G. (2016): Projektabwicklung in der Bauwirtschaft: Wege zur Win-Win-Situation für Auftraggeber und Auftragnehmer. Wege zur Win-Win-Situation für Auftraggeber und Auftragnehmer. 5. Aufl. VDI-Buch. Springer, Berlin, Heidelberg. ISBN: 978-3-662-49329-8.

Heidemann, A. (2011): Kooperative Projektabwicklung im Bauwesen unter der Berücksichtigung von Lean-Prinzipien - Entwicklung eines Lean- Projektabwicklungssystems. Internationale Untersuchungen im Hinblick auf die Umsetzung und Anwendbarkeit in Deutschland". Karlsruhe: Universität Karlsruhe. ISBN: 978-3-86644-583-3.

Kochendörfer, B.; Liebchen, J. H.; Viering, M. G. (2018): Bau-Projekt-Management. Grundlagen und Vorgehensweisen. 5. Aufl. Leitfaden des Baubetriebs und der Bauwirtschaft. Wiesbaden, Springer Vieweg. ISBN: 978-3-8348-1823-2. DOI: 10.1007/978-3-8348-2245-1. URL: http: //dx.doi.org/10.1007/978-3-8348-2245-1.

Mafakheri, F.; Dai, L.; Slezak, D.; Nasiri, F. (2007): Project Delivery System Selection under Uncertainty. In: Journal of Management in Engineering 23 (4), S. 200-206.

Schlabach, C. (2013): Untersuchungen zum Transfer der australischen Projektabwicklungsform Project Alliancing auf den deutschen Hochbaumarkt. Dissertation, Kassel, Universität Kassel. ISBN: 9783862194902.

Sommer, H. (2016): Projektmanagement im Hochbau mit BIM und Lean Management. Springer Vieweg.

Walker, D. H. T.; Rowlinson, S. (Hrsg) (2020): Routledge handbook of integrated project delivery. 1. Aufl. Routledge handbooks. London, Routledge. ISBN: 9781138736689.

Zuber, S. Z. S.; Nawi, M. N. M.; Nifa, F. A. A.; Bahaudin, A. Y. (2018): An Overview of Project Delivery Methods in Construction Industry. In: International Journal of Supply Chain Management 7 (6), S. 177-182.

M 6.86 Module: Public Economic and Technology Law [M-INFO-106754]

Coordinators: TT-Prof. Dr. Frederike Zufall
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules 2 (Law and Sociology)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	2

Public Economic and Technology Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-101309	Telecommunications Law	3 CP	
T-INFO-101312	European and International Law	3 CP	Brühann
T-INFO-111404	Seminar: IT- Security Law	3 CP	Schallbruch
T-INFO-113381	Public International Law	3 CP	Zufall
T-INFO-113887	EU Data Protection Law	3 CP	Gil Gasiola

Assessment
see partial achievement

Prerequisites
see partial achievement

Competence Goal
Students
- have in-depth knowledge and understanding of selected legal areas of public commercial and technology law,
- understand the international and European dimensions of the legal system
- can make connections between technical and legal issues, classify them legally and evaluate them.

Content
The module covers a range of special topics in public commercial and technology law. In addition to the areas of telecommunications law and IT security law, this also includes an in-depth examination of the European and international legal framework. Current legal aspects of the platform economy, the digital single market and the regulation of artificial intelligence are addressed.

Workload
The total workload for this module is approx. 270 hours (9 credits). The distribution is based on the credit points of the courses in the module. The workload for courses with 3 credits is approx. 90 hours. The total number of work hours per course results from the time required to attend the lectures, the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

Recommendations
see partial achievement

M 6.87 Module: Rail System Technology and Rail Vehicle Technology [M-MACH-107717]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German	4	1

Mandatory			
T-MACH-106424	Rail System Technology	4,5 CP	Cichon
T-MACH-105353	Rail Vehicle Technology	4,5 CP	Cichon

Assessment
Two separate written examinations
Duration: 60 minutes Rail System Technology and 60 minutes Rail Vehicle Technology
Aids: none except calculator and dictionary

Competence Goal

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- Based on operating requirements and legal framework they derive the requirements concerning a capable infrastructure and suitable concepts of rail vehicles.
- They recognize the impact of alignment, understand the important function of the wheel-rail-contact and estimate the impact of driving dynamics on the operating program.
- They evaluate the impact of operating concepts on safety and capacity of a rail system.
- They know the infrastructure to provide power supply to rail vehicles with different drive systems.
- The students learn the role of rail vehicles and understand their classification. They understand the basic structure und know the functions of the main systems. They understand the overall tasks of vehicle system technology.
- They learn functions and requirements of car bodies and jugde advantages and disadvantages of design principles. They know the functions of the car body's interfaces.
- They know about the basics of running dynamics and bogies.
- The students learn about advantages and disadvantages of different types of traction drives and judge, which one fits best for each application.
- They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems.
- They know the basic setup of train control management system and understand the most important functions.
- They specify and define suitable vehicle concepts based on requirements for modern rail vehicles.

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations
8. Vehicle system technology: structure and main systems of rail vehicles
9. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
10. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
11. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
12. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
13. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
14. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Additional Information

A bibliography is available for download (Ilias-platform).

The lectures can be attended in the same term.

Workload

1. Regular attendance: 42 hours
2. Self-study: 42 hours
3. Exam and preparation: 186 hours

Teaching and Learning Methods

Lectures

M 6.88 Module: Seminar Module [M-WIWI-101808]

Coordinators: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Business and Economics
Part of: Compulsory Elective Modules 1 (mandatory)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	10

Election Notes
Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.

Alternatively, one of the two seminars can be absolved at an engineering department.

Compulsory Seminars (Election: 2 items)			
T-WIWI-103474	Seminar in Business Administration A (Master)	3 CP	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103476	Seminar in Business Administration B (Master)	3 CP	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103477	Seminar in Economics B (Master)	3 CP	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103478	Seminar in Economics A (Master)	3 CP	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103479	Seminar in Informatics A (Master)	3 CP	Professorenschaft des Instituts AIFB
T-WIWI-103480	Seminar in Informatics B (Master)	3 CP	Professorenschaft des Instituts AIFB
T-WIWI-103481	Seminar in Operations Research A (Master)	3 CP	Nickel, Rebennack, Stein
T-WIWI-103482	Seminar in Operations Research B (Master)	3 CP	Nickel, Rebennack, Stein
T-WIWI-103483	Seminar in Statistics A (Master)	3 CP	Grothe, Schienle
T-WIWI-103484	Seminar in Statistics B (Master)	3 CP	Grothe, Schienle
T-MACH-102135	Conveying Technology and Logistics	3 CP	Furmans
T-MACH-109062	Seminar Production Technology	3 CP	Fleischer, Lanza, Schulze
T-MACH-108737	Seminar Data-Mining in Production	3 CP	Lanza
T-ETIT-100754	Seminar Creating a Patent Specification	3 CP	Stork
T-WIWI-108763	Seminar in Engineering Science Master (approval)	3 CP	Fachvertreter ingenieurwissenschaftlicher Fakultäten
T-INFO-115025	Seminar: Legal Studies Master I	3 CP	Professorenschaft des Fachbereichs Recht
T-INFO-115026	Seminar: Legal Studies Master II	3 CP	Professorenschaft des Fachbereichs Recht
Interdisciplinary Qualifications (Election: at least 3 credits)			
T-WIWI-112967	Tutoring: Training and Practice *This item will not influence the grade calculation of this parent.*	2 CP	
T-WIWI-111438	Self-Booking-HOC-SPZ-FORUM-STK-Graded *This item will not influence the grade calculation of this parent.*	1 CP	
T-WIWI-111439	Self-Booking-HOC-SPZ-FORUM-STK-Graded *This item will not influence the grade calculation of this parent.*	2 CP	
T-WIWI-111440	Self-Booking-HOC-SPZ-FORUM-STK-Graded *This item will not influence the grade calculation of this parent.*	3 CP	

T-WIWI-113353	Self-Booking-HOC-SPZ-FORUM-STK-Graded *This item will not influence the grade calculation of this parent.*	2 CP	
T-WIWI-113352	Self-Booking-HOC-SPZ-FORUM-STK-Graded *This item will not influence the grade calculation of this parent.*	1 CP	
T-WIWI-113354	Self-Booking-HOC-SPZ-FORUM-STK-Graded *This item will not influence the grade calculation of this parent.*	3 CP	
T-WIWI-111441	Self-Booking-HOC-SPZ-FORUM-STK-Ungraded *This item will not influence the grade calculation of this parent.*	1 CP	
T-WIWI-111442	Self-Booking-HOC-SPZ-FORUM-STK-Ungraded *This item will not influence the grade calculation of this parent.*	2 CP	
T-WIWI-111443	Self-Booking-HOC-SPZ-FORUM-STK-Ungraded *This item will not influence the grade calculation of this parent.*	3 CP	
T-WIWI-113355	Self-Booking-HOC-SPZ-FORUM-STK-Ungraded *This item will not influence the grade calculation of this parent.*	1 CP	
T-WIWI-113356	Self-Booking-HOC-SPZ-FORUM-STK-Ungraded *This item will not influence the grade calculation of this parent.*	2 CP	
T-WIWI-113357	Self-Booking-HOC-SPZ-FORUM-STK-Ungraded *This item will not influence the grade calculation of this parent.*	3 CP	

Assessment
The modul examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examintaion regulation). A detailed description of every singled assessment is given in the specific course characerization.

The final mark for the module is the average of the marks for each of the two seminars weighted by the credits and truncated after the first decimal. Grades of the KQ courses are not included.

Prerequisites
The event-specific requirements must be observed.

Seminars:

- Two seminars from the course list of the module, each worth at least 3 CP, offered by representatives of the Faculty of Business Administration and Economics, must be attended. (The two required seminars may also be taken at the same Wiwi-Institut).
- One of the two seminars can be completed by a seminar at an engineering faculty of KIT. The content of the seminar must match one of the engineering modules already taken. The coherence of content is considered to be given if the seminar and module are taken at the same ING institute. If this is not the case, it is necessary for the ING module coordinator of an engineering module taken to certify that the seminar fits in with his/her module. Engineering seminars of the WBK (Production Engineering) and IFL (Logistics) do not have to fulfill this requirement. The seminar must meet the performance standards of the Faculty of Business Administration and Economics (regular and active participation, seminar paper on one aspect of the seminar topic, presentation, total workload approx. 90 hours). Engineering seminars for the seminar module are generally **subject to approval** and must be applied for at the Examination Office of the Faculty of Business Administration and Economics. The application for approval is made via the corresponding engineering seminar form on the faculty's download page (wbk and IFL seminars are exempt from this approval requirement).
- One of the two seminars can also be a law or sociology seminar, provided that a law or sociology module is taken as an elective module**(subject to approval**)

Interdisciplinary qualifications:

As part of the additive interdisciplinary qualifications, **at least 3 CP** must be completed. For this purpose, one or more courses from the following central KIT institutions can be selected:

- **House of Competence (HOC)**
- **Center for Applied Cultural Studies and Studium Generale (ZAK)**
- **Language Center (SpZ)** - language courses of any kind

Restriction: Courses with a direct subject-related reference to economics are excluded from crediting. In cases of doubt, prior consultation with the **Examinations Office of the KIT Department of Business and Economics** is strongly recommended.

You can find the relevant courses in the campus system under

1. 1. **HOC:** Courses for all students > Specializations
   2. **ZAK:** General studies as well as key qualifications and additional qualifications > Key qualifications at ZAK
   3. **Language Center:** Courses offered by the Language Center > Language courses

Detailed descriptions of the concept and content can be found on the respective websites:

- ◦ **HOC course offerings:**www.hoc.kit.edu/lehrangebot
  ◦ **ZAK key qualifications:**www.zak.kit.edu/sq

Competence Goal

- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.
- Students are familiar with the DFG´s Code of Conduct "Guidelines for Safeguarding Good Research Practice" and base their scientific work on it.

Content

Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailled description o these qualifications is given in the section “Key Qualifications” of the module handbook.

Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

Additional Information

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload

The total workload for this module is approximately 270 hours (9 CP).

M 6.89 Module: Service Analytics [M-WIWI-101506]

Coordinators: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	11

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CP	Satzger
T-WIWI-114209	Artificial Intelligence in Service Systems II: Generative AI Applications & Adoption	4,5 CP	Satzger
T-WIWI-105777	Business Intelligence Systems	4,5 CP	Mädche
T-WIWI-112152	Practical Seminar: Artificial Intelligence in Service Systems	4,5 CP	Satzger
T-WIWI-113725	Special Topics in Information Systems	4,5 CP	Weinhardt

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Additional Information
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

Workload
Total workload for 9 credit points: approx. 270 hours.
Attendance time: 90 hours
Preparation and follow-up: 100 hours
Exam and exam preparation: 80 hours

M 6.90 Module: Service Design Thinking [M-WIWI-101503]

Coordinators: Prof. Dr. Gerhard Satzger
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	2 terms	English	4	1

Mandatory			
T-WIWI-102849	Service Design Thinking	9 CP	Satzger, Terzidis

Assessment
The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

Prerequisites
None

Competence Goal
Students

- Gain a comprehensive understanding of the globally recognized innovation approach “Design Thinking” as introduced and promoted by the Stanford University
- Apply the learned approach in the context of a real innovation project provided by a partner organization
- Conceive new, creative solutions through extensive need finding of relevant service users
  Develop prototypes early and independently, test them and improve them iteratively to solve the challenge provided by the partner organization
- Communicate, present and network in interdisciplinary and international environments.

Content
Course phases (roughly 4 weeks each):

Design Space Exploration:

- Exploring the problem space by questioning the given innovation challenge from practice.
- Familiarization with the topic area of the respective challenge.
- Gathering first impressions of the requirements and needs of people related to the problem.

Critical Function Prototype:

- Building an intensive understanding of the needs of the target group of the respective challenge.
- Deriving critical functions from the customer's perspective that could help solve the overall problem.
- Building prototypes for the critical functions and testing them in real customer situations.

Dark Horse Prototype:

- Reversal of assumptions and experiences made so far. The goal is to develop radically new and unconventional ideas.
- Implementation of the ideas into simple prototypes and subsequent testing.

Funky Prototype:

- Integration of the individual successfully tested functions from the critical function and dark horse phase into solution concepts. These are also tested and further developed.

Functional Prototype:

- Selection of successful funky prototypes and development of these towards high-resolution prototypes. The final solution approach for the project is written down in detail and feedback is obtained.

Final Prototype:

- Implementing the final prototype and presenting it to the practical partner as well as the SUGAR Network.

Additional Information
Due to practical project work as a component of the program, access is limited. The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June. For more information on the application process and the program itself are provided in the module component description and the program's website (https://sdtkarlsruhe.de/). Furthermore, the lecturers provide an information event for applicants every year in May.This module is part of the KSRI Teaching Program.

Workload
The workload for this module is approx. 2 days per week over a period of 9 months. The workload for this practical module is therefore comparatively high. The reason for this is that the participants work in international teams with students from other universities and partner organizations and solve real innovation challenges.

The workload of approx. 270 hours is spread over approx. 105 hours (3.5 CP) in the first semester and 165 hours (5.5 CP) in the second semester.

Recommendations
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

M 6.91 Module: Service Economics and Management [M-WIWI-102754]

Coordinators: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	6

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CP	Satzger
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CP	Weinhardt

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- understand the scientific basics of the management of digital services and corresponding systems
- gain a comprehensive insight in the importance and the most important features of information systems as an central component of the digitalization of business processes, products and services
- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully
- understand the OR methods in the sector of service management and apply them adequately
- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems
- are able to develop market-oriented coordination mechanisms and apply service systems.

Content
This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

Additional Information
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
Total workload for 9 credit points: approx. 270 hours. The allocation is based on the credit points of the courses in the module.

Recommendations
None

M 6.92 Module: Service Innovation, Design & Engineering [M-WIWI-102806]

Coordinators: Prof. Dr. Alexander Mädche
Prof. Dr. Gerhard Satzger

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	English	4	6

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CP	Satzger
T-WIWI-113460	Engineering Interactive Systems: AI & Wearables	4,5 CP	Mädche
T-WIWI-114210	(Gen)AI-based Automation in Organizations	4,5 CP	Mädche
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CP	Mädche
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CP	Satzger

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Dependencies between courses:

The course Practical Seminar Service Innovation cannot be applied in combination with the course Practical Seminar Digital Service Design.

Competence Goal
Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.
- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.
- are able to embed the concepts of innovation management, development and design of services into organisations
- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation
- elaborate concrete and problem-solving solutions for practical tasks in teams.

Content
This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

Additional Information
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
Total workload for 9 credit points: approx. 270 hours. The allocation is based on the credit points of the courses in the module.

Recommendations
Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].

Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

M 6.93 Module: Service Management [M-WIWI-101448]

Coordinators: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	English	4	12

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CP	Satzger
T-WIWI-114209	Artificial Intelligence in Service Systems II: Generative AI Applications & Adoption	4,5 CP	Satzger
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CP	Satzger

Assessment
The assessment is carried out as partial exams, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The students

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- systematically use vast amounts of available data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

Content
The module service management addresses the basics of developing and managing IT-based services. The lectures contained in this module teach the basics of developing and managing IT-based services and the application of OR methods in the field of service management. Moreover, students learn to systematically analyze vast amounts of data for planning, operation and improvement for complex service offerings. These tools enhance operational and strategic decision support and help to analyze and understand the overall innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

Additional Information
From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
Total workload for 9 credit points: approx. 270 hours. The allocation is based on the credit points of the courses in the module. 120-135 hours for the courses with 4.5 credits, 135-150 hours for the courses with 5 credits and 150-180 hours for the courses with 6 credits.

The total number of hours per course results from the time required to attend the lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

Recommendations
None

M 6.94 Module: Service Operations [M-WIWI-102805]

Coordinators: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Business and Economics
Part of: Operations Research
Compulsory Elective Modules 1 (Operations Research)
Compulsory Elective Modules 2 (Operations Research)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	9

Election Notes
At least one of the fourcourses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management orDiscrete-Event Simulation in Production and Logistics has to be assigned.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CP	Spieckermann
T-WIWI-102884	Operations Research in Health Care Management	4,5 CP	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CP	Nickel
T-WIWI-102716	Practical Seminar: Health Care Management (with Case Studies)	4,5 CP	Nickel
Supplementary Courses (Election: at most 1 item)			
T-MACH-112213	Applied material flow simulation	4,5 CP	Baumann
T-WIWI-114109	Service Operations and Cyber Security	4,5 CP	Mohr

Assessment
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the four courses "Operations Research in Supply Chain Management", "Operations Research in Health Care Management", "Practical seminar: Health Care Management" or "Discrete-Event Simulation in Production and Logistics" has to be assigned.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Additional Information
This module is part of the KSRI teaching profile "Digital Service Systems". Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

Workload
Total workload for 9 credit points: approx. 270 hours. The allocation is based on the credit points of the courses in the module.

Recommendations
The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.

M 6.95 Module: Sociology [M-GEISTSOZ-101169]

Coordinators: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: Compulsory Elective Modules 2 (Law and Sociology)

Credits	Grading	Recurrence	Duration	Level	Version
9 CP	graded	Each term	2 terms	4	2

Mandatory			
T-GEISTSOZ-104565	Computer Aided Data Analysis	0 CP	Nollmann
T-GEISTSOZ-109052	Application of Social Science Methods (WiWi)	9 CP	Nollmann

Prerequisites
Students must pass three excersise sheets within the seminar "Computer based data analysis".

Competence Goal
The student

- Gains theoretical and methodical knowledge of social processes and structures,
- learns a script based data analysis tool (R, Stata, Python),
- gathers his/her data within an own framework and/or analyzes complex data,
- is able to present his/her work results in a precise and clear way.

Content
The Sociology module offers students the opportunity to learn a data analysis tool (R, Stata, Python) within the framework of a two-semester course and to independently transfer this tool to a content-related question. Both the tool and the contents are determined by the lecturers. The contents can refer to the analysis of large population surveys (SOEP, Microcensus, ALLBUS), to own experiments, to own field studies or to Big Data analyses.

Additional Information
Basic knowledge in multivariate regression and inference statistics is required.

M 6.96 Module: Specialization in Food Process Engineering [M-CIWVT-101119]

Coordinators: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	3

Elective Courses: Specialization in Food Process Engineering (Election: at least 9 credits)			
T-CIWVT-111433	Drying of Dispersions	1,5 CP	Karbstein
T-CIWVT-108871	Microbiology for Engineers	3 CP	Schwartz
T-CHEMBIO-109442	Food Chemistry Basics	3 CP	Bunzel
T-CIWVT-111434	Additives and Active Substances	1,5 CP	van der Schaaf
T-CIWVT-111534	Introduction to Sensory Analysis with Practice	1,5 CP	Scherf
T-CIWVT-111535	Food Science and Functionality	3 CP	Watzl
T-CHEMBIO-108091	Introduction to Food Law	1,5 CP	Kuballa
T-CIWVT-112174	Extrusion Technology in Food Processing	4 CP	

Competence Goal
The students

- can explain and apply engineering fundamentals of process engineering
- Know and understand various specific aspects of food processing and can apply their basic knowledge to the specifics of food processing/ to the professional practice of food processing.

Content
See courses.

M 6.97 Module: Stochastic Optimization [M-WIWI-103289]

Coordinators: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Business and Economics
Part of: Operations Research
Compulsory Elective Modules 1 (Operations Research)
Compulsory Elective Modules 2 (Operations Research)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	1 term	German/English	4	11

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CP	Rebennack
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CP	Rebennack
T-WIWI-106549	Large-scale Optimization	4,5 CP	Rebennack
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CP	Nickel
T-WIWI-102719	Mixed Integer Programming I	4,5 CP	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CP	Stein
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CP	Grothe
T-WIWI-111587	Multicriteria Optimization	4,5 CP	Stein
T-WIWI-103124	Multivariate Statistical Methods	4,5 CP	Grothe
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CP	Nickel
T-WIWI-106545	Optimization under Uncertainty	4,5 CP	Rebennack
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CP	Rebennack

Assessment
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Advanced Stochastic Optimization", "Large-scale Optimization" or "Introduction to Stochastic Optimization" has to be taken.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,
- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content
The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

Additional Information
The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

Recommendations
It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

M 6.98 Module: Strategic Design of Modern Production Systems [M-MACH-105455]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	4	5

Strategic Design of Modern Production Systems (Election: at least 9 credits)			
T-MACH-113647	Digitalization from Product Concept to Production	4 CP	Wawerla
T-MACH-114800	Global Production	5 CP	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CP	Schlichtenmayer
T-MACH-105783	Learning Factory "Global Production"	6 CP	Lanza
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CP	Kienzle, Steegmüller
T-MACH-102107	Quality Management	4 CP	Lanza
T-MACH-114969	Strategic Decision-Making in Global Production Networks through Optimization and Simulation	4 CP	Lanza, Martin

Assessment
Oral exams: duration approx. 5 min per credit point

Written exams: duration approx. 20 - 25 min per credit point

Amount, type and scope of the success control can vary according to the individually choice.

Prerequisites
none

Competence Goal
The students

- are able to apply the methods of the strategic design of modern production systems to new problems.
- are able to outline the underlying conditions and influencing factors of today's production and derive recommendations for action for an integrated strategy.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Content
Within this module the students will get to know and learn about methods for the strategic design of modern production systems. Manifold lectures and excursions as part of several lectures provide specific insights into the field of science.

Module Grade Calculation
The module grade is the LP-weighted average of the selected partial performances.

Workload
The work load is about 270 hours, corresponding to 9 credit points.

Teaching and Learning Methods
Lectures, seminars, workshops, excursions

M 6.99 Module: Student Innovation Lab (SIL) 1 [M-WIWI-105010]

Coordinators: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Business and Economics

Part of: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	2 terms	English	4	1

Mandatory			
T-WIWI-102864	Entrepreneurship	3 CP	Terzidis
T-WIWI-110166	SIL Entrepreneurship Project	3 CP	Terzidis
T-WIWI-110287	SIL Entrepreneurship Emphasis	3 CP	Terzidis

Assessment
The assessment of this module comprises a written examination of 60 minutes on the lecture contents of the lecture "Entrepreneurship" as well as two seminars. All examinations are graded. In both seminars the following tasks have to be fulfilled:

- "SIL Entrepreneurship Project": Presentation of the Value Profile & submission of the Business Plan
- "SIL Entrepreneurship Emphasis": Submission of price calculation, market potential analysis, competition analysis, financial plan, risk analysis, decision basis for funding and legal form

In addition, both courses provide for smaller, ungraded tasks to monitor progress.

The grade consists of 60 % of the written examination, 20 % of the examination "SIL Entrepreneurship Project" and 20 % of the examination "SIL Entrepreneurship Advanced".

Prerequisites
The module can only be completed together with the module M-WIWI-105011 "Student Innovation Lab 2".

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.

.

Competence Goal
Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
  Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
- Conflict ability: Students can recognise conflicts at an early stage, analyse conflict situations and name solution concepts.

Innovation and Entrepreneurship Competence

- Agile product development: Students can apply methods of agile product development such as Scrum.
  Methodical innovation finding: Students can perform user- or technology-centric innovation processes to develop sustainable value propositions for dedicated target groups (e.g. Design Thinking (DT), Technology Application Selection (TAS) process).
- Orientation on the management of new technology-based companies (NTBF): Students can name the central concepts of intellectual property and legal form. Students can name the most important tasks of entrepreneurial leadership. They can identify the relevant forms of business modelling and draw up a business plan. Students know the central approaches to building an organisation. Students will be able to identify the ownership structure of investments and how to develop a strategy. The students can name marketing concepts and create a business model.
- Create investment readiness: The students are able to create a rudimentary sales and cost planning. Furthermore, they are able to create a project plan for a company and derive an investment plan from it. The students can present the business plan to potential investors and develop investor empathy.
- Business model development competence: Students are able to use relevant tools for business modelling, e.g. the Business Model Canvas. Students can develop and evaluate alternative business models.
- Dealing with risks:Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

- Problem-solving competence: Students can analyse, assess and solve a technical problem in a structured way.
- Agile Methodology of System Development: Students can name the different system development processes and apply them appropriately.
- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Content
In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one's own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

- As an innovation platform, the Automation Innovation Lab offers flying robots for cooperative swarm solutions.
- The Industry 4.0 Innovation Lab enables innovations in the area of the next industrial revolution with mobile robot platforms.
- In the Internet of Things Innovation Lab, innovations in Assisted Living and Smart Housing are made possible by a comprehensive kit of mobile robots and sensors.
- The Computer Vision for Health Lab offers a selection of state-of-the-art imaging devices and powerful computing hardware for innovative image-based applications for medicine and healthcare.

The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module. The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.100 Module: Student Innovation Lab (SIL) 2 [M-WIWI-105011]

Coordinators: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr. Werner Nahm
Prof. Dr.-Ing. Eric Sax
Prof. Dr. Wilhelm Stork
Prof. Dr. Orestis Terzidis
Prof. Dr.-Ing. Thomas Zwick

Organisation: KIT Department of Business and Economics

Part of: Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	2 terms	English	4	1

Mandatory			
T-ETIT-110291	Innovation Lab	9 CP	Hohmann, Nahm, Sax, Stork, Zwick

Assessment
The examination in this module comprises the submission of graded intermediate results in the form of prototypes (low fidelity and high fidelity) as well as various technical and economic reports (according to § 4 (2), 3 SPO):

1. Submission of a technical report with requirements list and system architectur
2. Submission of the reflection of the gate plans
3. Presentation of the High-fidelity

The module grade consists of 50% of the evaluation of the low fidelity prototype including intermediate results of a technical and economic nature and 50% of the evaluation of the high fidelity prototype including intermediate results of a technical and economic nature.

Prerequisites
The module can only be completed together with the module M-WIWI-105010 "Student Innovation Lab (SIL) 1".

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.

Competence Goal
Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
  Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
- Conflict ability: Students can recognise conflicts at an early stage, analyse conflict situations and name solution concepts.

Innovation and Entrepreneurship Competence

- Agile product development: Students can apply methods of agile product development such as Scrum.
  Methodical innovation finding: Students can perform user- or technology-centric innovation processes to develop sustainable value propositions for dedicated target groups (e.g. Design Thinking (DT), Technology Application Selection (TAS) process).
- Orientation on the management of new technology-based companies (NTBF): Students can name the central concepts of intellectual property and legal form. Students can name the most important tasks of entrepreneurial leadership. They can identify the relevant forms of business modelling and draw up a business plan. Students know the central approaches to building an organisation. Students will be able to identify the ownership structure of investments and how to develop a strategy. The students can name marketing concepts and create a business model.
- Create investment readiness: The students are able to create a rudimentary sales and cost planning. Furthermore, they are able to create a project plan for a company and derive an investment plan from it. The students can present the business plan to potential investors and develop investor empathy.
- Business model development competence: Students are able to use relevant tools for business modelling, e.g. the Business Model Canvas. Students can develop and evaluate alternative business models.
- Dealing with risks:Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

- Problem-solving competence: Students can analyse, assess and solve a technical problem in a structured way.
- Agile Methodology of System Development: Students can name the different system development processes and apply them appropriately.
- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Content
In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one's own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

- As an innovation platform, the Automation Innovation Lab offers flying robots for cooperative swarm solutions.
- The Industry 4.0 Innovation Lab enables innovations in the area of the next industrial revolution with mobile robot platforms.
- In the Internet of Things Innovation Lab, innovations in Assisted Living and Smart Housing are made possible by a comprehensive kit of mobile robots and sensors.
- The Computer Vision for Health Lab offers a selection of state-of-the-art imaging devices and powerful computing hardware for innovative image-based applications for medicine and healthcare.

The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Additional Information
New module starting winter term 2019/2020.

Workload
The module comprises a total of 270 hours (8 hours attendance time, 213 hours preparation and follow-up time, 49 hours preparation time for examination), which corresponds to a total of 9 credit points for two semesters.

M 6.101 Module: Transport Infrastructure Policy and Regional Development [M-WIWI-101485]

Coordinators: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Business and Economics
Part of: Economics
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	2

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-103107	Spatial Economics	4,5 CP	Ott
T-WIWI-100007	Transport Economics	4,5 CP	Mitusch, Szimba

Assessment
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students

- understand the economic issues related to transport and regional development with a main focus on economic policy issues generated by the relationship of transport and regional development with the public sector
- are able to compare different considerations of politics, regulation and the private sector and to analyse and assess the respective decision problems both qualitatively and by applying appropriate methods from economic theory
- are prepared for careers in the public sector, particularly for public companies, politics, regulatory agencies, related consultancies, mayor construction companies or infrastructure project corporations

Content
The development infrastructure (e.g. transport, energy, telecommunications) has always been one of the most relevant factors for economic development and particularly influences the development of the regional economy. From the repertoire of state actions, investments into transport infrastructure are often regarded the most important measure to foster regional economic growth. Besides the direct effects of transport policy on passenger and freight transport, a variety of individual economic activities is significantly dependent on the available or potential transport options. Decisions on the planning, financing and realization of mayor infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs.

Through its combination of lectures the module reflects the complex interdependencies between infrastructure policy, transport industry and regional policy and provides its participants with a comprehensive understanding of the functionalities of one of the most important sectors of the economy and its relevance for economic policy.

Additional Information
The courses *Assessment of Public Policies and Projects I* (winter term) and *Assessment of Public Policies and Projects II* (summer term) will no longer be part of this module. Student who have already had exams in this courses can integrate these exams in this module.

Workload
The total workload for this module is approximately 270 hours. The exact distribution is based on the credit points of the courses in the module. The total number of hours per course is determined by the amount of time spent attending the lectures and tutorials, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

M 6.102 Module: Transportation Modelling and Traffic Management [M-BGU-101065]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German/English	4	8

Election Notes

Compulsory exams: 2 or 3 of the selectable module components must be selected

if 'Traffic Management and Transport Telematics' is selected, the 'Exercise Transportation Data Analysis' must be selected as examination prerequisite;

Compulsory elective: a maximum of one of the selectable module components must be selected;

if 'Transportation Data Analysis' is selected, the 'Exercise Transportation Data Analysis' must be selected as examination prerequisite;

Compulsory Examination (Election: between 2 and 3 items as well as between 6 and 9 credits)			
T-BGU-101797	Methods and Models in Transportation Planning	3 CP	Vortisch
T-BGU-101798	Traffic Engineering	3 CP	Vortisch
T-BGU-113971	Exercise Transportation Data Analysis	0 CP	Vortisch
T-BGU-101799	Traffic Management and Transport Telematics	3 CP	Vortisch
T-BGU-101800	Traffic Flow Simulation	3 CP	Vortisch
Electives (Election: between 0 and 3 credits)			
T-BGU-113671	Exercise Transportation Data Analysis	0 CP	Kagerbauer
T-BGU-100010	Transportation Data Analysis	3 CP	Kagerbauer
T-BGU-106611	Freight Transport	3 CP	Szimba, Vortisch
T-BGU-106301	Long-Distance and Air Traffic	3 CP	Vortisch
T-BGU-101005	Tendering, Planning and Financing in Public Transport	3 CP	Vortisch
T-BGU-100014	Seminar in Transportation	3 CP	Kagerbauer, Vortisch
T-BGU-112552	Seminar on Modeling and Simulation in Transportation	3 CP	Kagerbauer, Vortisch
T-BGU-103425	Mobility Services and New Forms of Mobility	3 CP	Kagerbauer
T-BGU-103426	Strategic Transport Planning	3 CP	Waßmuth
T-BGU-106608	Information Management for Public Mobility Services	3 CP	Vortisch
T-BGU-111057	Sustainability in Mobility Systems	3 CP	Kagerbauer

Assessment
according to selected module component:

- module component T-BGU-101797 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-101798 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-113971 with not graded coursework according to § 4 Par. 3 as examination prerequisite for module component T-BGU-101799
- module component T-BGU-101799 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-101800 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-113671 with not graded coursework according to § 4 Par. 3 as examination prerequisite for module component T-BGU-100010
- module component T-BGU-100010 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-106611 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-106301 with written examination according to § 4 Par. 2 No. 1
- module component T-BGU-101005 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-100014 with examination of another type according to § 4 Par. 2 No. 3
- module component T-BGU-112552 with examination of another type according to § 4 Par. 2 No. 3
- module component T-BGU-103425 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-103426 with oral examination according to § 4 Par. 2 No. 2
- module component T-BGU-106608 with examination of an other type according to § 4 Par. 2 No. 3
- module component T-BGU-111057 with written examination according to § 4 Par. 2 No. 1

details about the learning controls, see module components

Prerequisites
None

Competence Goal
The student has in-depth knowledge and can apply the essential tools in combination with the basic methodological knowledge as an industrial engineer/technical economist, depending on the chosen 'specialization',

- as a 'traffic engineer' (specialization in traffic engineering) AND/OR
- as a 'transport planner' (specialization in transport planning) AND/OR
- in the field of transport software (e.g. in transport modeling)
- or in similar professional fields

to work.

Content
This module deepens existing knowledge in the field of transportation. The choice of core courses determines the specialization - more in the direction of transport planning or more in the direction of traffic engineering and/or traffic simulation. The module is therefore an ideal continuation of the module Fundamentals of Transportation [WI4INGBGU15].

Module Grade Calculation
grade of the module is CP weighted average of grades of the partial exams

Additional Information
If you have already attended lectures that are no longer offered, they can still be examined within this module if the content is the same. In this case, please come to the office hours for coordination!

Workload
contact hours (1 HpW = 1 h x 15 weeks), according to selected course and exam:

- Methods and Models in Transportation Planning lecture/exercise: 30 h
- Traffic Engineering lecture/exercise: 30 h
- Traffic Management and Transport Telematics lecture/exercises: 30 h
- Traffic Flow Simulation lecture/exercise: 30 h
- Transportation Data Analysis lecture/exercise: 30 h
- Freight Transport lecture/exercise: 30 h
- Long-Distance and Air Traffic lecture: 30 h
- Tendering, Planning and Financing in Public Transport lecture: 30 h
- Seminar in Transportation: 30 h
- Seminar on Modeling and Simulation in Transportation: 30 h
- Mobility Services and New Forms of Mobility lecture/exercise: 30 h
- Strategic Transport Planning lecture: 30 h
- Information Management for Public Mobility Services lecture/exercise: 30 h
- Sustainability in Mobility Systems lecture: 30 h

independent study, according to selected course and exam:

- preparation and follow-up Methods and Models in Transportation Planning lecture/exercises: 30 h
- examination preparation Methods and Models in Transportation Planning (selectable partial examination): 30 h
- preparation and follow-up Traffic Engineering lecture/exercises: 30 h
- examination preparation Traffic Engineering (selectable partial examination): 30 h
- preparation and follow-up Traffic Management and Transport Telematics lecture/exercises: 30 h
- preparation of the Exercise Transportation Data Analysis (not graded examination prerequisite): 10 h
- examination preparation Traffic Management and Transport Telematics (selectable partial examination): 20 h
- preparation and follow-up Traffic Flow Simulation lecture/exercises: 30 h
- examination preparation Traffic Flow Simulation (selectable partial examination): 30 h
- preparation and follow-up Transportation Data Analysis lecture/exercises: 20 h
- preparation of the Exercise Transportation Data Analysis (not graded examination prerequisite): 10 h
- examination preparation Transportation Data Analysis (selectable partial examination): 30 h
- preparation and follow-up lecture/exercises Freight Transport: 30 h
- examination preparation Freight Transport (selectable partial examination): 30 h
- preparation and follow-up lectures Long-Distance and Air Traffic: 30 h
- examination preparation Long-Distance and Air Traffic (selectable partial examination): 30 h
- preparation and follow-up lectures Tendering, Planning and Financing in Public Transport: 30 h
- examination preparation Tendering, Planning and Financing in Public Transport (selectable partial examination): 30 h
- preparation of seminar paper in Transportation and presentation (selectable partial examination): 60 h
- work on a practical problem in the Seminar on Modeling and Simulation in Transportation (selectable partial examination): 60 h
- preparation and follow-up lecture/exercises Mobility Services and New Forms of Mobility: 30 h
- examination preparation Mobility Services and New Forms of Mobility (selectable partial examination): 30 h
- preparation and follow-up lectures Strategic Transport Planning: 30 h
- examination preparation Strategic Transport Planning (selectable partial examination): 30 h
- preparation and follow-up lecture/exercises Information Management for Public Mobility Services: 30 h
- preparation accompanying exercises Information Management for public Mobility Services (selectable partial examination): 30 h
- preparation and follow-up lectures Sustainability in Mobility Systems: 30 h
- examination preparation Sustainability in Mobility Systems (selectable partial examination): 30 h

total: 270 h

Recommendations
None

M 6.103 Module: Water Chemistry and Water Technology I [M-CIWVT-101121]

Coordinators: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	1 term	German/English	4	3

Mandatory			
T-CIWVT-106802	Water Technology	6 CP	Horn
T-CIWVT-106840	Practical Course in Water Technology	3 CP	Hille-Reichel, Horn

Prerequisites
none

Competence Goal
Students learn fundamental knowledge in water chemistry and how to apply it to processes in aquatic systems in general and in reactors for water treatment. Water treatment will be taught for drinking water and partly waste water. The students are able to apply physical, chemical and biochemical treatment for the respective removal of particulate and dissolved components in water. They are able to use the fundamental design parameters for the different types of unit operations.

Students can explain the most important processes in water treatment. They are able to do calculations, and to compare and interpret data. They learn how to use different methods, and to interpret different processes.

Content
Water cycle, different types of raw water (ground and surface water). Water as solvent, carbonate balance, differentiation between microbiological and chemical population. Unit operations: sieving, sedimentation, filtration, flocculation, flotation, ion exchange, aeration, oxidation, disinfection, adsorption). For all unit operations design parameters will be provided. Simple 1D models will be discussed for description of kinetics and retention time in reactors for water treatment.

6 different experiments out of: equilibrium study of the calcium carbonate system, flocculation, adsorption, oxidation, atomic absorption spectroscopy, ion chromatography, liquid chromatography, sum parameter, and an oral presentation of the student. In addition, excursions to two different treatment plants (waste water, drinking water)

Literature

- Crittenden, J. C. et al. (2012): Water treatment, principles and design. 3. Auflage, Wiley & Sons, Hoboken.
- Jekel, M., Czekalla, C. (Hrsg.) (2016). DVGW Lehr- und Handbuch der Wasserversorgung. Deutscher Industrieverlag.
- Harris, D. C., Lucy, C. A. (2019): Quantitative chemical analysis, 10. Auflage. W. H. Freeman and Company, New York.
- Patnaik, P., 2017: Handbook of environmental analysis: Chemical pollutants in air, water, soil, and solid wastes. CRC Press.
- Wilderer, P. (Ed., 2011): Treatise on water science, four-volume set, 1st edition, volume 3: Aquatic chemistry and biology. Elsevier, Oxford.
- Lecture notes will be provided in ILIAS

M 6.104 Module: Water Chemistry and Water Technology II [M-CIWVT-101122]

Coordinators: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

Credits	Grading	Recurrence	Duration	Level	Version
12 CP	graded	Each term	2 terms	4	3

Mandatory			
T-CIWVT-113235	Exercises: Membrane Technologies	1 CP	Horn, Saravia
T-CIWVT-113236	Membrane Technologies in Water Treatment	5 CP	Horn, Saravia
T-CIWVT-106838	Fundamentals of Water Quality	6 CP	Wagner

Prerequisites
The Module "Water Chemistry and Water Technology I" must be passed.

Competence Goal
The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- is able to explain the interrelationships of the occurrence of geogenic and anthropogenic substances as well as of microorganisms in the different areas of the hydrological cycle and is able to select suitable analytical methods for their determination,
- knows about the different types of water treatment and water purification methods to convert, reduce or concentrate water constituents, especially for membrane processes,
- is able to use methodical tools, analyze the correlations and critically evaluate the critically evaluate the different procedures.

Content
The types of water, water law, basic terms of water chemical analysis, analysis quality, sampling, rapid test procedures and general investigation methods as well as summary parameters are dealt with. The analytical methods for main and secondary constituents as well as for organic and inorganic trace substances are discussed with examples for orientation.
The effects of the different treatment and purification methods are shown and it is explained how they can convert, reduce or concentrate water constituents.

7 Module components

T 7.1 Module component: "Practical Seminar in Discrete Optimization: Implementing and Evaluating Solution Methods (with Python)" [T-WIWI-114747]

Coordinators: Dr.-Ing. Hannah Bakker
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Once	1

Courses					
WT 25/26	2500066	Practical Seminar in Discrete Optimization: Implementing and Evaluating Solution Methods (with Python)	3 SWS	Others / 🗣	Bakker
Exams					
WT 25/26	7900067	"Practical Seminar in Discrete Optimization: Implementing and Evaluating Solution Methods (with Python)"			Nickel

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is conducted as an alternative exam assessment in the form of a computational experiment. This includes the submission of a documented code project, a written report (6–8 pages), as well as an interim and a final presentation.

The final grade is composed of the graded and weighted assessment components: the code, the written report, and the interim and final presentations. Details will be announced at the beginning of the course.

Prerequisites
None

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Practical Seminar in Discrete Optimization: Implementing and Evaluating Solution Methods (with Python)

Others (sonst.) On-Site

2500066, WS 25/26, 3 SWS, Language: German, Open in study portal

Content
This application-oriented seminar provides students with practical skills in working with heuristic methods for discrete optimization. Participants implement a given solution approach in Python and apply it to defined benchmark instances. The focus is not only on technical implementation but also on the systematic setup, execution, and evaluation of a computational experiment. Students practice presenting and assessing results in a structured manner. The aim of the seminar is to develop fundamental competencies in algorithmic implementation and empirical evaluation of heuristic methods, applied to a concrete optimization problem.

Organizational issues
Die Veranstaltung ist teilnahmebeschränkt. Die Anmeldung wird vom 15.08. bis zum 30.09. im Wiwi-Portal freigeschaltet sein.

T 7.2 Module component: (Gen)AI and Virtual Reality for Business [T-WIWI-114749]

Coordinators: Prof. Dr. Jella Pfeiffer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	1

Assessment
Success is assessed in the form of an examination of another type. It consists of the creation of a podcast, poster or video and a final presentation. The overall impression will be assessed. Details on the structure of the assessment will be announced during the lecture.

Prerequisites
None

Recommendations
Basic knowledge of artificial intelligence and data science methods is an advantage.

Additional Information
There is a tutorial associated with the lecture, which takes place every two weeks.
This course component is expected to be offered firstly in the winter semester of 2026/27.

Workload:

- Lecture attendance time (2 SWS × 15 weeks): 30 h
- Attendance time tutorial (1 SWS × 15 weeks): 15 h
- Self-study lecture: 20 h
- Self-study tutorial: 50 h
- Exam preparation: 20 h
- Total: 135 h

Workload
135 hours

T 7.3 Module component: (Gen)AI-based Automation in Organizations [T-WIWI-114210]

Coordinators: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2500015	(Gen)AI-based Automation in Organizations	3 SWS	Lecture /	Mädche, Benke
Exams					
ST 2026	7900308	(Gen)AI-based Automation in Organizations			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The alternative exam assessment is a single examination of another type that combines a written examination (duration ≈ 60 minutes) with the implementation of a capstone project. Both components are integrated into one overall assessment; the internal weighting of the two parts is defined by the teaching staff, but only one final grade is awarded for the whole examination. The final grade therefore reflects the total impression of the combined performance

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **(Gen)AI-based Automation in Organizations** — **Lecture (V)** **Blended (On-Site/Online)**
2500015, SS 2026, 3 SWS, Language: English, Open in study portal

Content
Content
The advent of generative artificial intelligence (GenAI) has received great attention in business and society due to its capabilities of content creation or decision making. Individuals started rapidly to use the capabilities of tools like ChatGPT, Claude or Google Gemini for text and image generation, personal recommendations, or decision support. At the same time, organizations are challenged to leverage GenAI and traditional AI technology within their business models, processes, and information systems. (Gen)AI technologies enable executing cognitive tasks which in the past were carried out manually by organizations' employees. Ultimately, this leads to an increase of automation in organizations. This digital transformation process to higher levels of automation, however, must be managed by organizations.

This course will address this organizational challenge and teach concepts about the automation of organizations and their employees leveraging (Gen)AI technologies. The course is not focusing on the technological foundations of GenAI but looks into the economic and social impact of the technology and its management.

Learning Objectives

As a result of attending this program, students will be able to:

- describe key concepts of (Gen)AI technologies enabling the increase of automation in organizations.
- understand the historical evolution and core concepts of automation to drive organizational efficiency and innovation.
- articulate (Gen)AI integration principles for effectively implementing automation in organizations.
- understand and apply automation management strategies and best practices for addressing challenges to ensure adoption of (Gen)AI capabilities for organizational automation from a socio-economic perspective.
- explore and prototype (Gen)AI-based applications to streamline individual tasks and workflows in the context of organizational automation.

Case-studies & No-code exercise
The course contains two applied elements:

- Case-study exercises in which the students apply the theoretical knowledge on integrating (Gen)AI-based services into an organization.
- No-code exercises in which the students will develop a no/low-code application using (Gen)AI services to implement automation.

Organization
The lecture kickoff will take place on **April 24, 2026** from 14:00 - 15:30 at Building 10.11 Room 213 (Plenarsaal).

More information about the schedule of the lecture, the exercises or any organizational aspect will be posted in advance in the ILIAS course of the lecture. For questions regarding the course please use the ILIAS Forum.

The lecture will be held by Dr. Ivo Benke and Till Carlo Schelhorn.

Lecture contact for organizational questions is Till Carlo Schelhorn (till.schelhorn∂kit.edu)

T 7.4 Module component: Additive Manufacturing of Metallic Components [T-MACH-113985]

Coordinators: Prof. Dr.-Ing. Frederik Zanger
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2149671	Additive Manufacturing of Metallic Components	2 SWS	Lecture / 🗣	Zanger
Exams					
WT 25/26	76-T-MACH-113985	Additive Manufacturing of Metallic Components			Zanger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral examination, duration approx. 30 minutes

Prerequisites
The following module component may not have started:

- T-MACH-114019 - Additive Fertigung metallischer Bauteile: Designoptimierung und Herstellung

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Additive Manufacturing of Metallic Components

2149671, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course “Additive Manufacturing of Metallic Components” teaches the theoretical fundamentals of metallic additive manufacturing, particularly using the example of the laser-based process powder bed fusion (PBF-LB/M). It thus provides the ideal prerequisite for the course “Project Internship Additive Manufacturing: Design Optimization and Manufacturing of Metallic Components.”

The course covers the underlying mechanisms and the necessary steps in the additive process chain for metallic components. Other processes for manufacturing metallic components using additive manufacturing methods are also discussed. Students will learn about the following topics:

- Structure and function of a PBF-LB/M system
- Influence of process parameters on the quality of components manufactured in the PBF-LB/M process
- Design for additive manufacturing
- Options for simulation assistance in the process chain
- Process monitoring and quality assurance in additive manufacturing
- Downstream processes for adjusting the required component state
- Quality control in additive manufacturing
- Fundamentals and possibilities of directed energy deposition, binder jetting, and bath-based photopolymerization processes.

Learning Outcomes:

Students ...

- are able to explain the basic principles of the laser-based additive manufacturing processes powder bed fusion and directed energy deposition, as well as the two processes binder jetting and bath-based photopolymerization.
- can describe the characteristics and areas of application of the four processes mentioned above.
- can describe the creation of a product along the entire additive process chain (CAD, simulation, construction job preparation, CAM) from the initial idea to production using the example of the powder bed fusion process.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- can explain in detail the mechanisms behind the powder bed fusion process and derive measures for improving the process.
- can evaluate and select options for post-processing additively manufactured components based on their requirements.
- are able to name the most important methods for quality assurance in additive manufacturing and the relevant standards.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.5 Module component: Additive Manufacturing Processes [T-MACH-113570]

Coordinators: Prof. Dr.-Ing. Frederik Zanger
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	2150702	Additive Manufacturing Processes	3 SWS	Lecture / 🗣	Zanger

Legend: 📱 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral examination, duration approx. 20 minutes

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Additive Manufacturing Processes** — Lecture (V) On-Site
2150702, SS 2026, 3 SWS, Language: German, Open in study portal

Content
The course “Additive Manufacturing Processes” provides participants with in-depth knowledge of industrially relevant additive manufacturing processes and their process chains. During the course, students learn the theoretical principles and practical application aspects of the following processes:

MEX: Material extrusion
MJT: Material jetting
PBF: Powder bed fusion
BJT: Binder jetting
DED: Directed energy deposition
VPP: Vat photopolymerization.

In addition, the following topics are covered:

Holistic view of the process chain
Materials for additive manufacturing processes (production and characterisation)
Design methods and simulation in additive manufacturing
Future trends and innovative technologies.

The acquired knowledge is supplemented by practical lectures from industry, which offer valuable insights into current applications, challenges and innovations in additive manufacturing.

Learning Outcomes:

Students ...

can describe the principles and special features of industrially relevant additive manufacturing technologies
are able to explain the process of layer formation in additive manufacturing processes and evaluate it in terms of manufacturing possibilities
can describe the various methods of powder production and assess their advantages and disadvantages in relation to additive manufacturing
can name the essential materials for additive manufacturing, explain their properties and analyse their fields of application
are able to explain additive process chains, including heat treatment, post-processing and quality assurance, and to evaluate their significance for component quality.
can take into account the design requirements and process-specific features of additive manufacturing in component development
are able to classify current research and development topics in the field of additive manufacturing in the context of industrial applications

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Bekanntgabe von möglichen Praxisvorlesungen erfolgt in der ersten Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.6 Module component: Additives and Active Substances [T-CIWVT-111434]

Coordinators: Dr.-Ing. Ulrike van der Schaaf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading	Term offered	Version
Written examination	1,5 CP	graded	Each summer term	1

T 7.7 Module component: Advanced Corporate Finance [T-WIWI-113469]

Coordinators: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2530214	Advanced Corporate Finance	2 SWS	Lecture / 🗣	Ruckes
Exams					
WT 25/26	7900058	Advanced Corporate Finance			Ruckes
ST 2026	7900317	Advanced Corporate Finance			Ruckes

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-102622 - Corporate Financial Policy must not have been started.

Below you will find excerpts from courses related to this module component:

V Advanced Corporate Finance

2530214, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course covers the foundational principles of advanced topics of corporate finance, such as corporate governance, executive compensation, strategy & finance, mergers & acquisitions (M&A), and sustainable finance. Additionally, the course explores the respective institutional aspects within these areas of corporate finance. The approach is holistic, including both theoretical-conceptional aspects (e.g., moral hazard and the influence of asymmetric information) and empirical insights (e.g., the effects of financial decisions on firm value). Throughout, the course will emphasize both fundamental and current research findings.

Learning outcomes:

Upon successful completion of the course, students will possess profound knowledge and skills in advanced areas of corporate finance. These areas include topics such as corporate governance, executive compensation, strategy and finance, mergers and acquisitions (M&A), as well as key aspects of sustainable finance. Participants of this course will be able to describe and analyze the theoretical and conceptual foundations of the effects of information asymmetries and moral hazard on corporate financing behavior and assess their impact in corporate practice. Furthermore, upon completion of the course, participants will be familiar with the fundamental institutional elements in these areas and be able to discuss and solve advanced problems in corporate finance from both a theoretical and an empirical perspective. Moreover, students will acquire an advanced understanding of the central scientific findings in these topic areas, which will enable them to critically apply them in scientific and practical contexts.

Literature
Verschiedene Literaturquellen, u.a. Brealey/Myers/Allen/Edmans: Principles of Corporate Finance; Thomson/Conyon: Corporate Governance: Mechanisms and Systems; Larcker/Tayan: Corporate Governance Matters. Weitere Literatur wird in der Lehrveranstaltung bekannt gegeben.

Various source of literature, among others Brealey/Myers/Allen/Edmans: Principles of Corporate Finance; Thomson/Conyon: Corporate Governance: Mechanisms and Systems; Larcker/Tayan: Corporate Governance Matters. Additional reading materials will be introduced during the course.

T 7.8 Module component: Advanced Food Processing [T-CIWVT-100152]

Coordinators: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	2211010	Process Engineering for the Production of Food from Animal Origins	2 SWS	Lecture / 🗣	Gaukel
Exams					
WT 25/26	7211010	Process Engineering for the Production of Food from Animal Origins			Gaukel
WT 25/26	7211111	Advanced Food Processing			Gaukel

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.9 Module component: Advanced Game Theory [T-WIWI-102861]

Coordinators: Prof. Dr. Karl-Martin Ehrhart
Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2521533	Advanced Game Theory	2 SWS	Lecture / 🗣	Reiß
WT 25/26	2521534	Übung zu Advanced Game Theory	1 SWS	Practice / 🗣	Reiß, Peters, Potarca
Exams					
WT 25/26	00076	Advanced Game Theory			Puppe
WT 25/26	7910020	Advanced Game Theory			Reiß

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
It is recommended that students have basic knowledge in mathematics and statistics.

Below you will find excerpts from courses related to this module component:

V Advanced Game Theory

2521533, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

T 7.10 Module component: Advanced Lab Informatics (Master) [T-WIWI-110548]

Coordinators: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	1

Courses					
WT 25/26	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course / 🧩	Schiefer, Toussaint
WT 25/26	2512314	Practical Course Linked Data and the Semantic Web (Master)	3 SWS	Practical course / 🗣	Käfer, Braun, Li, Kubelka
WT 25/26	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course / 🧩	Zöllner, Schneider
WT 25/26	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course / 🧩	Volkamer, Strufe, Berens, Fallahi, Ballreich, Hennig, Länge, Mossano, Hilt
WT 25/26	2512600	Project lab Knowledge-driven Artificial Intelligence (Master)	3 SWS	Practical course / 🧩	Sack, Tietz, Vafaie
ST 2026	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course / 🗣	Schiefer, Toussaint, Kruse
ST 2026	2512207	Lab Agentic AI im Smart IoT Office (Master)	3 SWS	Practical course / 🗣	Oberweis, Rybinski, Ullrich
ST 2026	2512500	Project Lab Machine Learning	3 SWS	Practical course / 🧩	Zöllner, Schneider
ST 2026	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course / 🧩	Volkamer, Strufe, Hennig, Fallahi, Länge, Ballreich, Hilt, Sikra, Algedri, Reimer, Mack
Exams					
WT 25/26	7900102	Advanced Lab Knowledge-driven Artificial Intelligence (Master)			Sack
WT 25/26	7900107	Advanced Lab Cognitive Automobile and Robots (Master)			Zöllner
WT 25/26	7900218	Advanced Lab Linked Data and the Semantic Web (Master)			Käfer
WT 25/26	7900306	Advanced Lab Realization of Innovative Services (Master)			Oberweis
WT 25/26	7900307	Advanced Lab Security, Usability and Society (Master)			Volkamer
ST 2026	7900061	Advanced Lab Agentic AI im Smart IoT Office (Master)			Oberweis
ST 2026	7900086	Project Lab Machine Learning			Zöllner
ST 2026	7900148	Advanced Lab Realization of innovative services (Master)			Oberweis, Schiefer
ST 2026	7900178	Practical Lab Security, Usability and Society (Master)			Volkamer, Strufe

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The alternative exam consists of a single examination of another type that combines three mandatory components:

- Practical work
- Presentation
- Written thesis

All three parts are integrated into one overall assessment. Their individual contributions are weighted according to the course-specific weighting scheme, but only one final grade is awarded for the whole examination. The final grade reflects the total impression of the combined performance.

Prerequisites
None

Additional Information
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at https://portal.wiwi.kit.edu.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Lab Realisation of innovative services (Master)**
2512205, WS 25/26, 3 SWS, Language: German, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Organizational issues
Informationen zu Themen und die Anmeldung erfolgt vor Praktikumsbeginn im Wiwi-Portal
https://portal.wiwi.kit.edu/ys

V **Practical Course Linked Data and the Semantic Web (Master)**
2512314, WS 25/26, 3 SWS, Language: German/English, Open in study portal
Practical course (P)
On-Site

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V **Practical Course Cognitive automobiles and robots (Master)**
2512501, WS 25/26, 3 SWS, Language: German/English, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to courses such as "Machine Learning 1/2".
Scientific topics, mostly in the area of autonomous driving and robotics, will be addressed in joint work with ML/KI methods. The goal of the internship is for participants to design, develop, and evaluate ML Software system.

In addition to the scientific goals, such as the study and application of methods, the aspects of project-specific teamwork in research (from specification to presentation of results) are also worked on in this internship.

The individual projects require the analysis of the set task, selection of appropriate methods, specification and implementation and evaluation of the solution approach. Finally, the selected solution is to be documented and presented in a short lecture.

Learning Objectives:

- Students will be able to practically apply theoretical knowledge from lectures on machine learning to a selected area of current research.
- Students will be proficient in analyzing and solving thematic problems.
- Students will be able to evaluate, document, and present their concepts and results.

Recommendations:

- Theoretical knowledge of machine learning and/or AI.
- Python knowledge
- Initial experience with deep learning frameworks such as PyTorch/Jax/Tensorflow may be beneficial.

Workload:

The workload of 5 credit points consists of practical implementation of the selected solution, as well as time for literature research and planning/specification of the selected solution. In addition, a short report and presentation of the work performed will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V **Praktikum Security, Usability and Society (Master)** — **Practical course (P)** / **Blended (On-Site/Online)**
2512555, WS 25/26, 3 SWS, Language: English, Open in study portal

Content
In the lab course “Security, Usability and Society”, students explore practical and interdisciplinary topics in the field of IT security and privacy at the cutting edge of society. In addition to the programming of data-saving apps, the development or implementation of user studies can also be possible tasks in this course.

The course can be credited towards the KASTEL certificate. Further information about the KASTEL certificate can be found on the SECUSO website: https://secuso.aifb.kit.edu/Studium_und_Lehre.php

Prerequisites:

The internship is aimed at Bachelor's and Master's students from the Industrial Engineering and Management, Business Informatics and Computer Science degree programs as well as related degree programs.

Organization:

There are two **mandatory** attendance dates: The kick-off is scheduled for the first week of the lectures, and the final presentations will take place in the second-to-last week of lectures. Additional dates will be arranged individually with the supervisors. All in-person lectures will be held in English. The main components of the course are the work on the respective topic, a final presentation, and a final report. After consultation with the supervisor, all components can be completed in either German or English.

Please note: In-person attendance at the kick-off and final presentation is mandatory to be allocated a topic.

If you have any questions about the course or the registration, please contact contact@secuso.org.

Registration:

The topics for the course, as well as the registration, are organized via the WiWi Portal. To reserve a place and select a topic, students register for the course in the WiWi Portal. A description of the current topics as well as important dates and deadlines can also be found there.

Please note that the number of topics is limited, and topics are allocated in the order of registration.

V **Project lab Knowledge-driven Artificial Intelligence (Master)** — **Practical course (P)** / **Blended (On-Site/Online)**
2512600, WS 25/26, 3 SWS, Language: English, Open in study portal

Content
The **project course Knowledge-driven AI** is based on the summer semester lecture "Information Service Engineering". Goal of the project course is to work on a (real) research problem in small groups related to the ISE lecture topics, including:

- Large Language Models (LLM)
- Natural Language Processing (NLP),
- Knowledge Graphs (KG),
- Machine Learning (ML)

Previous project courses were based on real (funded) research projects and included project tasks, as e.g., leveraging (large) language models for OCR post-processing of scanned historic documents, knowledge extraction and knowledge graph creation from historic documents, entity typing based on knowledge graph embeddings and language models, knowledge graph completion, semantic and exploratory search based on knowledge graphs, and many more.

The project course topics this semester include:

- **"Telling Data Stories with Semantic Technologies and Generative AI"**.
  This topic addresses the challenge that large Knowledge Graphs are often overwhelming for non-technical users due to their complexity, making it difficult to understand the structures and contents in a clear and intuitive way. Data Stories are designed to help users explore data; they simplify the complex relationships within Knowledge Graphs, reveal "hidden" connections and patterns, and provide narrative summaries. In this course, we aim to conceptualize and implement methods for creating Data Stories from large and complex Knowledge Graphs. This includes the creation of engaging visualizations and the use of generative AI to bridge the gap between data creators and users. This topic is part of the currently running project NFDI4Culture. The course results will be published on the NFDI4Culture Portal.
- **"Leveraging Large Language Models to Suggest Heuristics for Ontology Reasoning".**
  Ontology reasoning is a key component of semantic technologies, but traditional reasoning engines often face scalability issues with large or complex ontologies. With the rise of Large Language Models (LLMs), there is growing interest in exploring their potential to support symbolic reasoning. This project presents a preliminary study on using LLMs to suggest simple heuristics for ontology reasoning optimization. Rather than replacing existing reasoners, LLMs will serve as heuristic advisors—for example, by identifying structural patterns or recommending strategies for small ontologies. The project will involve lightweight experiments on selected ontology datasets, comparing reasoning performance with and without LLM-guided heuristics. The goal is to provide an initial exploration of the feasibility of LLM-assisted reasoning, laying the foundation for more advanced research.
- **"Large Language Models for Ontology Alignment with Foundational Ontologies"**
  Ontology alignment with foundational ontologies like BFO is important but often complex and time-consuming. This topic explores how Large Language Models (LLMs) can support or automate this process by interpreting ontology classes, suggesting alignments, and explaining their reasoning.
- **"Information Extraction in the era of Large Language Models"**
  Large Language Models (LLMs) are known to produce inaccurate or even misleading answers. One approach to mitigate this gross limitation is to enhance their responses with verified, structured data from knowledge graphs. The process of extracting structured data from unstructured texts often employs task-specific language models. In this project, students will explore and implement cutting-edge techniques for Named Entity Recognition (NER) using LLMs, comparing different approaches and evaluating their effectiveness in transforming unstructured text into structured data.

In this course you have the chance to combine creativity and practical implementation tasks to develop solutions for real-world projects and problems. The project will be worked on in **teams of 3-4 students** each, guided by a tutor from the teaching staff.

The **kick-off meeting** will take place in person on Wednesday, October 29th in room 05-09 (AIFB building 05.20), 9:45am.

The project course will be held in a **hybrid format**. The kick-off session will take place in person, and the individual group meetings throughout the semester will take place online. Each group can decide together with their tutors on regular meeting times (30min each).

For questions, please reach out to Prof. Harald Sack (harald.sack@kit.edu) or Tabea Tietz (tabea.tietz@kit.edu).

Required coursework for each student team include:

- Mid term presentation (5-10 min)
- Final presentation (10-15 min)
- Course report (c. 16 pages)
- Participation and contribution of the students during the course
- Software development and delivery

Notes:

- If need be, the ISE project course can also be credited as a seminar.
- The project course will be restricted to overall 16 participants max.
- Participation in the lecture "Information Service Engineering" (summer semester) is not necessarily required, but highly beneficial (the lecture recordings are available on youtube).

Outcomes of previous project course editions:

- Hackathon Coding da Vinci 2022: Winners in the category "most FAIR application"

- Paper publications:
  - M. Li, H. Yang, Z. Liu, M.M. Alam, E. Norouzi, H. Sack and G.A. Gesese: KGMistral: Towards Boosting the Performance of Large Language Models for Question Answering with Knowledge Graph Integration. In Workshop on Deep Learning and Large Language Models for Knowledge Graphs 2024
  - O. Bruns, T. Tietz, M. B. Chaabane, M. Portz, F. Xiong, and H. Sack: The Nuremberg Address Knowledge Graph. In: Proceedings of the 17th Extended Semantic Web Conference, P&D Track 2021 [PDF]

Literature
ISE video channel on youtube: https://www.youtube.com/channel/UCjkkhNSNuXrJpMYZoeSBw6Q/

V Lab Realisation of innovative services (Master)
2512205, SS 2026, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Organizational issues
Informationen zu Themen und die Anmeldung erfolgt bis Mitte März im Wiwi-Portal
https://portal.wiwi.kit.edu/ys

V Lab Agentic AI im Smart IoT Office (Master)
2512207, SS 2026, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
As part of the lab, various topics on everyday automation are offered. During the lab, the participants will gain an insight into problem-solving oriented project work and work on a project together in small groups.

In case of questions, please contact fabian.rybinski@kit.edu.

Organizational issues
Informationen zu Themen und die Anmeldung erfolgt vor Praktikumsbeginn im Wiwi-Portal
https://portal.wiwi.kit.edu/ys

Bei Fragen bitte an fabian.rybinski@kit.edu wenden.

V Project Lab Machine Learning
2512500, SS 2026, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V

Praktikum Security, Usability and Society (Master)

2512555, SS 2026, 3 SWS, Language: English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content

In the lab-course “Security, Usability and Society”, students deal with practical and interdisciplinary topics from the field of IT security and privacy at the cutting edge of society. In addition to the programming of data-saving apps, the development or implementation of user studies can also be possible tasks in this course.

The course can be credited towards the KASTEL certificate. Further information about the KASTEL certificate can be found on the SECUSO website: https://secuso.aifb.kit.edu/Studium_und_Lehre.php

Prerequisites:

The internship is aimed at Bachelor's and Master's students from the Industrial Engineering and Management, Business Informatics and Computer Science degree programs as well as related degree programs.

Organization:

There are two mandatory attendance dates: The kick-off is scheduled for the first week of the lectures, and the final presentations will take place in the second to last week of lectures. Additional dates will be arranged individually with the supervisors. All in-person lectures will be held in English. The main components of the course is the work on the respective topic, a final presentation and a final report. After consultation with the supervisor, all components can be either completed in German or English.

If you have any questions about the course or the registration, please contact contact@secuso.org.

Registration:

The topics for the course as well as the registration is organized via the WiWi-Portal. To reserve a place and choose a topic, students register for the course in the WiWi-Portal. A description of the current topics as well as important dates and deadlines can also be found there.

Please note that the number of topics is limited and topics are allocated in the order of registration.

T 7.11 Module component: Advanced Lab Realization of Innovative Services (Master) [T-WIWI-112914]

Coordinators: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	1

Courses					
WT 25/26	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course / 🧩	Schiefer, Toussaint
ST 2026	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course / 🗣	Schiefer, Toussaint, Kruse
Exams					
WT 25/26	7900218	Advanced Lab Linked Data and the Semantic Web (Master)			Käfer
WT 25/26	7900306	Advanced Lab Realization of Innovative Services (Master)			Oberweis
ST 2026	7900061	Advanced Lab Agentic AI im Smart IoT Office (Master)			Oberweis
ST 2026	7900148	Advanced Lab Realization of innovative services (Master)			Oberweis, Schiefer

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Additional Information
As part of the lab, the participants should work together in small groups to produce innovative services (mainly for students).
Further information can be found on the ILIAS page of the lab.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Lab Realisation of innovative services (Master)

2512205, WS 25/26, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Organizational issues
Informationen zu Themen und die Anmeldung erfolgt vor Praktikumsbeginn im Wiwi-Portal
https://portal.wiwi.kit.edu/ys

V Lab Realisation of innovative services (Master)

2512205, SS 2026, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Organizational issues
Informationen zu Themen und die Anmeldung erfolgt bis Mitte März im Wiwi-Portal
https://portal.wiwi.kit.edu/ys

T 7.12 Module component: Advanced Lab Security, Usability and Society [T-WIWI-108439]

Coordinators: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	3

Courses					
WT 25/26	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Fallahi, Ballreich, Hennig, Länge, Mossano, Hilt
WT 25/26	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Fallahi, Ballreich, Hennig, Länge, Mossano, Hilt
ST 2026	2512554	Practical Course: Security, Usability and Society	3 SWS	Practical course /	Volkamer, Strufe, Hennig, Länge, Fallahi, Ballreich, Sikra, Hilt, Reimer, Algedri, Mack
ST 2026	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Hennig, Fallahi, Länge, Ballreich, Hilt, Sikra, Algedri, Reimer, Mack
Exams					
WT 25/26	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
WT 25/26	7900307	Advanced Lab Security, Usability and Society (Master)			Volkamer
ST 2026	7900029	Practical lab Security, Usability and Society (Bachelor)			Volkamer, Strufe

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Assessment takes the form of an alternative exam. It consists of a practical assignment, a presentation, and, if required, a written report. The lectures and the presentations will be in English. The written report can be written in either English or German after consultation with the supervisor.
Practical work, presentation, and written thesis are weighted according to the course.

Prerequisites
None

Recommendations
Knowledge from the lecture "Applied Informatics - Cybersecurity" is recommended.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Praktikum Security, Usability and Society (Bachelor)

2512554, WS 25/26, 3 SWS, Language: English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
In the lab course “Security, Usability and Society”, students explore practical and interdisciplinary topics in the field of IT security and privacy at the cutting edge of society. In addition to the programming of data-saving apps, the development or implementation of user studies can also be possible tasks in this course.

The course can be credited towards the KASTEL certificate. Further information about the KASTEL certificate can be found on the SECUSO website: https://secuso.aifb.kit.edu/Studium_und_Lehre.php

Prerequisites:

The internship is aimed at Bachelor's and Master's students from the Industrial Engineering and Management, Business Informatics and Computer Science degree programs as well as related degree programs.

Organization:

There are two **mandatory** attendance dates: The kick-off is scheduled for the first week of the lectures, and the final presentations will take place in the second-to-last week of lectures. Additional dates will be arranged individually with the supervisors. All in-person lectures will be held in English. The main components of the course are the work on the respective topic, a final presentation, and a final report. After consultation with the supervisor, all components can be completed in either German or English.

Please note: In-person attendance at the kick-off and final presentation is mandatory to be allocated a topic.

If you have any questions about the course or the registration, please contact contact@secuso.org.

Registration:

The topics for the course, as well as the registration, are organized via the WiWi Portal. To reserve a place and select a topic, students register for the course in the WiWi Portal. A description of the current topics as well as important dates and deadlines can also be found there.

Please note that the number of topics is limited, and topics are allocated in the order of registration.

V **Praktikum Security, Usability and Society (Master)**
2512555, WS 25/26, 3 SWS, Language: English, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
In the lab course “Security, Usability and Society”, students explore practical and interdisciplinary topics in the field of IT security and privacy at the cutting edge of society. In addition to the programming of data-saving apps, the development or implementation of user studies can also be possible tasks in this course.

The course can be credited towards the KASTEL certificate. Further information about the KASTEL certificate can be found on the SECUSO website: https://secuso.aifb.kit.edu/Studium_und_Lehre.php

Prerequisites:

The internship is aimed at Bachelor's and Master's students from the Industrial Engineering and Management, Business Informatics and Computer Science degree programs as well as related degree programs.

Organization:

There are two **mandatory** attendance dates: The kick-off is scheduled for the first week of the lectures, and the final presentations will take place in the second-to-last week of lectures. Additional dates will be arranged individually with the supervisors. All in-person lectures will be held in English. The main components of the course are the work on the respective topic, a final presentation, and a final report. After consultation with the supervisor, all components can be completed in either German or English.

Please note: In-person attendance at the kick-off and final presentation is mandatory to be allocated a topic.

If you have any questions about the course or the registration, please contact contact@secuso.org.

Registration:

The topics for the course, as well as the registration, are organized via the WiWi Portal. To reserve a place and select a topic, students register for the course in the WiWi Portal. A description of the current topics as well as important dates and deadlines can also be found there.

Please note that the number of topics is limited, and topics are allocated in the order of registration.

V **Practical Course: Security, Usability and Society**
2512554, SS 2026, 3 SWS, Language: English, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
In the lab-course “Security, Usability and Society”, students deal with practical and interdisciplinary topics from the field of IT security and privacy at the cutting edge of society. In addition to the programming of data-saving apps, the development or implementation of user studies can also be possible tasks in this course.

The course can be credited towards the KASTEL certificate. Further information about the KASTEL certificate can be found on the SECUSO website: https://secuso.aifb.kit.edu/Studium_und_Lehre.php

Prerequisites:

The internship is aimed at Bachelor's and Master's students from the Industrial Engineering and Management, Business Informatics and Computer Science degree programs as well as related degree programs.

Organization:

There are two mandatory attendance dates: The kick-off is scheduled for the first week of the lectures, and the final presentations will take place in the second to last week of lectures. Additional dates will be arranged individually with the supervisors. All in-person lectures will be held in English. The main components of the course is the work on the respective topic, a final presentation and a final report. After consultation with the supervisor, all components can be either completed in German or English.

If you have any questions about the course or the registration, please contact contact@secuso.org.

Registration:

The topics for the course as well as the registration is organized via the WiWi-Portal. To reserve a place and choose a topic, students register for the course in the WiWi-Portal. A description of the current topics as well as important dates and deadlines can also be found there.

Please note that the number of topics is limited and topics are allocated in the order of registration.

V

Praktikum Security, Usability and Society (Master)

2512555, SS 2026, 3 SWS, Language: English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
In the lab-course “Security, Usability and Society”, students deal with practical and interdisciplinary topics from the field of IT security and privacy at the cutting edge of society. In addition to the programming of data-saving apps, the development or implementation of user studies can also be possible tasks in this course.

The course can be credited towards the KASTEL certificate. Further information about the KASTEL certificate can be found on the SECUSO website: https://secuso.aifb.kit.edu/Studium_und_Lehre.php

Prerequisites:

The internship is aimed at Bachelor's and Master's students from the Industrial Engineering and Management, Business Informatics and Computer Science degree programs as well as related degree programs.

Organization:

There are two mandatory attendance dates: The kick-off is scheduled for the first week of the lectures, and the final presentations will take place in the second to last week of lectures. Additional dates will be arranged individually with the supervisors. All in-person lectures will be held in English. The main components of the course is the work on the respective topic, a final presentation and a final report. After consultation with the supervisor, all components can be either completed in German or English.

If you have any questions about the course or the registration, please contact contact@secuso.org.

Registration:

The topics for the course as well as the registration is organized via the WiWi-Portal. To reserve a place and choose a topic, students register for the course in the WiWi-Portal. A description of the current topics as well as important dates and deadlines can also be found there.

Please note that the number of topics is limited and topics are allocated in the order of registration.

T 7.13 Module component: Advanced Machine Learning [T-WIWI-109921]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Dr. Abdolreza Nazemi

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2540535	Advanced Machine Learning	2 SWS	Lecture	Nazemi
ST 2026	2540536	Exercise Advanced Machine Learning	1 SWS	Practice	Nazemi
Exams					
WT 25/26	7900253	Advanced Machine Learning (Nachklausur SoSe 2025)			Geyer-Schulz
ST 2026	7900227	Advanced Machine Learning			Geyer-Schulz
ST 2026	7900252	Advanced Machine Learning (Nachklausur SoSe 2026)			Geyer-Schulz

Assessment
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Please note: this exam will no longer be offered after August 2026.

Prerequisites
None

Additional Information
Please note: this course, exercises and exam will no longer be offered after August 2026.

Below you will find excerpts from courses related to this module component:

V **Advanced Machine Learning** **Lecture (V)**
2540535, SS 2026, 2 SWS, Language: English, Open in study portal

Content

In recent years, the volume, variety, velocity, veracity, and variability of available data have increased due to improvements in computational and storage power. The rise of the Internet has made available large sets of data that allow us to use and merge them for different purposes. Data science helps us to extract knowledge from the continually-increasing large datasets. This course will introduce students to a wide range of machine learning and statistical techniques such as deep learning, LASSO, and support vector machine. You will get familiar with text mining, and the tools you need to analyze the various facets of data sets in practice. Students will learn theory and concepts with real data sets from different disciplines such as marketing, finance, and business.

Tentative Course Outline:

- Introduction
- Statistical Inference
- Shrinkage Methods
- Model Assessment and Selection
- Tree-based Machine Learning Algorithms
- Dimensionality Reduction
- Neural Networks and Deep Learning
- Natural Language Processing with Deep Learning
- Support Vector Machine

Time of attendance

- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m

The student will learn

- A wide range of machine learning algorithms and their weaknesses.
- The fundamental issues and challenges: data, high-dimension, train, model selection, etc.
- How to imply machine learning algorithms for real-world applications.
- The fundamentals of deep learning, main research activities, and on-going research in this field.

Literature

- Alpaydin, E. (2014). Introduction to Machine Learning. Third Edition, MIT Press.
- De Prado, M. L. (2018). Advances in Financial Machine Learning. John Wiley & Sons.
- Goodfellow, I., Bengio, Y., and A. Courville (2017). Deep Learning. MIT Press. (online available)
- Hastie, T., Tibshirani, R., and J. Friedman (2009). Elements of Statistical Learning. Second Edition. Springer. (online available)
- Leskovec, J., Rajaraman, A., Ullman, J. D., (2014). Mining of Massive Datasets. Cambridge University Press. (online available)
- Witten, I. H., Eibe, F., Hall, M. A., Pal, C. J. (2016). Data Mining: Practical Machine Learning Tools and Techniques. Morgan Kaufmann.

T 7.14 Module component: Advanced Machine Learning and Data Science [T-WIWI-111305]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105659 - Advanced Machine Learning and Data Science

Type	Credits	Grading	Term offered	Version
Examination of another type	9 CP	graded	Each term	5

Courses					
ST 2026	2500016	Advanced Machine Learning and Data Science	4 SWS	Project / 🗣	Ulrich

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is carried out in an alternative form. The grade is evaluated based on the intermediate presentations during the project, the quality of the implementation, the final written thesis, and a final presentation.

Additional Information
The course is aimed at students majoring in data science and/or machine learning. It offers students the opportunity to gain practical knowledge of new developments in the fields of data science and machine learning.

Kick-off Meeting for Winter Term 2025/26:
We will introduce project topics designed for students of computer science, engineering, and mathematics. The meeting will provide an overview of the course structure, project topics, and expectations for the semester.

- **Date**: Tuesday, October 28, 2025, Time: 5:00 PM – 7:00 PM
- **Format**: Online (MS Teams link: Kick-Off (WS-2025)-Tuesday, October 28, 2025 | Meeting-Join | Microsoft Teams)
- **Ms Team Meeting link**: https://teams.microsoft.com/meet/3867172715541?p=GS2swv7ueF5gAClUEs
- **Form link**: https://docs.google.com/forms/d/e/1FAIpQLSek36NGe9I7JyIIlc4iBnd-XEwbhexFS7Wn_P6Wga1-EKU8Qw/viewform?usp=dialog

After the meeting (within 48 hours): Please submit your Priority A and Priority B topic preferences via the form within 48 hours after the kick-off.

If you need more information, please visit https://risk.fbv.kit.edu/2307.php.

Workload
270 hours

Below you will find excerpts from courses related to this module component:

V Advanced Machine Learning and Data Science

2500016, SS 2026, 4 SWS, Language: English, Open in study portal

Project (PRO)
On-Site

Content
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning.

Organizational issues
Während des Kick-off Meetings in der ersten Wochen werden Themen vorgestellt.

Wir bereiten Themen für Studenten der Informatik, W-Ing und Wi-Ma vor.

Themen und studentische Bearbeiter werden nach dem Kick-off gematched.

Literature
Literatur und Computerprogramme wird in der ersten Vorlesung bekannt gegeben.

T 7.15 Module component: Advanced Management Accounting [T-WIWI-102885]

Coordinators: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading	Term offered	Version
Oral examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2579907	Advanced Management Accounting	4 SWS	Lecture / 🗣	Wouters, Dickemann, Letmathe
Exams					
WT 25/26	79-2579907-M	Advanced Management Accounting			Wouters

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral exam (30 min) (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendations
The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Additional Information
This course is held in English. Lectures and tutorials are integrated.

The course is compulsory and must be examined.

Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters∂kit.edu).

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Advanced Management Accounting** — **Lecture (V) On-Site**
2579907, WS 25/26, 4 SWS, Language: English, Open in study portal

Content
This course is held in English. Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

Inhalt:

- The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

Learning objectives:

- Students will be able to consider advanced management accounting methods in an interdisciplinary way and to apply these to managerial decision-making problems in operations and innovation.
- They will also be able to identify relevant research results on such methods.

Examination:

- The assessment consists of an oral exam (30 min) taking place in the recess period (according to § 4 (2) No. 2 of the examination regulation).
- The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Required prior Courses:

- The course is compulsory and must be examined.

Recommendations:

- The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Workload:

- The total workload for this course is approximately 135 hours. For further information see German version.

Organizational issues
Die LV wird in englischer Sprache gehalten. Studierende, die Interesse haben, an dieser Lehrveranstaltung teilzunehmen, sollten bitte vorher eine E-Mail an Professor Wouters senden (marc.wouters@kit.edu).

Literature
Literature is mostly made available via ILIAS.

T 7.16 Module component: Advanced Quantitative Finance [T-WIWI-114979]

Coordinators: Prof. Dr. Julian Thimme
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	1

Assessment
The assessment of success in this course is carried out as a non exam assessment. The grade is made up as follows:

1. Written elaboration (weighting: 33 %).
2. Working on and presenting data analysis problems in small groups (weighting: 67 %).

Additional Information
New course from summer semester 2026

Workload
135 hours

T 7.17 Module component: Advanced Statistics [T-WIWI-103123]

Coordinators: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101637 - Analytics and Statistics
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2550552	Advanced Statistical Techniques, Including Multivariate and Simulation Methods	2 SWS	Lecture / 🗣	Grothe
WT 25/26	2550553	Exercises and Computer Labs in Advanced Statistical Techniques	2 SWS	Practice / 🗣	Grothe
Exams					
WT 25/26	7900289	Advanced Statistical Techniques, Including Multivariate and Simulation Methods			Grothe
ST 2026	7900253	Advanced Statistical Techniques, Including Multivariate and Simulation Methods			Grothe

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Advanced Statistical Techniques, Including Multivariate and Simulation Methods

Lecture (V) On-Site

2550552, WS 25/26, 2 SWS, Language: English, Open in study portal

Literature
Skript zur Vorlesung

T 7.18 Module component: Advanced Stochastic Optimization [T-WIWI-106548]

Coordinators: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Oral examination	4,5 CP	graded	Irregular	2

Courses					
WT 25/26	2500050	Advanced Stochastic Optimization	2 SWS	Lecture / 💻	Rebennack
WT 25/26	2550468	Übung zu Advanced Stochastic Optimization	1 SWS	Practice / 🛠	Rebennack
Exams					
WT 25/26	7900039	Advanced Stochastic Optimization			Rebennack

Legend: 💻 Online, 🛠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral exam (20 minutes). The exam is offered every semester.

Prerequisites
None.

Recommendations
It is recommended to attend the lecture "Introduction to Stochastic Optimization" before attending the lecture "Advanced Stochastic Optimization".

Additional Information
Lectures and tutorials are offered irregularly.

Workload
135 hours

T 7.19 Module component: Advanced Topics in Digital Management [T-WIWI-111912]

Coordinators: Prof. Dr. Petra Nieken
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each summer term	1

Courses					
ST 2026	2573016	Advanced Topics in Digital Management	2 SWS	Colloquium / 🗣	Nieken, Mitarbeiter

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment. The following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendations
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas digital HRM, personnel economics, and leadership and those who are interest in an academic career path.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Advanced Topics in Digital Management** — **Colloquium (KOL) On-Site**
2573016, SS 2026, 2 SWS, Language: English, Open in study portal

Content
The students will discuss and analyze selected research papers in the areas digital HRM, personnel economics, and leadership with a focus on digital management. The students will present research papers and discuss research methods and designs as well as content. They will develop an own research design on a predefined topic.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership with a focus on digital management and AI.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills and discussion skills.
- Practices scientific debating.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of digital HRM and management.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
- Learns how to develop an own research design and idea.

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues
Geb. 05.20, Raum 2A-25, Termine werden bekannt gegeben

T 7.20 Module component: Advanced Topics in Digital Twins [T-WIWI-114951]

Coordinators: Prof. Dr.-Ing. Sanja Lazarova-Molnar
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Once	1

Courses					
ST 2026	2511104	Advanced Topics in Digital Twins	2 SWS	Lecture	Lazarova-Molnar
ST 2026	2511105	Exercises Advanced Topics in Digital Twins	1 SWS	Practice	Lazarova-Molnar, Khodadadi, Zare, Götz, Jungmann, Mostafa, Lee, Mahmoud, Daniel, Deufel
Exams					
ST 2026	7900050	Advanced Topics in Digital Twins (Registration until 20.07.2026)			Lazarova-Molnar

Assessment
Written examination (60 minutes).

Prerequisites
None

Recommendations
Basic knowledge of modeling and simulation is helpful but not mandatory.
An interest in interdisciplinary research and applied innovation in cyber-physical systems is advantageous.

Additional Information
The course will be offered once in the summer semester 2026.
The course is conducted in-person only to encourage active participation and hands-on learning.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Advanced Topics in Digital Twins

2511104, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content

This lecture series provides an overview of current research in Digital Twins, delivered by members of the SYDSEN research group working on active research topics in the field. Each lecture focuses on a specific topic and covers state-of-the-art methods as well as practical applications. Topics include:

1. Comprehensive Digital Twins
2. Digital Twins for Labor-intensive Manufacturing Systems
3. Integration of Expert Knowledge into Data-Driven Digital Twin Models
4. Human-in-the-Loop Digital Twins
5. Validation of Digital Twins for Production Systems
6. Explainability in Digital Twins
7. Automation of Simulation-Based Decision Support in Data-Driven Digital Twins
8. Digital Twins for Enhanced Reliability in Energy Systems
9. Data-driven Agent-Based Simulation for Digital Twins

By the end of the course, students will understand how Digital Twins are applied in different domains. They will be able to analyze research approaches, identify limitations, and assess the practical relevance of current work. Students will also be able to recognize emerging research directions and innovation opportunities.

Prerequisites

Basic programming experience and foundational knowledge in mathematics, modeling, and data-driven methods.

Learning Objectives

- Conduct critical analysis of Digital Twin research and its practical relevance.
- Evaluate limitations and opportunities for innovation in existing Digital Twin approaches.
- Identify emerging trends across application domains and research areas.
- Connect theoretical knowledge with hands-on experience through demonstrations and tool-based exercises.

Form of Instruction

Lectures covering theoretical foundations and research contributions, complemented by practical sessions including demonstrations, case studies, and tool-based exercises. A detailed course plan will be provided before the start of the semester.

Competence Certificate

The examination will be offered as a written exam (60 minutes).

T 7.21 Module component: Advanced Topics in Economic Theory [T-WIWI-102609]

Coordinators: Prof. Dr. Johannes Brumm
Prof. Dr. Kay Mitusch

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101406 - Network Economics
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Economic Theory and its Application in Finance
M-WIWI-107010 - Economics in a Connected World
M-WIWI-107011 - Economics of Innovation and Growth

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Assessment
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

Prerequisites
None

Recommendations
This course is designed for advanced Master students with a strong interest in economic theory and mathematical models. Bachelor students who would like to participate are free to do so, but should be aware that the level is much more advanced than in other courses of their curriculum.

T 7.22 Module component: Advanced Topics in Human Resource Management [T-WIWI-111913]

Coordinators: Prof. Dr. Petra Nieken
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Courses					
WT 25/26	2573014	Advanced Topics in Human Resource Management	2 SWS	Colloquium / 🗣	Nieken, Mitarbeiter

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment.The following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendations
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas HRM, personnel economics, and leadership and those who are interest in an academic career path.

Additional Information
Teaching and learning format: Colloquium

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Advanced Topics in Human Resource Management** — **Colloquium (KOL) On-Site**
2573014, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
The students will discuss and analyze selected research papers in the areas HRM, personnel economics, and leadership. The students will present research papers and discuss research methods and designs as well as content. They will develop an own research design on a predefined topic.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills and discussion skills.
- Practices scientific debating.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of HRM.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
- Learns how to develop an own research design and idea.

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues
siehe Homepage

T 7.23 Module component: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

Coordinators: Dr.-Ing. Marcus Gohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2134150	Gas, lubricating oil and operating media analysis in drive train development	2 SWS	Lecture / 🗣	Gohl
Exams					
ST 2026	76-T-Mach-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines			Gohl

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral examination, duration approx. 25 min, no aids

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Gas, lubricating oil and operating media analysis in drive train development** — Lecture (V) On-Site
2134150, SS 2026, 2 SWS, Language: German, Open in study portal

Literature
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.

T 7.24 Module component: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

Coordinators: Jürgen Pfeil
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2134134	Analysis tools for combustion diagnostics	2 SWS	Lecture / 🗣	Pfeil
Exams					
WT 25/26	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Koch
ST 2026	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Pfeil

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Analysis tools for combustion diagnostics

2134134, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

T 7.25 Module component: Application of Social Science Methods (WiWi) [T-GEISTSOZ-109052]

Coordinators: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101169 - Sociology

Type	Credits	Grading	Term offered	Version
Examination of another type	9 CP	graded	Each term	2

Courses					
ST 2026	5011006	Gender Pay Gap	2 SWS	Seminar /	Nollmann
ST 2026	5011008	Decomposition and Regression Analysis	2 SWS	Seminar /	Nollmann
Exams					
WT 25/26	7400048	Application of Social Science Methods (WiWi)			Nollmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 7.26 Module component: Applied Econometrics [T-WIWI-111388]

Coordinators: Prof. Dr. Fabian Krüger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II
M-WIWI-107010 - Economics in a Connected World
M-WIWI-107011 - Economics of Innovation and Growth

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2520020	Applied Econometrics	2 SWS	Lecture / 🗣	Krüger, N.N.
WT 25/26	2520021	Tutorial in Applied Econometrics	2 SWS	Practice / 🗣	Krüger, N.N.
Exams					
WT 25/26	7900251	Applied Econometrics			Krüger
ST 2026	7900007	Applied Econometrics			Krüger

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (90 min).

Prerequisites
None

Below you will find excerpts from courses related to this module component:

V Applied Econometrics

2520020, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course starts with a concise review of the linear regression model. It then presents methods for causal inference: The potential outcomes approach, methods for analyzing randomized controlled trials, and methods for analyzing observational data (e.g., regression discontinuity). Empirical examples and R code are used to illustrate the methodological concepts.

Learning goals

Students understand the properties of various econometric estimators and research designs, and can implement econometric estimators using R software.

Workload

The total workload for this course (4.5 credit points) is approximately 135 hours.

Literature
The following book is the main reference for the course:

Ding, P. (2024). A First Course in Causal Inference. Routledge.

Further literature will be announced in class.

T 7.27 Module component: Applied material flow simulation [T-MACH-112213]

Coordinators: Dr.-Ing. Marion Baumann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading	Term offered	Version
Oral examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2117054	Applied material flow simulation	3 SWS	Lecture / Practice /	Baumann
Exams					
WT 25/26	76-T-MACH-112213	Applied material flow simulation			Baumann, Furmans

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
None

Recommendations

- Basic statistical knowledge and understanding
- Knowledge of a common programming language (Java, Python, ...)
- Recommended course: T-WIWI-102718 - Discrete Event Simulation in Production and Logistics

Additional Information
The course is offered in German.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Applied material flow simulation** — **Lecture / Practice (VÜ) On-Site**
2117054, WS 25/26, 3 SWS, Language: German, Open in study portal

Content
Learning Content:

- Methods of modeling a simulation such as:
  - Discrete-event simulation
  - Agent based simulation
- Design of a simulation model of a material flow system
- Data exchange in simulation models
- Verification and validation of simulation models
- Execution of simulation studies
- Statistical evaluation and parameter study

This is an application-oriented course in which the course contents are applied and deepened using the Anylogic software.

Learning Goals:
Students are able to:

- select the appropriate simulation modeling method depending on a modeling objective and build a suitable simulation model for material flow systems,
- extend a simulation model in a meaningful way with data import and export,
- verify and validate a simulation model,
- conduct a simulation study efficiently and with meaningful results, and
- design and conduct a parameter study and statistically analyze and evaluate the results.

Requirements:

- Basic knowledge of the Java programming language

Recommendations:

- Basic statistical skills
- Recommended course: T-WIWI-102718 - Discrete Event Simulation in Production and Logistics

Workload for 4,5 ECTS (135 h):

- regular attendance: 21 hours
  self-study: 114 hours

Organizational issues

- **Im Wintersemester 2025/2026 ist die Veranstaltung auf maximal 30 Teilnehmer beschränkt.**
- **Die Anmeldung ist durch Beitritt zum ILIAS-Kurs und Ausfüllen des Anmeldungsformulars (erforderliche Felder beim Beitritt zum ILIAS-Kurs) möglich.**
- **Die Anmeldung ist vom 01.09.2025 bis zum 30.09.2025 möglich.**

Literature
Borshev, A. (2022): The Big Book of Simulation Modeling - Multimethod Modeling with AnyLogic 8, https://www.anylogic.de/resources/books/big-book-of-simulation-modeling/.

Grigoryev, I. (2021): AnyLogic8 in Three Days, 5. Aufl., https://www.anylogic.de/resources/books/free-simulation-book-and-modeling-tutorials/.

Gutenschwager, K. et. al. (2017): Simulation in Produktion und Logistik, Springer Vieweg, Berlin.

VDI (2014): Simulation von Logistik-, Materialfluss- und Produktionssystemen - Grundlagen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

VDI (2016): Simulation von Logistik-, Materialfluss- und Produktionssystemen - Simulation und Optimierung. VDI Richtlinie 3633, Blatt 12, VDI-Verlag, Düsseldorf

T 7.28 Module component: Artificial Intelligence for Autonomous Driving [T-WIWI-112966]

Coordinators: Prof. Dr. Alexey Vinel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	3

Exams			
WT 25/26	79AIFB_ABMS_A3	Artificial Intelligence for Autonomous Driving (registration until 09.02.2026)	Vinel

Assessment
The assessment of this course is a written examination (60 min) or an oral exam (20 min).

The exam takes place every semester and can be repeated at every regular examination date.

Workload
135 hours

T 7.29 Module component: Artificial Intelligence in Production [T-MACH-112115]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105968 - Artificial Intelligence in Production
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each winter term	1

Courses					
WT 25/26	2149921	Artificial Intelligence in Production	3 SWS	Lecture / 🗣	Fleischer
Exams					
WT 25/26	76-T-MACH-112970	Artificial Intelligence in Production			Fleischer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written Exam (90 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V **Artificial Intelligence in Production** — Lecture (V), On-Site
2149921, WS 25/26, 3 SWS, Language: German, Open in study portal

Content
The module AI in Production is designed to teach students the practical, holistic integration of machine learning and artificial intelligence methods in production. The course is oriented towards the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content-related aspects (methods) within the individual phases. In addition to teaching the practical aspects of integrating the most important machine learning methods, the focus is primarily on the necessary steps for data generation and data preparation as well as the implementation and validation of the methods in an industrial environment.

The lecture"Artificial Intelligence in Production" deals with the theoretical basics in a practical context. Here, the six phases of the CRISP-DM process are run through sequentially and the necessary basics for the implementation of the respective phases are taught. The course first deals with the data sources that are prevalent in the production environment. Subsequently, possibilities for target-oriented data acquisition as well as data transfer and data storage are introduced. Possibilities for data filtering and data preprocessing are discussed and production-relevant aspects are pointed out. The course then covers in detail the necessary algorithms and procedures for implementing AI in production, before techniques and fundamentals for making the models permanent in production (deployment) are discussed.

Learning Outcomes:

The students

- understand the relevance for the application of AI in production and know the main drivers and challenges.
- will understand the CRISP-DM process for implementing AI projects in manufacturing. Students will be able to name the main data sources, data ingestion methods, communication architectures, models and methods for data processing.
- will understand the main machine learning techniques and be able to contrast and select them in the context of industrial issues.
- are able to assess whether a specific problem in the context of production can be solved in a target-oriented manner using machine learning methods, as well as what the necessary steps are for implementation.
- are able to assess the most important challenges and name possible approaches to solve them.
- are able to apply the phases of the CRISP-DM to a problem in production. Students will know the steps necessary to build a data pipeline and will be able to do so theoretically in the context of a real-world use case.
- are able to evaluate the results of common deep learning methods and, based on this, to theoretically elaborate and theoretically apply proposed solutions (from the field of machine learning).

Workload:

MACH:
regular attendance: 31,5 hours
self-study: 88,5 hours
WING:
regular attendance: 31,5 hours
self-study: 118,5 hours

Organizational issues
Vorlesungstermine freitags 14:00 Uhr, begleitet durch Online-Programmierübungen.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.30 Module component: Artificial Intelligence in Service Systems [T-WIWI-108715]

Coordinators: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2595650	Artificial Intelligence in Service Systems	1.5 SWS	Lecture /	Spitzer, Holstein, Satzger
WT 25/26	2595651	Übung zu Artificial Intelligence in Service Systems	1.5 SWS	Practice /	Spitzer, Holstein, Hendriks, Satzger
Exams					
WT 25/26	7900032	Artificial Intelligence in Service Systems			Satzger
ST 2026	7900073	Artificial Intelligence in Service Systems (NK am 15.06.2026)			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment consists of a written exam (60 min). Successful completion of the exercises is a prerequisite for admission to the written exam.

Prerequisites
None

Additional Information
The course will be offered in the form of a flipped classroom concept starting in winter semester 2022/2023. The lecture will be recorded in advance and made available online. During the exercise classes, the contents of the lecture will be discussed and applied as part of programming exercises.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Artificial Intelligence in Service Systems

2595650, WS 25/26, 1.5 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Artificial Intelligence (AI) and the application of machine learning is becoming more and more popular to solve relevant business challenges — both within isolated entities but also within co-creating systems (like value chains). However, it is not only essential to be familiar with precise algorithms but rather a general understanding of the necessary steps with a holistic view—from real-world challenges to the successful deployment of an AI-based solution. As part of this course, we teach the complete lifecycle of an AI project focusing on supervised machine learning challenges. We do so by also introducing the use of Python and the required packages like scikit-learn, pytorch and langchain with exemplary data and use cases. We then take this knowledge to the more complex case of service systems with different entities (e.g., companies) who interact with each other and show possibilities on how to derive holistic insights. Apart from the technical aspects necessary when developing AI within service systems, we also shed light on the collaboration of humans and AI in such systems (e.g., with the support of XAI), topics of ethics and bias in AI, as well as AI's capabilities on being creative - like generative AI creating songs and images.Students of this course will be able to understand and implement the complete lifecycle of a typical Artificial Intelligence use case with supervised machine learning. Furthermore, they understand the importance and the means of applying AI within service systems, which allows multiple, independent entities to collaborate and derive insights. Besides technical aspects, they will gain an understanding of the broader challenges and aspects when dealing with AI. Students will be proficient with typical Python code for AI challenges.

Workload:

- Attendance time – Lecture (1.5 SWS × 15 weeks): 22.5 h
- Attendance time – Tutorial (1.5 SWS × 15 weeks): 22.5 h
- Self-study – Lecture: 35 h
- Self-study – Tutorial: 35 h
- Exam preparation: 20 h
- **Total workload: 135 h**

Organizational issues
The course will be offered in the form of a flipped classroom concept starting in winter semester 2022/2023. The lecture will be recorded in advance and made available online. During the exercise classes, the contents of the lecture will be discussed and applied as part of programming exercises.

Literature

- Baier, L., Kühl, N., & Satzger, G. (2019). How to cope with change?-preserving validity of predictive services over time. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Cawley, G. C., & Talbot, N. L. (2010). On over-fitting in model selection and subsequent selection bias in performance evaluation. The Journal of Machine Learning Research, 11, 2079-2107.
- Fink, O., Netland, T., & Feuerriegel, S. (2021). Artificial intelligence across company borders. arXiv preprint arXiv:2107.03912.
- Gama, J., Žliobaitė, I., Bifet, A., Pechenizkiy, M., & Bouchachia, A. (2014). A survey on concept drift adaptation. ACM computing surveys (CSUR), 46(4), 1-37.
- Hemmer, P., Schemmer, M., Vössing, M., & Kühl, N. (2021). Human-AI Complementarity in Hybrid Intelligence Systems: A Structured Literature Review. PACIS 2021 Proceedings.
- Hirt, R., & Kühl, N. (2018). Cognition in the Era of Smart Service Systems: Inter-organizational Analytics through Meta and Transfer Learning. In 39th International Conference on Information Systems, ICIS 2018; San Francisco Marriott MarquisSan Francisco; United States; 13 December 2018 through 16 December 2018.
- Holstein, J., Spitzer, P., Hoell, M., Vössing, M., & Kühl, N. (2024). Understanding Data Understanding: A Framework to Navigate the Intricacies of Data Analytics. In European Conference on Information Systems (ECIS 2024), Paphos, Cyprus, 13-19 June, 2024.
- Kühl, N., Goutier, M., Hirt, R., & Satzger, G. (2019, January). Machine Learning in Artificial Intelligence: Towards a Common Understanding. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Kühl, N., Hirt, R., Baier, L., Schmitz, B., & Satzger, G. (2021). How to Conduct Rigorous Supervised Machine Learning in Information Systems Research: The Supervised Machine Learning Report Card. Communications of the Association for Information Systems, 48(1), 46.
- Maleshkova, M., Kühl, N., & Jussen, P. (Eds.). (2020). Smart Service Management: Design Guidelines and Best Practices. Springer Nature.
- Martin, D., Hirt, R., & Kühl, N. (2019). Service Systems, Smart Service Systems and Cyber-Physical Systems—What's the difference? Towards a Unified Terminology. 14. Internationale Tagung Wirtschaftsinformatik 2019 (WI 2019), Siegen, Germany, February 24-27.
- Mehrabi, N., Morstatter, F., Saxena, N., Lerman, K., & Galstyan, A. (2019). A survey on bias and fairness in machine learning. arXiv preprint arXiv:1908.09635.
- Schemmer, M., Bartos, A., Spitzer, P., Hemmer, P., Kühl, N., Liebschner, J., & Satzger, G. (2023). Towards Effective Human-AI Decision-Making: The Role of Human Learning in Appropriate Reliance on AI Advice. In Proceedings of the 44th International Conference on Information Systems (ICIS2023), Hyderabad, India.
- Schöffer, J., Machowski, Y., & Kühl, N. (2021). A Study on Fairness and Trust Perceptions in Automated Decision Making. In Joint Proceedings of the ACM IUI 2021 Workshops, April 13–17, 2021, College Station, USA.
- Spitzer, P., Kühl, N., Goutier, M., Kaschura, M., & Satzger, G. (2024). Transferring Domain Knowledge with (X) AI-Based Learning Systems. In European Conference on Information Systems (ECIS 2024), Paphos, Cyprus, 13-19 June, 2024.
- Zahn, M. V., Feuerriegel, S., & Kühl, N. (2021). The cost of fairness in AI: Evidence from e-commerce. Business & information systems engineering.

T 7.31 Module component: Artificial Intelligence in Service Systems II: Generative AI Applications & Adoption [T-WIWI-114209]

Coordinators: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2595501	Artificial Intelligence in Service Systems - Generative AI Applications and Adoption	3 SWS	Lecture / 🗣	Spitzer, Holstein, Satzger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of an examination of another type. The following aspects are included in the assessment:

- Collaborative development of a prototype as a group task
- Group presentation of the developed prototype
- Group report detailing the prototype and its development

Further details on the organization of the performance and the points system for the assessment will be announced in the lecture.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-105778 - Service Analytics A must not have been started.
2. The module component T-WIWI-111219 - Artificial Intelligence in Service Systems - Applications in Computer Vision must not have been started.

Additional Information
This course is admission restricted (see https://dsi.win.kit.edu/index.php). You can apply for this course via the Wiwi-Portal.
The course replaces T-WIWI-111219 "Artificial Intelligence in Service Systems - Applications in Computer Vision" as of summer semester 2025.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Artificial Intelligence in Service Systems - Generative AI Applications and Adoption

2595501, SS 2026, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

---We renamed this course from "Artificial Intelligence in Service Systems - Applications in Computer Vision" to "Artificial Intelligence in Service Systems - Generative AI Applications and Adoption" ---

Learning objectives

This course provides deepens the students's theoretical knowledge and practical skills in developing AI-based services. It adds "state-of-the-art" generative AI technologies and the focus on integrating AI-based services into larger service systems and organizational workflows. Students will not only learn core theoretical concepts and frameworks, but also engage in team projects to gain hands-on experience in implementing and adapting these services for human adoption.

Description

This course builds on the course "Artificial Intelligence in Service Systems" (LV-Nr.: 2595650) and applies the "end-to-end" development of AI-based services to particular team projects with two key objectives: (1) capturing new Generative AI methods, but also (2) focus on the integration of the service in organizational workflows and the necessary adoption by humans. Starting with the fundamentals of generative AI, students work with Large Language Models (LLMs) and multimodal architectures to develop practical applications. Building on these implementations, the course investigates how to integrate these services into organizational workflows and information systems, focusing on user interaction, system transparency, and human-AI collaboration mechanisms.
Through a group project, students apply their learning by first implementing a technical artifact to address real-world challenges, then identifying and applying appropriate metrics to design and evaluate adoption while considering human factors such as user acceptance, trust, workflow integration, and ethical implications. This hands-on approach provides students with practical experience in both technical implementation and organizational integration of AI-based services.

Recommendations

The course is aimed at students in the Master's program with basic knowledge in statistics and applied programming in Python. Knowledge from the lecture Artificial Intelligence in Service Systems may be beneficial.

Additional information

- Group-based project work
- Flipped classroom format with pre-recorded lectures
- Three half-day block sessions for in-depth discussions and optional hands-on coding exercises

Workload:

- Attendance time (3 SWS × 15 weeks): 45 h
- Self-study: 60 h
- Exam preparation: 30 h
- **Total workload: 135 h**

Literature

- Baltrušaitis, T., Ahuja, C. and Morency, L.P., 2018. Multimodal machine learning: A survey and taxonomy. *IEEE transactions on pattern analysis and machine intelligence*, *41*(2), pp.423-443
- Chang, Y., Wang, X., Wang, J., Wu, Y., Yang, L., Zhu, K., Chen, H, Yi, X., Wang, C., Wang, Y., Ye, W., Zhang, Y., Chang, Y., Yu, P, Yang, Q., and Xie, X. (2024). A Survey on Evaluation of Large Language Models. ACM Trans. Intell. Syst. Technol. 15, 3, Article 39 (June 2024), 45 pages.
- Fourney, A., Bansal, G., Mozannar, H., Tan, C., Salinas, E., Niedtner, F., Proebsting, G., Bassman, G., Gerrits, J., Alber, J. and Chang, P., 2024. Magentic-one: A generalist multi-agent system for solving complex tasks. *arXiv preprint arXiv:2411.04468*.
- Hemmer, P., Schemmer, M., Kühl, N., Vössing, M., & Satzger, G. (2024). Complementarity in Human-AI Collaboration: Concept, Sources, and Evidence. *arXiv preprint arXiv:2404.00029*.
- Kreuzberger, D., Kühl, N. and Hirschl, S., 2023. Machine learning operations (mlops): Overview, definition, and architecture. *IEEE access*, *11*, pp.31866-31879.
- Schemmer, M., Kuehl, N., Benz, C., Bartos, A., & Satzger, G. (2023, March). Appropriate reliance on AI advice: Conceptualization and the effect of explanations. In *Proceedings of the 28th International Conference on Intelligent User Interfaces* (pp. 410-422).
- Zhang, Y., Li, Y., Cui, L., Cai, D., Liu, L., Fu, T., Huang, X., Zhao, E., Zhang, Y., Chen, Y., Wang, L., Luu, A.T., Bi, W., Shi, F., & Shi, S. (2023). Siren's Song in the AI Ocean: A Survey on Hallucination in Large Language Models. *ArXiv*, *abs/2309.01219*.

T 7.32 Module component: Asset Pricing [T-WIWI-102647]

Coordinators: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2530555	Asset Pricing	2 SWS	Lecture / 🗣	Uhrig-Homburg, Thimme
ST 2026	2530556	Asset Pricing Exercices	1 SWS	Practice / 🗣	Böll, Uhrig-Homburg, Thimme
Exams					
WT 25/26	7900056	Asset Pricing			Uhrig-Homburg
ST 2026	7900110	Asset Pricing			Uhrig-Homburg, Thimme

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (60 minutes). The examination is offered every semester and can be repeated at any regular examination date.

A bonus can be earned for successful participation in the exercises by submitting correct solutions to at least 50% of the bonus exercises set. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendations
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

Below you will find excerpts from courses related to this module component:

V Asset Pricing Exercices

2530556, SS 2026, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Organizational issues
Die Übung findet erst ab der 2. Vorlesungswoche statt.

T 7.33 Module component: Auction Theory [T-WIWI-102613]

Coordinators: Prof. Dr. Karl-Martin Ehrhart
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2520408	Auction Theory	2 SWS	Lecture	Ehrhart
WT 25/26	2520409	Auction Theory Exercise	1 SWS	Practice	Ehrhart
Exams					
WT 25/26	7900033	Auction Theory			Ehrhart
ST 2026	7900255	Auction Theory			Ehrhart

Assessment
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites
None

Below you will find excerpts from courses related to this module component:

V Auction Theory

2520408, WS 25/26, 2 SWS, Open in study portal **Lecture (V)**

Content
Workload:

- Attendance time lecture (2 SWS × 15 weeks): 30 h
- Exercise attendance time (1 SWS × 15 weeks): 15 h
- Self-study lecture: 45 h
- Self-study exercise: 25 h
- Exam preparation: 20 h
- **Total: 135 h**

Literature

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

T 7.34 Module component: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

Coordinators: Prof. Dr. Gerd Gutekunst
Prof. Dr. Berthold Wigger

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture / 🗣	Wigger, Gutekunst
Exams					
WT 25/26	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger
ST 2026	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (90 minutes). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Recommendations
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course "Öffentliche Einnahmen" beforehand.

Below you will find excerpts from courses related to this module component:

V Basics of German Company Tax Law and Tax Planning

2560134, WS 25/26, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

T 7.35 Module component: Basics of Production Automation [T-MACH-114049]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101298 - Automated Manufacturing Systems

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	5 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	2150703	Basics of Production Automation	3 SWS	Lecture / Practice / 🗣	Fleischer
Exams					
WT 25/26	76-T-MACH-114049	Basics of Production Automation			Fleischer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam (60 minutes)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V **Basics of Production Automation** — **Lecture / Practice (VÜ) On-Site**
2150703, SS 2026, 3 SWS, Language: German, Open in study portal

Content
The lecture provides an overview of the structure and functioning of automated production systems. The functioning and application of fundamental elements for the realisation of automated production systems are taught. These include:

- Drive and control technology
- Handling technology for the handling of workpieces and tools
- Industrial robots
- Quality assurance in automated production plants
- Structures and design of manufacturing and assembly systems
- Introduction to project planning of automated production plants

An interdisciplinary consideration of these sub-areas reveals interfaces to Industry 4.0 approaches. The theoretical foundations are supplemented by practical application examples and live demonstrations in the Karlsruhe Research Factory. Within exercises, the contents of the lecture are deepened and applied to specific problems and tasks.

Learning Outcomes:

The students ...

- are able to name and describe the automation tasks in production plants and the components required for implementation.
- can select components from the areas of 'handling technique, 'industrial robots', 'sensor technology' and 'control & drive technology' for a given application.
- are able to compare different concepts of robotics and select the appropriate one for a given application.
- can assess the automation of production plants implemented on the basis of the examples given and apply them to new problems.
- know the process of planning automated production plants.

Workload:

MACH:
regular attendance: 32 hours
self-study: 88 hours
WING:
regular attendance: 32 hours
self-study: 118 hours

Organizational issues
Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.36 Module component: Bayesian Statistics for Analyzing Data [T-WIWI-113471]

Coordinators: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-105714 - Consumer Research

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Each summer term	1 semesters	1

Courses					
WT 25/26	2500025	Bayesian Statistics for Analyzing Data	2 SWS	Seminar	Scheibehenne
Exams					
WT 25/26	7900208	Bayesian Statistics for Analyzing Data			Scheibehenne

Assessment
Alternative exam assessment (assignments and active participation). Details will be communicated at the first day of class.

Additional Information
Participation is limited to 10 participants. Registration is required for the course. If too many students register, students in higher semesters are selected first.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Bayesian Statistics for Analyzing Data

2500025, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The goal of this class is to introduce Bayesian statistics as a viable alternative to conventional Null-Hypothesis significance testing (NHST) and the calculation of p-values. The class introduces the theoretical background of Bayesian statistics and its advantages over NHST. Based on this, students will work through hands-on approaches for analyzing various empirical data using Bayesian statistics. These analyses will mainly be conducted with the statistics software R and JASP. The class provides participants with the necessary skills to evaluate and interpret the results of published Bayesian analyses and to use the method for testing hypotheses and estimating model parameters based on empirical data. There will be regular reading and homework assignments.

Workload:

Attendance time (7 "double hours"): 45 h

Self-study: 90 h

Exam preparation: 0 h (performance assessment takes place during the semester)

Total: 135 h

Organizational issues
Beginn 29.10.25, 14:00 - 16:00 Uhr Seminarraum Geb. 01.87, R 5B 25

alle 2 Wochen mittwochs bis 21.2.26

T 7.37 Module component: Behavioral Dimensions of Energy Transitions [T-WIWI-114980]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each summer term	1

Exams			
WT 25/26	7900280	Social Dimensions of Energy Transitions	Fichtner

Assessment
Written examination (60 minutes). The examination is offered every semester and can be repeated at any regular examination date.

Workload
105 hours

T 7.38 Module component: Behavioral Lab Exercise [T-WIWI-113095]

Coordinators: Prof. Dr. Petra Nieken
Prof. Dr. Benjamin Scheibehenne

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-105714 - Consumer Research
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Irregular	1 semesters	1

Courses					
WT 25/26	2500040	Behavioral Lab Exercise	4.5 SWS	Seminar / 🗣	Scheibehenne, Nieken
Exams					
WT 25/26	7900368	Behavioral Lab Exercise			Nieken, Scheibehenne

Legend: 📱 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (presentation during the semester). Details will be communicated at the first day of class.

Recommendations
This class caters towards Master students who are interested in empirical research and in running lab experiments.

Additional Information
Due to the interactive nature of the class, the number of participants is limited. If you are interested, please contact the teachers directly via email.
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback, enabling them to improve their drafts for future research.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Behavioral Lab Exercise

2500040, WS 25/26, 4.5 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback enabling them to improve their drafts for future research.

T 7.39 Module component: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I [T-MACH-100966]

Coordinators: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	3

Courses					
WT 25/26	2141864	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 25/26	76-T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I			Guber
ST 2026	76-T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I			Guber

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam (75 Min.)

Prerequisites
none

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I

Lecture (V) On-Site

2141864, WS 25/26, 2 SWS, Language: German, Open in study portal

Organizational issues
BioMEMS I-Klausur: Mo, 23.03.2026, 17:30 - 19:30; 10.21 Gottlieb-Daimler-Hörsaal
BioMEMS II-Klausur: Mo, 02.03.2026, 8:00 - 10:00; 10.21 Gottlieb-Daimler-Hörsaal
BioMEMS III-Klausur: Mo, 09.03.2026, 13:15 - 15:15; 10.21 Gottlieb-Daimler-Hörsaal

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.40 Module component: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]

Coordinators: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	3

Courses					
ST 2026	2142883	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 25/26	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber
ST 2026	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written exam (75 Min.)

Prerequisites
none

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II

2142883, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Examples of use in Life-Sciences and biomedicine: Microfluidic Systems:
LabCD, Protein Cristallisation
Microarrys
Tissue Engineering
Cell Chip Systems
Drug Delivery Systems
Micro reaction technology
Microfluidic Cells for FTIR-Spectroscopy
Microsystem Technology for Anesthesia, Intensive Care and Infusion
Analysis Systems of Person´s Breath
Neurobionics and Neuroprosthesis
Nano Surgery

Organizational issues
Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

schriftl. Prüfung: Mo, 07.09.2026, 8 - 10 Uhr; 10.21 Gottlieb-Daimler-Hörsaal

Literature

Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994

M. Madou
Fundamentals of Microfabrication

T 7.41 Module component: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III [T-MACH-100968]

Coordinators: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	3

Courses					
ST 2026	2142879	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 25/26	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber
ST 2026	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written exam (75 Min.)

Prerequisites
none

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III

2142879, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Examples of use in minimally invasive therapy
Minimally invasive surgery (MIS)
Endoscopic neurosurgery
Interventional cardiology
NOTES
OP-robots and Endosystems
License of Medical Products and Quality Management

Organizational issues
Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

schriftl. Prüfung: Mo, 28.09.2026, 8:00 - 10:00 Uhr; 10.21 Gottlieb-Daimler.Hörsaal

Literature

Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994

M. Madou
Fundamentals of Microfabrication

T 7.42 Module component: Bond Markets [T-WIWI-110995]

Coordinators: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2530560	Bond Markets	3 SWS	Lecture / Practice / 🗣	Müller, Uhrig-Homburg, Molnar
Exams					
WT 25/26	7900311	Bond Markets			Uhrig-Homburg
ST 2026	7900280	Bond Markets			Uhrig-Homburg

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (75min.)

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Additional Information
This course will be held in English.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Bond Markets

2530560, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture "Bond Markets" deals with the national and international bond markets, which are an important source of financing for companies, as well as for the public sector. After an overview of the most important bond markets, different yield definitions are discussed. Based on this, the concept of the yield curve is presented. In addition, the theoretical and empirical relationships between ratings, default probabilities and spreads are analyzed. The focus will then be on questions regarding the valuation, measurement, management and control of credit risks.

The total workload for this course is approximately 135 hours (4.5 credits).

The assessment consists of a written exam (75min.) (according to §4(2), 1 SPO). A bonus can be earned by correctly solving at least 50% of the posed bonus exercices. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Students deepen their knowledge of national and international bond markets. They gain knowledge of the traded instruments and their key figures for describing default risk such as ratings, default probabilities or credit spreads.

Organizational issues
Die Veranstaltung wird freitags in der ersten Semesterhälfte am Campus B (Geb. 09.21) im Raum 124 angeboten. Die Klausur findet bereits im Januar statt.

T 7.43 Module component: Bond Markets - Models & Derivatives [T-WIWI-110997]

Coordinators: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2530565	Bond Markets - Models & Derivatives	2 SWS	Block / 🗣	Grauer, Uhrig-Homburg, Müller
Exams					
WT 25/26	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of success consists in equal parts of a written thesis and an oral exam including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.

Recommendations
Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.

Additional Information
This course will be held in English.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Bond Markets - Models & Derivatives

2530565, WS 25/26, 2 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content

- **Competence Certificate:** The assessment of success consists in equal parts of a written thesis and an oral exam (according to §4(2), 3 SPO) including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** Students deepen their knowledge of national and international bond markets. They are able to apply the knowledge they have gained about traded instruments and common valuation models for pricing derivative financial instruments.
- **Prerequisites:**
- **Content:** The lecture "Bond Markets – Models & Derivatives" deepens the content of the lecture "Bond Markets". The modelling of the dynamics of yield curves and the management of credit risks forms the theoretical foundation for the valuation of interest rate and credit derivatives to be discussed. In this course, students deal intensively with selected topics and acquire the relevant knowledge on their own.
- **Recommendation:** Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.
- **Workload:** The total workload for this course is approximately 90 hours (3.0 credits).

Organizational issues
Die Veranstaltung mit Seminarcharakter und dem Ziel, ein selbstgewähltes Themenfeld in Form einer schriftlichen Ausarbeitung eigenständig zu erarbeiten, findet in der 2. Semesterhälfte statt.

T 7.44 Module component: Bond Markets - Tools & Applications [T-WIWI-110996]

Coordinators: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Examination of another type	1,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2530562	Bond Markets - Tools & Applications	1 SWS	Block / 🗣	Uhrig-Homburg, Grauer, Müller
Exams					
WT 25/26	7900317	Bond Markets - Tools & Applications			Uhrig-Homburg

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an empirical case study with written elaboration and presentation. The main examination is offered once a year, re-examinations every semester.

Recommendations
Knowledge of the "Bond Markets" course is very helpful.

Additional Information
This course will be held in English.

Workload
45 hours

Below you will find excerpts from courses related to this module component:

V Bond Markets - Tools & Applications

2530562, WS 25/26, 1 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content

- **Competence Certificate:** The assessment consists of an empirical case study with written elaboration and presentation (according to $4(2), 3 SPO). The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** The students apply various methods in practice within the framework of a project-related case study. They are able to deal with empirical data and analyze them in a targeted manner.
- **Content:** The course "Bond Markets – Tools & Applications" includes a hands-on project in the field of national and international bond markets. Using empirical datasets, the students have to apply practical methods in order to analyze the data in a targeted manner.
- **Recommendation:** Knowledge of the "Bond Markets" course is very helpful.
- **Workload:** The total workload for this course is approximately 45 hours (1.5 credits).

Organizational issues
Die Veranstaltung findet in der ersten Semesterhälfte statt und beinhaltet eine eigenständige Projektarbeit im Umgang mit realen Bond Daten. Die Erfolgskontrolle erfolgt anhand einer schriftlichen Ausarbeitung und einer kurzen Präsentation.

T 7.45 Module component: Boosting of Combustion Engines [T-MACH-105649]

Coordinators: Dr.-Ing. Johannes Kech
Dr. Nicolas Lachenmaier

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2134153	Boosting of Combustion Engines	2 SWS	/ 🗣	Kech
Exams					
ST 2026	76-T-MACH-105649	Boosting of Combustion Engines			Kech, Lachenmaier

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, 20 min

Prerequisites
none

Additional Information
This course is offerd in German.

Workload
120 hours

T 7.46 Module component: Business Data Strategy [T-WIWI-106187]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2540484	Business Data Strategy	2 SWS	Lecture / 🗣	Weinhardt, van Dinther
WT 25/26	2540485	Übung zu Business Data Strategy	1 SWS	Practice / 🗣	Weinhardt, Schulz
Exams					
WT 25/26	7900234	Business Data Strategy			Weinhardt
ST 2026	7900267	Business data strategy			Weinhardt

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulationand an alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. The grade isdetermined by 2/3 through the written exam and by 1/3 through the alternative exam assessment (e.g., presentation).

Prerequisites
None

Recommendations
Students should be familiar with basic concepts of business organisations, information systems, and programming. However, all material will be introduced, so no formal pre-conditions are applied.

Additional Information
Limited number of participants.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Business Data Strategy

2540484, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
With new methods for capturing and using different types of data and industry's recognition that society's use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making all add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense–making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications. Additionally, the disruptive factor of generative AI in the scope of data management is reflected upon.

Organizational issues
Application/Registration

Attendance will be limited. Application/registration is therefore preliminary. After the application deadline has passed, positions will be allocated, based on evaluation of the previous study records. Applications are accepted only through the Wiwi-Portal: https://portal.wiwi.kit.edu/ys/8946

Anmeldung

Die Teilnehmeranzahl ist begrenzt. Eine Anmeldung erfolgt deshalb zunächst unter Vorbehalt. Nach Ablauf der Anmeldefrist werden die Plätze zur Teilnahme, nach Einsicht der Vorleistungen im Studium vergeben. Die Anmeldung/Bewerbung erfolgt ausschließlich über das Wiwi-Portal: https://portal.wiwi.kit.edu/ys/8946

Dates / Termine

The lecture will be held as a block lecture, the dates and rooms will be published soon.

Die Vorlesung wird als Blockveranstaltung gehalten. Die Termine werden zeitnah bekanntgegeben.

T 7.47 Module component: Business Dynamics [T-WIWI-102762]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2540531	Business Dynamics	2 SWS	Lecture / 🗣	Geyer-Schulz, Glenn
WT 25/26	2540532	Exercise Business Dynamics	1 SWS	Practice / 🗣	Geyer-Schulz, Glenn
Exams					
WT 25/26	7979777	Business Dynamics (WS 2025/2026)			Geyer-Schulz
ST 2026	7900065	Business Dynamics (Nachklausur WS 2025/2026)			Geyer-Schulz

Legend: 💻 Online, 🏢 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Please note: this exam will no longer be offered after August 2026.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Business Dynamics

2540531, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Termine:

Samstags von 9:00 - 19:00 Uhr

22.11.2025 => Termin 1

13.12.2025 => Termin 2

17.01.2026 => Termin 3 (dieser **Termin** wird **auf** den **24. Januar 2026 verschoben**)

24.01.2026 => Termin 3

14.02.2026 => Termin 4

Literature
John D. Sterman. Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, 2000.

T 7.48 Module component: Business Intelligence Systems [T-WIWI-105777]

Coordinators: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101506 - Service Analytics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2540422	Business Intelligence Systems	3 SWS	Lecture /	Mädche
Exams					
WT 25/26	7900224	Business Intelligence Systems			Mädche
ST 2026	7900149	Business Intelligence Systems			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendations
Basic knowledge on database systems is helpful.

Below you will find excerpts from courses related to this module component:

V **Business Intelligence Systems** — **Lecture (V)**
2540422, WS 25/26, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content

In most modern enterprises, Business Intelligence & Analytics (BI&A) Systems represent a core enabler of decision-making in that they supply up-to-date and accurate information about all relevant aspects of a company's planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance. Modern BI&A systems leverage beyond reporting and dashboards also advanced analytical functions. Thus, today, they also play a major role in enabling data-driven products and services. This course aims to introduce theoretical foundations, concepts, tools, and current practice of BI&A Systems from a managerial and technical perspective.

The course is complemented by an engineering capstone project, where students work in a team with real-world use cases and data in order to create a prototypical Business intelligence & Analytics system using state-of-the-art technologies (e.g., scikit-learn in Python or Microsoft Power BI).

Learning objectives

- Understand the theoretical foundations of key Business Intelligence & Analytics concepts supporting decision-making
- Explore key capabilities of state-of-the-art Business Intelligence & Analytics Systems
- Learn how to successfully implement and run Business Intelligence & Analytics Systems from multiple perspectives, e.g. architecture, data management, consumption, analytics
- Get hands-on experience by working with Business Intelligence & Analytics Systems with real-world use cases and data

Prerequisites

This course is limited to 50 places. The capacity limitation is due to the format of the accompanying engineering capstone project. Strong analytical abilities and profound skills in SQL and Python are required. Students have to apply with their CVs and transcripts of records via the WiWi-Portal. The first lecture will present all organizational details and the underlying registration process for the lecture and the capstone project. The teaching language is English.

Die Erfolgskontrolle erfolgt in Form einer Prüfungsleistung anderer Art (Form) nach § 4 Abs. 2 Nr. 3 SPO. Die Leistungskontrolle erfolgt in Form einer einstündigen Klausur und durch Durchführung eines Capstone Projektes. Details zur Ausgestaltung der Erfolgskontrolle werden im Rahmen der Vorlesung bekannt gegeben.

Workload:

The total workload for this course is approximately 135 hours.

- Attendance Lecture (2 SWS × 15 weeks): 30 h
- Attendance Exercise (1 SWS × 15 weeks): 15 h
- Preparation and Wrap-up of the lecture: 45 h
- Preparation and Wrap-up of the exercise: 25 h
- Exam preparation: 20 h
- Total: 135 h (equivalent to 4.5 CP)

Literature

- Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. "Decision Support and Business Intelligence Systems".
- Watson, H. J. 2014. "Tutorial: Big Data Analytics: Concepts, Technologies, and Applications," Communications of the Association for Information Systems (34), p. 24.
- Arnott, D., and Pervan, G. 2014. "A critical analysis of decision support systems research revisited: The rise of design science," Journal of Information Technology (29:4), Nature Publishing Group, pp. 269–293 (doi: 10.1057/jit.2014.16) .
- Carlo, V. (2009). "Business intelligence: data mining and optimization for decision making". Editorial John Wiley and Sons, 308-317.
- Chen, H., Chiang, R. H. L, and Storey, V. C. 2012. „Business Intelligence and Analytics: From Big Data to Big Impact," MIS Quarterly (36:4), pp. 1165-1188.
- Davenport, T. 2014. Big Data @ Work, Boston, MA: Harvard Business Review.
- Economist Intelligence Unit. 2015 "Big data evolution: Forging new corporate capabilities for the long term"
- Power, D. J. 2008. "Decision Support Systems: A Historical Overview," Handbook on Decision Support Systems, pp. 121–140 (doi: 10.1007/978-3-540-48713-5_7) .
- Sharma, R., Mithras, S., and Kankanhalli, A. 2014. „Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations," European Journal of Information Systems (23:4), pp. 433-441.
- Silver, M. S. 1991. "Decisional Guidance for Computer-Based Decision Support," MIS Quarterly (15:1), pp. 105-122.

Further literature will be made available in the lecture.

T 7.49 Module component: Business Planning for Founders [T-WIWI-115110]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Assessment
Alternative exam assessment.

Prerequisites
None

Recommendations
None

T 7.50 Module component: Business Process Modelling [T-WIWI-102697]

Coordinators: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2511210	Business Process Modelling	2 SWS	Lecture / 🗣	Oberweis
WT 25/26	2511211	Exercise Business Process Modelling	1 SWS	Practice / 🗣	Kruse
Exams					
WT 25/26	79AIFB_MvG_C2	Business Process Modelling (Registration extended until 16.02.2026)			Oberweis
ST 2026	791-AIFB-MvG-NK	Business Process Modelling (Registration until 20.07.2026)			Oberweis

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from courses related to this module component:

V Business Process Modelling

2511210, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

Learning objectives:

Students

- describe goals of business process modeling and aplly different modeling languages,
- choose the appropriate modeling language according to a given context,
- use suitable tools for modeling business processes,
- apply methods for analysing and assessing process modells to evaluate specific quality characteristics of the process model.

Recommendations:

Knowledge of course Applied Informatics I - Modelling is expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karl: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.51 Module component: Case Studies Seminar: Innovation Management [T-WIWI-102852]

Coordinators: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2545105	Case studies seminar: Innovation management	2 SWS	Seminar / 🗣	Weissenberger-Eibl
Exams					
WT 25/26	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessments (§4(2), 3 SPO).

The grade is made up of 50% of the grade for the written paper * and 50% of the grade for the presentation.

* Scope according to the current requirements for recognition in the seminar module

Prerequisites
None

Recommendations
Prior attendance of the course Innovation Management is recommended.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Case studies seminar: Innovation management

2545105, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The objective of the seminar is to acquire selected concepts and methods of innovation management and to apply these in a practical way. The focus is on working on specific issues using a case study from business practice. Students work in groups and transfer the content taught, for example from the areas of scenario development, to entrepreneurial challenges in the context of fictitious case studies. The course follows a didactic interplay of theoretical input and direct application of what has been learned. At the end, the groups present their results in a plenary presentation, which is prepared by a short introduction to presentation techniques. The joint discussion promotes the transfer of knowledge to different contexts and strengthens the participants' ability to reflect.

As part of the seminar, students deal independently with current, research-oriented issues and systematically apply scientific criteria. They research relevant information, analyze, abstract and critically evaluate it. They draw conclusions independently from poorly structured data, incorporate interdisciplinary knowledge and contribute selectively to the further development of existing research perspectives. The results are validated and systematically prepared both orally and in writing using scientific standards - particularly with regard to structuring, terminology and correct citation of sources. In doing so, students argue in a technically sound manner and defend their findings in discourse with other participants and lecturers. They are also familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and apply these standards consistently in the preparation of their scientific work.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 7.52 Module component: Characteristics of Transportation Systems [T-BGU-106609]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	2

Courses					
ST 2026	6232806	Properties of Means of Transport	2 SWS	Lecture / 🗣	Vortisch
Exams					
WT 25/26	8240106609	Characteristics of Transportation Systems			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
None

Recommendations
None

Additional Information
None

Workload
90 hours

T 7.53 Module component: Circular Economy – Challenges and Potentials [T-WIWI-114057]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each summer term	1

Courses					
ST 2026	2581965	Circular Economy - Challenges and Potentials	2 SWS	Lecture / 🗣	Schultmann, Rudi
Exams					
WT 25/26	7981965	Circular Economy – Challenges and Potentials			Schultmann
ST 2026	7981965	Circular Economy – Challenges and Potentials			Schultmann

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Workload
105 hours

Below you will find excerpts from courses related to this module component:

V Circular Economy - Challenges and Potentials

2581965, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Circular Economy (CE) is an economic system that on the one hand aims to minimize waste, emissions and resource consumption and on the other hand increase resource efficiency by keeping products and materials in use for as long as possible. Based on basic ideas and principles of CE this lecture tackles potentials and challenges for the design and operations of circular value chains and systems. Different research-orientied case studies reveal and illustrate the potential implementation as well as the limits and future needs of CE as a key element of sustainable industrial development.

Literature
Wird in der Lehrveranstaltung bekannt gegeben.

T 7.54 Module component: Civil Engineering Structures and Regenerative Energies [T-BGU-111922]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	1

Courses					
ST 2026	6241810	Civil Engineering Structures and Regenerative Energies	2 SWS	Lecture / Practice / 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 25/26	8240111922	Civil Engineering Structures and Regenerative Energies			Haghsheno

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.55 Module component: CO2-Neutral Combustion Engines and their Fuels I [T-MACH-111550]

Coordinators: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	5 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2133113	CO2-neutral combustion engines and their fuels I	3 SWS	Lecture / Practice / 🗣	Koch
Exams					
WT 25/26	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Kubach, Koch
ST 2026	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Koch

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Additional Information
This course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V CO2-neutral combustion engines and their fuels I

2133113, WS 25/26, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Organizational issues
Übungstermine Donnerstags nach Bekanntgabe in der Vorlesung

T 7.56 Module component: CO2-Neutral Combustion Engines and their Fuels II [T-MACH-111560]

Coordinators: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	5 CP	graded	Each summer term	4

Courses					
ST 2026	2134151	CO2-neutral combustion engines and their fuels II	3 SWS	Lecture / Practice / 🗣	Koch
Exams					
WT 25/26	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Kubach, Koch
ST 2026	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Koch

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral examination, duration: 25 minutes, no auxiliary means

Prerequisites
none

Recommendations
Fundamentals of Combustion Engines II helpful

Additional Information
This course is offered in German.

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V CO2-neutral combustion engines and their fuels II

2134151, SS 2026, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

T 7.57 Module component: Collective Intelligence in Human Judgment and Decision Making [T-WIWI-114186]

Coordinators: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105714 - Consumer Research

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	2500026	Collective Intelligence in Human Judgment and Decision Making	2 SWS	Lecture / 🗣	Gradwohl

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The overall grade is derived from a weighted score of several assessment components (active participation, presentations, and written assignments). Details regarding the scoring system and the evaluation criteria will be announced at the start of the course.

Prerequisites
None

Recommendations
Willingness to engage with experimental research papers and basic mathematical models is required.

Additional Information
This course covers the key ideas of collective intelligence, asking when it emerges and when it fails. Students will engage with classical and contemporary research papers about how we can combine information from different individuals. They learn to understand and discuss under which conditions combining judgments and decisions of multiple individuals produces collective intelligence and when it creates the risk to run into collective madness and herding.

After the course students can define and describe important concepts of collective intelligence and can name and describe models, theories and experimental paradigms that are used to investigate it. They will practice their ability to read and understand research papers and to critically evaluate the claims in empirical and theoretical research papers.
Moreover, they can apply the concepts and ideas of collective intelligence to examples related to consumer behavior, management and their everyday lives.

All lectures, materials, and assignments will be in English.

The number of participants is limited. The registration will take place via the WiWi portal.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Collective Intelligence in Human Judgment and Decision Making

2500026, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This course covers the key ideas of collective intelligence, asking when it emerges and when it fails. Students will engage with classical and contemporary research papers about how we can combine information from different individuals. They learn to understand and discuss under which conditions combining judgments and decisions of multiple individuals produces collective intelligence and when it creates the risk to run into collective madness and herding.

After the course students can define and describe important concepts of collective intelligence and can name and describe models, theories and experimental paradigms that are used to investigate it. They will practice their ability to read and understand research papers and to critically evaluate the claims in empirical and theoretical research papers.

Moreover, they can apply the concepts and ideas of collective intelligence to examples related to consumer behavior, management and their everyday lives. All lectures, materials, and assignments will be in English.

A strong interest in human judgment and decision making, willingness to engage with scientific literature and empirical methods, as well as openness to engage with mathematical models are important prerequisites.

All lectures, materials, and assignments are in English. The number of participants is limited. The registration will take place via the Campus portal.

Grades will be determined based on different parts, including active participation and written assignments. Details will be discussed at the beginning of the course.

Organizational issues
Participation is limited to 15 participants. Registration via the WiWi portal is required for the course. If too many students register, students in higher semesters are selected first.

Literature
Kameda, T., Toyokawa, W., & Tindale, R. S. (2022). Information aggregation and collective intelligence beyond the wisdom of crowds. *Nature Reviews Psychology*, *1*(6), 345-357.

T 7.58 Module component: Collective Perception in Autonomous Driving [T-WIWI-113363]

Coordinators: Prof. Dr. Alexey Vinel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2511456	Collective Perception in Autonomous Driving	2 SWS	Lecture /	Zhao, Bied, Vinel
ST 2026	2511457	Exercise Collective Perception in Autonomous Driving	1 SWS	Practice /	Flores Comeca, Arockiasamy, Bied, Zhao, Khoshkdahan
Exams					
WT 25/26	79AIFB_CPAD_B3	Collective Perception in Autonomous Driving			Vinel
ST 2026	791-AIFB-CPAD-HK	Collective Perception in Autonomous Driving (Registration until 20.07.2026)			Vinel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The default assessment of this course is a written examination (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Workload
135 hours

T 7.59 Module component: Communication Systems and Protocols [T-ETIT-101938]

Coordinators: Dr.-Ing. Jens Becker
Prof. Dr.-Ing. Jürgen Becker

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each summer term	1

Courses					
ST 2026	2311616	Communication Systems and Protocols	2 SWS	Lecture / 🗣	Becker, Becker
ST 2026	2311618	Tutorial for 2311616 Communication Systems and Protocols	1 SWS	Practice / 🗣	Stammler
Exams					
WT 25/26	7311616	Communication Systems and Protocols			Becker, Becker

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The examination consists of a written examination of 120 min.

Prerequisites
none

Recommendations
Knowledge of the basics from the lecture "Digitaltechnik"is helpful.

T 7.60 Module component: Competition in Networks [T-WIWI-100005]

Coordinators: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101406 - Network Economics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	3

Courses					
WT 25/26	2561204	Competition in Networks	2 SWS	Lecture /	Mitusch
WT 25/26	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice /	Mitusch, Corbo
Exams					
WT 25/26	7900221	Competition in Networks			Mitusch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None.

Recommendations
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Competition in Networks

2561204, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 7.61 Module component: Computational Economics [T-WIWI-102680]

Coordinators: Prof. Dr. Pradyumn Kumar Shukla
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	3

Courses					
WT 25/26	2590458	Computational Economics	2 SWS	Lecture /	Shukla
WT 25/26	2590459	Excercises to Computational Economics	1 SWS	Practice /	Shukla
Exams					
WT 25/26	79AIFB_CE_B1	Computational Economics (Registration extended until 16.02.2026)			Shukla
ST 2026	791-AIFB-CE-NK	Computational Economics (only for repeaters, registration until 20.07.2026)			Shukla

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Success is assessed in the form of a written (60 min) or oral examination.

The examination for this course is offered both in the semester in which the course takes place and in the following semester. In the following semester (summer term), participation in the exam is **exclusively reserved for students who did not pass the first attempt.** This regulation applies from winter semester 2025/2026.

Prerequisites
The prerequisite for admission to the examination "Computational Economics" is the successful completion of a computational assignment issued in mid-December; submissions are due in the third week of January or, alternatively, no later than one week before the examination registration.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Computational Economics

2590458, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

Learning objectives:

The student

- understands the methods of Computational Economics and applies them on practical issues,
- evaluates agent models considering bounded rational behaviour and learning algorithms,
- analyses agent models based on mathematical basics,
- knows the benefits and disadvantages of the different models and how to use them,
- examines and argues the results of a simulation with adequate statistical methods,
- is able to support the chosen solutions with arguments and can explain them.

Literature

- R. Axelrod: "Advancing the art of simulation in social sciences". R. Conte u.a., Simulating Social Phenomena, Springer, S. 21-40, 1997.
- R. Axtel: "Why agents? On the varied motivations for agent computing in the social sciences". CSED Working Paper No. 17, The Brookings Institution, 2000.
- K. Judd: "Numerical Methods in Economics". MIT Press, 1998, Kapitel 6-7.
- A. M. Law and W. D. Kelton: "Simulation Modeling and Analysis", McGraw-Hill, 2000.
- R. Sargent: "Simulation model verification and validation". Winter Simulation Conference, 1991.
- L. Tesfation: "Notes on Learning", Technical Report, 2004.
- L. Tesfatsion: "Agent-based computational economics". ISU Technical Report, 2003.

Weiterführende Literatur:

- Amman, H., Kendrick, D., Rust, J.: "Handbook of Computational Economics". Volume 1, Elsevier North-Holland, 1996.
- Tesfatsion, L., Judd, K.L.: "Handbook of Computational Economics". Volume 2: Agent-Based Computational Economics, Elsevier North-Holland, 2006.
- Marimon, R., Scott, A.: "Computational Methods for the Study of Dynamic Economies". Oxford University Press, 1999.
- Gilbert, N., Troitzsch, K.: "Simulation for the Social Scientist". Open University Press, 1999.

T 7.62 Module component: Computational Modelling of Judgments, Decisions and Cognition [T-WIWI-114185]

Coordinators: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105714 - Consumer Research

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	2500119	Computational Modelling of Judgments, Decisions and Cognition	2 SWS	Others / 🗣	Gradwohl

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The alternative exam assessment is a single examination of another type that combines four assignments performed during the semester. All four assignments are integrated into one overall assessment; their individual contributions are weighted equally (each ≈ 25 % of the total), but only one final grade is awarded for the whole examination.

Recommendations
Basic programming skills (first experience with R or Python is advantageous), willingness to engage with maths and mathematical notation, calculus, and probability theory are required.

Additional Information
This course enables students to develop a basic understanding of computational models in the study of human judgment, decision making and cognition. After this course students can describe why we use computational models of cognition and behavior, they will be able to list prominent models and some of their criticisms and weaknesses. Moreover, they will be capable of programming and understanding simple and more advanced computational models in mathematical notation and code.After covering the main ideas of using computational models and preparing technical prerequisites, we will learn how to interpret models with tools like simulations and how to fit models to data.

All lectures, materials, and assignments are in English. The number of participants is limited. The registration will take place via the WiWi portal.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Computational Modelling of Judgments, Decisions and Cognition

2500119, SS 2026, 2 SWS, Language: English, Open in study portal

Others (sonst.)
On-Site

Content
This course enables students to develop a basic understanding of computational models in the study of human judgment, decision making and cognition. After this course students can describe why we use computational models of cognition and behavior, they will be able to list prominent models and some of their criticisms and weaknesses. Moreover, they will be capable of programming and understanding simple and more advanced computational models in mathematical notation and code.

After covering the main ideas of using computational models and preparing technical prerequisites, we will learn how to interpret models with tools like simulations and how to fit models to data.

Grades will be determined based on 4 programming assignments during the semester.

All lectures, materials, and assignments are in English. The number of participants is limited. The registration will take place via the WiWi portal.

Organizational issues
Participation is limited to 8 participants. Registration via the WiWi portal is required for the course. If too many students register, students in higher semesters are selected first.

T 7.63 Module component: Computational Risk and Asset Management [T-WIWI-102878]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105032 - Data Science for Finance

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	5

Assessment
The module examination takes the form of an alternative exam assessment.
The alternative exam assessment consists of a Python-based "Takehome Exam". At the end of the third week of January, the student is given a "Takehome Exam" which he processes and sends back independently within 4 hours using Python. Precise instructions will be announced at the beginning of the course. The alternative exam assessment can be repeated a maximum of once. A timely repeat option takes place at the end of the third week in March of the same year. More detailed instructions will be given at the beginning of the course.

Prerequisites
None.

Recommendations
Basic knowledge of capital markt theory.

Workload
135 hours

T 7.64 Module component: Computer Aided Data Analysis [T-GEISTSOZ-104565]

Coordinators: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101169 - Sociology

Type	Credits	Grading	Version
Coursework	0 CP	pass/fail	1

Courses					
WT 25/26	5000058	Decompositions and regression methods	2 SWS	Course /	Nollmann
WT 25/26	5000059	The gender wage gap	2 SWS	Course /	Nollmann
ST 2026	5011018	Computational Social Science: Topics and positions in the German Parliament (Part 2)	2 SWS	Seminar /	Banisch
Exams					
WT 25/26	7400278	Computer Aided Data Analysis			Nollmann, Teutsch
WT 25/26	7400353	Computer Aided Data Analysis			Nollmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from courses related to this module component:

V Computational Social Science: Topics and positions in the German Parliament (Part 2)

5011018, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The course consists of two parts (5011018 and 5011002) that are ideally taken in parallel.

Organizational issues
The course consists of two parts (5011018 and 5011002) that are ideally taken in parallel.

See Ilias-course: 5011002 – Computational Social Science: Themen und Positionen im Deutschen Bundestag (Teil 1)

T 7.65 Module component: Computer Contract Law [T-INFO-102036]

Coordinators: Dr. Michael Menk
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	2

Courses					
WT 25/26	2411604	Computer Contract Law	2 SWS	Lecture / 🗣	Menk
Exams					
WT 25/26	7500065	Computer Contract Law			Matz
ST 2026	7500066	Computer Contract Law			Sattler

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from courses related to this module component:

V Computer Contract Law

2411604, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

Literature

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H.Beck, II. Aufl. 2002
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

Weiterführende Literatur

Ergänzende Literatur wird in den Vorlesungsfolien angegeben.

T 7.66 Module component: Construction Equipment [T-BGU-101845]

Coordinators: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6243701	Construction Equipment	2 SWS	Lecture / 🗣	Dörfler, Schneider
Exams					
WT 25/26	8240101845	Construction Equipment			Gentes, Schneider

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.67 Module component: Control of Linear Multivariable Systems [T-ETIT-100666]

Coordinators: Dr.-Ing. Mathias Kluwe
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101157 - Control Engineering II

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each winter term	1

Courses					
WT 25/26	2303193	Multivariable Control Systems	3 SWS	Lecture / 🗣	Kluwe
WT 25/26	2303194	Tutorial to 2303194 "Multivariable Control Systems"	1 SWS	Practice / 🗣	Fehn
Exams					
WT 25/26	7303177	Control of Linear Multivariable Systems			Kluwe

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is checked as part of a written overall test (120 minutes) of the course.

Prerequisites
none

Recommendations
For a deeper understanding, basic knowledge of system dynamics and control technology is absolutely necessary, as taught in the ETIT Bachelor module "System Dynamics and Control Technology" M-ETIT-102181.

T 7.68 Module component: Control Technology [T-MACH-105185]

Coordinators: Dr.-Ing. Philipp Gönnheimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	2

Courses					
ST 2026	2150683	Control Technology	2 SWS	Lecture / 🗣	Gönnheimer
Exams					
WT 25/26	76-T-MACH-105185	Control Technology			Gönnheimer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written Exam (60 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Control Technology** — **Lecture (V) On-Site**
2150683, SS 2026, 2 SWS, Language: German, Open in study portal

Content
The lecture control technology gives an integral overview of available control components within the field of industrial production systems.
The first part of the lecture deals with the fundamentals of signal processing and with control peripherals in the form of sensors and actors which are used in production systems for the detection and manipulation of process states.
The second part handles with the function of electric control systems in the production environment. The main focus in this chapter is laid on programmable logic controls, computerized numerical controls and robot controls. Finally the course ends with the topic of cross-linking and decentralization with the help of bus systems.
The lecture is very practice-oriented and illustrated with numerous examples from different branches.

The following topics will be covered:

- Signal processing
- Control peripherals
- Programmable logic controls
- Numerical controls
- Controls for industrial robots
- Distributed control systems
- Field bus
- Trends in the area of control technology

Learning Outcomes:

The students …

- are able to name the electrical controls which occur in the industrial environment and explain their function.
- can explain fundamental methods of signal processing. This involves in particular several coding methods, error protection methods and analog to digital conversion.
- are able to choose and to dimension control components, including sensors and actors, for an industrial application, particularly in the field of plant engineering and machine tools. Thereby, they can consider both, technical and economical issues.
- can describe the approach for projecting and writing software programs for a programmable logic control named Simatic S7 from Siemens. Thereby they can name several programming languages of the IEC 1131.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.69 Module component: Convex Analysis [T-WIWI-102856]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Assessment
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Additional Information
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 7.70 Module component: Conveying Technology and Logistics [T-MACH-102135]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each summer term	1

Courses					
WT 25/26	2119100	Fördertechnik und Logistiksysteme		Seminar / 🗣	Furmans
ST 2026	2119100	Fördertechnik und Logistiksysteme	2 SWS	Seminar / 🗣	Furmans
Exams					
WT 25/26	76-T-MACH-102135	Conveying Technology and Logistics			Furmans

Legend: 💻 Online, 🏠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Fördertechnik und Logistiksysteme

2119100, WS 25/26, SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues
Weiteres siehe Homepage

V Fördertechnik und Logistiksysteme

2119100, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues
Ort: Gebäude 50.38, Raum 0.22, Termine siehe Homepage

T 7.71 Module component: Cooperative Autonomous Vehicles [T-WIWI-112690]

Coordinators: Prof. Dr. Alexey Vinel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2511450	Cooperative Autonomous Vehicles	2 SWS	Lecture /	Vinel
ST 2026	2511451	Exercise Cooperative Autonomous Vehicles	1 SWS	Practice /	Vinel
Exams					
WT 25/26	79AIFB_CAV_A3	Cooperative Autonomous Vehicles (Registration extended until 16.02.2026)			Vinel
ST 2026	791-AIFB-CAV-HK	Cooperative Autonomous Vehicles (Registration until 20.07.2026)			Vinel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The default assessment of this course is a written examination (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Workload
135 hours

T 7.72 Module component: Copyright [T-INFO-101308]

Coordinators: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	1

Courses					
WT 25/26	24121	Copyright	2 SWS	Lecture / 🗣	Hartmann
Exams					
WT 25/26	7500064	Copyright			Matz
ST 2026	7500064	Copyright			Sattler

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is carried out as a written examination (§ 4 Abs. 2 No. 1 SPO) lasting 60 minutes.

Prerequisites
None.

Recommendations
None.

T 7.73 Module component: Corporate Compliance [T-INFO-101288]

Coordinators: Andreas Herzig
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2400087	Corporate Compliance	2 SWS	Lecture /	Herzig, Siddiq
Exams					
WT 25/26	7500063	Corporate Compliance			Matz
ST 2026	7500063	Corporate Compliance			Sattler

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 7.74 Module component: Corporate Risk Management [T-WIWI-109050]

Coordinators: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	2

Assessment
The success of the course (lecture and exercise) is assessed in the form of a written examination (60 min.) in accordance with § 4 para. 2 no. 1 SPO. If the number of participants registered for the written examination is low, we reserve the right to hold an oral examination instead of a written examination.
Please note that the examination is only offered in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendations
None

Workload
135 hours

T 7.75 Module component: Current Directions in Consumer Psychology [T-WIWI-111100]

Coordinators: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105714 - Consumer Research

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Each term	1 semesters	2

Courses					
WT 25/26	2540441	Current Directions in Consumer Psychology	2 SWS	Seminar / 🗣	Scheibehenne
Exams					
WT 25/26	7900214	Current Directions in Consumer Psychology			Scheibehenne

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment. Grading will be based on a continuous basis throughout the semester.

Prerequisites
Strong interest in research. Students who wish to write a master's thesis at our department will be given priority in the allocation of places.

Additional Information
Please note: Due to a research sabbatical of Prof. Scheibehenne, this course will not be offered in the summer semester 2026. The course is expected to be available again in the summer semester 2027.

This class covers current research topics at the intersection between Psychology, Consumer Behavior, and Behavioral Economics. Based on weekly reading assignments of current scientific journal publications, students will get a first-hand experience of the ongoing topics and discussions at this exciting and dynamic area of research. The reading list will be announced at the first day of class and will be updated throughout the semester. Grades will be based on weekly participation throughout the semester including short oral presentation of papers in class, active engagement in discussions, and homework assignments. Due to the highly interactive format of this class the number of participants is limited.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Current Directions in Consumer Psychology

2540441, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
NOTE: sign-up required via the Campus+ Portal

This class covers current research topics at the intersection between Psychology, Consumer Behavior, and Behavioral Economics. Based on weekly reading assignments of current scientific journal publications, students will get a first-hand experience of the ongoing topics and discussions at this exciting and dynamic area of research. The reading list will be announced at the first day of class. Grades will be based on continuous participation throughout the semester including short oral presentation of papers in class, active engagement in discussions and homework assignments. This class will be taught in English.

Organizational issues
Participation is restricted to 6 participants.

If more than 6 students apply, we will assign places by motivation.

Achtung: Seminar findet im Seminarraum Geb 01.87, R 5B 25 statt.

Beginn Mittwoch 29.10.25 09:45 - 11:15 Uhr, dann immer mittwochs bis 18.2.2 gleiche Uhrzeit

T 7.76 Module component: Current Topics on BioMEMS [T-MACH-102176]

Coordinators: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each term	2

Courses					
WT 25/26	2143873	Actual topics of BioMEMS	2 SWS	Seminar /	Guber, Ahrens
ST 2026	2143873	Actual topics of BioMEMS	2 SWS	Seminar /	Guber, Ahrens

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
active participation and own presentation (30 Min.)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Actual topics of BioMEMS

2143873, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Organizational issues
Aktuell werden im Rahmen dieses Seminars nur Vorträge zu Abschlussarbeiten gehalten. Neue Themen nur auf Anfrage.

V Actual topics of BioMEMS

2143873, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

- Short introduction to the basics of BioMEMS
- Selected aspects of biomedical engineering and life sciences
- Possible micro technical manufacturing processes
- Selected application examples from research and industry

The seminar includes (bio)medical engineering as well as biological and biotechnological topics in the context of engineering sciences

- Use of microtechnical components and systems in innovative medical products
- Use of microfluidic chip systems in applied biology and biotechnology

Organizational issues
Aktuell werden im Rahmen dieses Seminars nur Vorträge zu Abschlussarbeiten gehalten. Neue Themen nur auf Anfrage.

T 7.77 Module component: Data Science for Business [T-WIWI-114089]

Coordinators: Prof. Dr. Jella Pfeiffer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	1

Courses					
WT 25/26	2540473	Business Data Analytics	2 SWS	Seminar / 🗣	Hariharan, Grote, Schulz, Motz
ST 2026	2540466	Data Science for Business	2 SWS	Lecture / 🗣	Pfeiffer
ST 2026	2540467	Exercise Data Science for Business	1 SWS	Practice / 🗣	Gutschow, Heßler
Exams					
WT 25/26	7900188	Data Science for Business (Nachklausur)			Pfeiffer
ST 2026	7900183	Data Science for Business			Pfeiffer

Legend: 💻 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is monitored through ongoing elaborations and presentations of tasks and a written exam (60 minutes) at the end of the lecture period. Successful participation in the exercises is a prerequisite for admission to the written examination. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

The number of participants is limited to 50, as this is the only way to ensure that the case study is supervised conscientiously.

Prerequisites
None

Recommendations
Knowledge of programming (particular python) and statistics is helpful.

Additional Information
The lecture and exercise are blocked. Three units take place consecutively in the first few weeks. The weeks after that can be used to work on the case (team project).

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Business Data Analytics** — **Seminar (S) On-Site**
2540473, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Content
wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

V **Data Science for Business** — **Lecture (V) On-Site**
2540466, SS 2026, 2 SWS, Language: English, Open in study portal

Content
In the course "Data Science for Business":

- You will learn about essential Data Science methods, including clustering and classification techniques (e.g., random forests, SVMs).
- You will understand process models such as CRISP-DM.
- You will explore different types of data, including eye-tracking data, click data, neurophysiological data, sales data, and other business-related data.
- You will gain skills in data visualization and evaluation using programming languages and software tools.

Workload:

- Attendance time Lecture (2 SWS × 15 weeks): 30 h
- Attendance time Tutorial (1 SWS × 15 weeks): 15 h
- Self-study Lecture: 20 h
- Self-study Tutorial: 50 h
- Exam preparation: 20 h
- Total: 135 h

Organizational issues

- ehemals Business Data Analytics: Applications and Tools
- formerly Business Data Analytics: Applications and Tools

V

Exercise Data Science for Business

2540467, SS 2026, 1 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

Content
In the course "Data Science for Business":

- You will learn about essential Data Science methods, including clustering and classification techniques (e.g., random forests, SVMs).
- You will understand process models such as CRISP-DM.
- You will explore different types of data, including eye-tracking data, click data, neurophysiological data, sales data, and other business-related data.
- You will gain skills in data visualization and evaluation using programming languages and software tools.

Organizational issues

- ehemals Business Data Analytics: Applications and Tools
- formerly Business Data Analytics: Applications and Tools

T 7.78 Module component: Derivatives [T-WIWI-102643]

Coordinators: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2530550	Derivatives	2 SWS	Lecture / 🗣	Uhrig-Homburg
ST 2026	2530551	Übung zu Derivate	1 SWS	Practice / 🗣	Dinger, Uhrig-Homburg
Exams					
WT 25/26	7900051	Derivatives			Uhrig-Homburg
ST 2026	7900111	Derivatives			Uhrig-Homburg

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (60 minutes). The examination is offered every semester and can be repeated at any regular examination date.

A bonus can be earned for successful participation in the exercises by submitting correct solutions to at least 50% of the bonus exercises set. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Derivatives

2530550, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Weiterführende Literatur:
Cox/Rubinstein (1985): Option Markets, Prentice Hall

T 7.79 Module component: Design and Operation of Industrial Plants and Processes [T-WIWI-114618]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	5,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2581952	Design and Operation of Industrial Plants and Processes	2 SWS	Lecture / 🗣	Schultmann, Rudi
Exams					
WT 25/26	7981952	Design and Operation of Industrial Plants and Processes			Schultmann
ST 2026	7981952	Design and Operation of Industrial Plants and Processes			Schultmann

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Design and Operation of Industrial Plants and Processes

2581952, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.

During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.80 Module component: Design Thinking [T-WIWI-102866]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Courses					
WT 25/26	2545008	Design Thinking (Track 1)	2 SWS	Seminar /	Haller, Terzidis
ST 2026	2545008	Design Thinking (Track 1)	2 SWS	Seminar /	Haller
Exams					
WT 25/26	7900084	Design Thinking (Track 1)			Terzidis
ST 2026	7900053	Design Thinking (Track 1)			Terzidis

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendations
None

Additional Information
Please note that the number of participants is limited. Registration takes place via the Wiwi-Portal. The seminar contents will be published on the institute's homepage.

Below you will find excerpts from courses related to this module component:

V Design Thinking (Track 1)

2545008, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Course Content:

Design Thinking is a user-centric method for innovation management. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes created that get tested by the user group. The result is a validated concept of an innovation or product.

Learning Objectives

During the seminar, students learn basic procedures for achieving user-centric innovations. These are concrete methods focusing on actual users' needs and pain points. Design Thinking is problem-oriented and emphasizes specific customer situations. After attending the seminar, students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues
Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of 4-5 persons. The groups are formed in the seminar

V

Design Thinking (Track 1)

2545008, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

Design Thinking is a user-centric method for innovation management. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes created that get tested by the user group. The result is a validated concept of an innovation or product.

Learning Objectives

During the seminar, students learn basic procedures for achieving user-centric innovations. These are concrete methods focusing on actual users' needs and pain points. Design Thinking is problem-oriented and emphasizes specific customer situations. After attending the seminar, students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the wiwi seminar module!

T 7.81 Module component: Designing Interactive Systems: Human-AI Interaction [T-WIWI-113465]

Coordinators: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2540558	Designing Interactive Systems: Human-AI Interaction	3 SWS	Lecture /	Mädche, Seitz Sänger
Exams					
WT 25/26	7900205	Designing Interactive Systems			Mädche
ST 2026	7900299	Designing Interactive Systems: Human-AI Interaction			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-108461 - Interactive Information Systems must not have been started.

Additional Information
The course is held in english.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Designing Interactive Systems: Human-AI Interaction

2540558, SS 2026, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Description

The field of computing has transitioned from traditional batch processing toward the development of highly sophisticated interactive and intelligent systems. As artificial intelligence (AI) continues to advance, these systems have gained the capacity to learn, adapt to environmental stimuli, and simulate human cognitive processes. While the capacity of AI-based information technology to augment and automate human tasks has expanded, it simultaneously creates complex new demands for the design of interactive systems and necessitates a sophisticated understanding of the nuances within human-AI interaction.
This Master's course explores the state-of-the-art scientific knowledge and practical applications required to navigate these complexities, specifically focusing on the design of AI-based interactive systems for personal productivity on the individual level and virtual collaboration on the team level within professional environments.

The course is divided into two phases: The first phase establishes a scientific foundation through a **flipped classroom model**. Students engage with conceptual foundations and theoretical frameworks independently, allowing in-person sessions to be dedicated to analysis and critical discussion of existing knowledge for designing interactive systems enabling effective human-AI interaction. The second phase transitions into the practical application of these concepts through a collaborative **capstone project** conducted in partnership with an industry partner. In this phase, students work in teams to apply knowledge acquired in the first phase culminating in the creation of a prototype of an interactive system. The project emphasizes the intricacies of human-AI interaction, requiring students to synthesize their theoretical knowledge into a functional and sophisticated design solution.

Learning objectives

- Evaluate existing theories and conceptual frameworks of interactive systems to assess their role in modern computing environments.
- Analyze the unique characteristics of human-AI interaction and determine their impact on future interactive systems design.
- Create a functional interactive prototype by following the human-centered design process and applying state-of-the-art knowledge within a collaborative capstone project to solve real-world problems.
- Get hands-on experience by applying lecture content in a design capstone project

Prerequisites

No specific prerequisites are required for the lecture

Literature

Further literature will be made available in the lecture.

Die Erfolgskontrolle erfolgt in Form einer Prüfungsleistung anderer Art (Form) nach § 4 Abs. 2 Nr. 3 SPO. Details zur Ausgestaltung der Erfolgskontrolle werden im Rahmen der Vorlesung bekannt gegeben.

Literature

Die Vorlesung basiert zu einem großen Teil auf

· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.

Weiterführende Literatur wird in der Vorlesung bereitgestellt.

T 7.82 Module component: Development of Hybrid Drivetrains [T-MACH-110817]

Coordinators: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2134155	Development of Hybrid Powertrains	2 SWS	Lecture / 🗣	Koch, Doppelbauer
Exams					
WT 25/26	76-T-MACH-110817	Development of hybrid drivetrains			Koch
ST 2026	76-T-MACH-110817	Development of hybrid drivetrains			Koch

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, 20 min.

Prerequisites
None

Additional Information
This course is offered in German.

Workload
120 hours

T 7.83 Module component: Development of Sustainable, Digital Business Models [T-WIWI-113663]

Coordinators: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Assessment
Non exam assessment. The final grade is composed 50% of the grade of the written paper (ca. 5 Pages /Person) and 50% of the presentation of the results.

Prerequisites
None

Recommendations
Prior attendance of the course Innovation Management is recommended.

Workload
90 hours

T 7.84 Module component: Digital Democracy [T-WIWI-113160]

Coordinators: Jonas Fegert
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101446 - Market Engineering
M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	00053	Übung zur Digital Democracy	1 SWS	Practice /	Stein
WT 25/26	2500045	Digital Democracy - Challenges and Opportunities of the Digital Society	2 SWS	Seminar /	Fegert, Stein, Bezzaoui
WT 25/26	2600052	Digital Democracy	2 SWS	Lecture /	Fegert
Exams					
WT 25/26	00059	Digital Democracy			Weinhardt

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative exam assessment. The examination consists of two parts (presentation and oral exam). Details on the design of the exam will be announced at the beginning of the course.

Additional Information
Limited to 25 students. Application (cover letter) via the Wiwi-portal.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Digital Democracy

2600052, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The "Digital Democracy" Lecture deals with opportunities and challenges of democracy and participation in a digitalized world. Social networks and other platforms have become a central place for human interaction.

These technologies open up many possibilities to connect people, promote societal discourse, and organize social movements. On the other hand, they are also used to undermine democracy by extremist forces.

One example is the spread of disinformation through social media, which can undermine trust in democratic institutions and exacerbate divisions in society. Big tech actors pursue their own economically driven interests, some of which run counter to societal ones.

So to what extent can Internet platforms help strengthen social discourse? And what measures can be taken to promote the quality and diversity of discourse in the digital world? What role do big tech players play in digital democracy and how can their interests be reconciled with democratic principles? These and many more questions will be explored in the lecture. The lecture introduces theoretical foundations and evidence-based research on digital democracy. It will address the following questions: What characterizes deliberative democracies, how do democracies change, and what can damage them? How does social polarization emerge and what drives it - off- and online. Accordingly, different platform types and phenomena of disinformation, such as clickbait, will be presented. The last part of the lecture series will deal with the search for approaches and alternatives to these problems.

The exercise session connected to this lecture is conducted in cooperation with an NGO and applies the lecture content in a practical context: The formulation of a data-based policy recommendation.

Organizational issues
Die Teilnahme am Kurs ist auf 25 Plätze beschränkt, diese erfolgt über das Wiwi-Portal.

Die Termine werden ebenfalls zeitnah bekannt gegeben.

T 7.85 Module component: Digital Marketing [T-WIWI-112693]

Coordinators: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105312 - Marketing and Sales Management
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2571185	Digital Marketing	2 SWS	Lecture / 🗣	Kupfer
ST 2026	2571186	Digital Marketing Exercise	1 SWS	Practice / 🗣	Schmitt, Cinar, Kupfer
Exams					
WT 25/26	7900021	Digital Marketing			Kupfer
ST 2026	7900064	Digital Marketing			Kupfer

Legend: 📱 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of an examination of another type. The following aspects are included in the assessment:

- Elaboration and presentation of a group task
- Written exam

Further details on the organization of the performance and the points system for the assessment will be announced in the lecture.

Prerequisites
None

Recommendations
Students are highly encouraged to actively participate in class.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Digital Marketing

2571185, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn the theoretical foundations of digital marketing and its most important concepts. They develop an understanding both for the digital consumer and the digital environment. Special emphasis will be given to digital marketing strategies and practices, such as content marketing and influencer marketing. A tutorial offers the opportunity to apply the key learnings of the lecture as part of a group work.

The learning objectives are as follows:

- Getting to know the theoretical foundations of digital marketing
- Evaluating digital marketing strategies and practices (e.g., in the context of content marketing and influencer marketing)
- Fostering critical and analytical thinking skills and the application of knowledge to marketing problems
- Improving English skills

Total time required for 4.5 credit points: approx. 135 hours
Attendance time: 30 hours
Self-study: 105 hours

Organizational issues
Termine werden bekannt gegeben.

T 7.86 Module component: Digital Marketing and Sales in B2B [T-WIWI-106981]

Coordinators: Prof. Dr. Martin Klarmann
Anja Konhäuser

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-105312 - Marketing and Sales Management
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading	Term offered	Version
Examination of another type	1,5 CP	graded	Each summer term	1

Courses					
ST 2026	2571156	Digital Marketing and Sales in B2B	1 SWS	Others / 🗣	Konhäuser
Exams					
ST 2026	7900297	Digital Marketing and Sales in B2B			Klarmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

Prerequisites
None.

Additional Information
This course will not take place in the summer term 2023, but is expected to be offered again on a regular basis starting in the summer term 2024.
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).Please note that only one of the 1.5-ECTS courses can be attended in this module.

Workload
45 hours

Below you will find excerpts from courses related to this module component:

V **Digital Marketing and Sales in B2B** — **Others (sonst.) On-Site**
2571156, SS 2026, 1 SWS, Language: English, Open in study portal

Content

Learning Sessions:

The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.
Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g. product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:

After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

- Understand digital marketing and sales approaches for the B2B sector
- Recognise important elements and understand how-to-setup of digital strategies
- Become familiar with the effectiveness and usage of different digital marketing channels
- Understand the effect of digital sales on sales management, customer support and value chain
- Be able to measure and interpret digital KPIs
- Calculate the Return on Investment (RoI) for digital marketing by combining online data with company performance data

time of presentness = 15 hrs.

private study = 30 hrs.

Organizational issues

Blockveranstaltung, Raum B5.26, Gebäude 01.87

6.5.26 11:00-17:00 Uhr

7.5.26 09:00-14:00 Uhr

Literature

-

T 7.87 Module component: Digital Services: Innovation & Business Models [T-WIWI-112757]

Coordinators: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101448 - Service Management
M-WIWI-102754 - Service Economics and Management
M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2595468	Digital Services: Innovation & Business Models	1.5 SWS	Lecture /	Satzger, Benz, Schüritz, Heinz
ST 2026	2595469	Übung zu Digital Services: Innovation & Business Models	1.5 SWS	Practice /	Satzger, Benz, Schüritz, Heinz
Exams					
WT 25/26	7900036	Digital Services: Innovation & Business Models			Satzger
ST 2026	7900163	Digital Services: Innovation & Business Models			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment consists of a written exam (60 min.).

Prerequisites
None

Recommendations
None

Additional Information
The course "Digital Services: Innovation & Business Models" replaces the course Service Innovation, based on a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Previous foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Below you will find excerpts from courses related to this module component:

V **Digital Services: Innovation & Business Models** — **Lecture (V)** **Blended (On-Site/Online)**
2595468, SS 2026, 1.5 SWS, Language: English, Open in study portal

Content
Leveraging data and digital technologies for business success is a key challenge for organizations as they need to

- get aware of the newly arising potential
- develop suitable digital services that are user-centric and individualized
- "servitize" their offering portfolio and business model
- transform their organizations

This course will equip students with concepts and methods to tackle this challenge along two dimensions: First, we will cover innovation as a concept as well as apply contemporary innovation methods (like Design Thinking, Open Innovation) to the services space. Second, we deal with leveraging innovation to develop new business models (including multi-partner concepts in platforms or ecosystems), to servitize existing business models (e.g., via product-service-systems), and to accordingly transform the organization.

The course links innovation and business model theories with practical examples and exercises. Students are asked to actively engage in the discussion.

Organizational issues
The course will be offered in the form of a flipped classroom concept. The lecture will be recorded in advance and made available online. During the "in presence" sessions, the contents of the lecture will be applied and expanded on.

Literature

- Böhmann, T./ Leimeister, J.M./ Möslein, K. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79.
- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.) (2015). Fundamentals of service systems (Vol. 12). Heidelberg: Springer.
- Chesbrough, H. (2011). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons.
- Rogers, S. (2003). Diffusion of Innovations. 5. ed. New York: Free Press.
- Satzger, G., Benz, C., Böhmann, T., Roth, A. (2022). Servitization and Digitalization as Siamese Twins – Concepts and Research Agenda. Edvardsson/Tronvoll (eds.): The Palgrave Handbook of Service Management, 967-989.
- Uebernickel, F., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2015). Design Thinking: Das Handbuch. Frankfurt am Main: Frankfurter Allgemeine Buch.
- Vargo, S.L., Lusch, R.F. (2017). Service-dominant logic 2025. Int. J. Res. Mark. 34, 46–67.
- Weill, P.; Woerner, S.L. (2018): "What's your Digital Business Model? – Six Questions to Help you Build the Next-Generation Enterprise". Boston, Massachusetts: Harvard Business Review Press.

V Übung zu Digital Services: Innovation & Business Models

Practice (Ü)
On-Site

2595469, SS 2026, 1.5 SWS, Language: English, Open in study portal

Content
Leveraging data and digital technologies for business success is a key challenge for organizations as they need to

- get aware of the newly arising potential
- develop suitable digital services that are user-centric and individualized
- "servitize" their offering portfolio and business model
- transform their organizations

This course will equip students with concepts and methods to tackle this challenge along two dimensions: First, we will cover innovation as a concept as well as apply contemporary innovation methods (like Design Thinking, Open Innovation) to the services space. Second, we deal with leveraging innovation to develop new business models (including multi-partner concepts in platforms or ecosystems), to servitize existing business models (e.g., via product-service-systems), and to accordingly transform the organization.

The course links innovation and business model theories with practical examples and exercises. Students are asked to actively engage in the discussion.

Organizational issues
The course will be offered in the form of a flipped classroom concept. The lecture will be recorded in advance and made available online. During the "in presence" sessions, the contents of the lecture will be applied and expanded on.

Literature

- Böhmann, T./ Leimeister, J.M./ Möslein, K. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79.
- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.) (2015). Fundamentals of service systems (Vol. 12). Heidelberg: Springer.
- Chesbrough, H. (2011). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons.
- Rogers, S. (2003). Diffusion of Innovations. 5. ed. New York: Free Press.
- Satzger, G., Benz, C., Böhmann, T., Roth, A. (2022). Servitization and Digitalization as Siamese Twins – Concepts and Research Agenda. Edvardsson/Tronvoll (eds.): The Palgrave Handbook of Service Management, 967-989.
- Uebernickel, F., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2015). Design Thinking: Das Handbuch. Frankfurt am Main: Frankfurter Allgemeine Buch.
- Vargo, S.L., Lusch, R.F. (2017). Service-dominant logic 2025. Int. J. Res. Mark. 34, 46–67.
- Weill, P.; Woerner, S.L. (2018): "What's your Digital Business Model? – Six Questions to Help you Build the Next-Generation Enterprise". Boston, Massachusetts: Harvard Business Review Press.

T 7.88 Module component: Digital Transformation of Public Administration [T-WIWI-114977]

Coordinators: Philipp Bauer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Assessment
The assessment of success in this course is carried out as a non exam assessment. The grade is made up as follows:

1. **Written elaboration**: (weighting: 75 %). The required scope depends on the current requirements of the degree program for recognition in the seminar module.
2. **Presentation of the final project**: (weighting: 25 %).

Prerequisites
None

Recommendations
Prior attendance of the course Innovation Management is recommended.

Workload
90 hours

T 7.89 Module component: Digitalization from Product Concept to Production [T-MACH-113647]

Coordinators: Dr.-Ing. Marc Wawerla
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2149702	Digitalization from Product Concept to Production	2 SWS	Lecture / 🗣	Wawerla
Exams					
WT 25/26	76-T-MACH-113647	Digitalization from Product Concept to Production			Wawerla

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative test achievement (graded):
- Written processing of a case study (weighting 50%) and
- Presentation of the results (ca. 10 min.) followed by a colloquium (ca. 30 min.) (weighting 50%)

Prerequisites
T-MACH-110176 may not have started.

Additional Information
The course is offered in English.

For organizational reasons, the number of participants in the course is limited. As a result, a selection process will be carried out for registrations. Further information on the course and application can be found via https://www.wbk.kit.edu/studium-und-lehre.php.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Digitalization from Product Concept to Production

2149702, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture covers digitalization along the entire value chain in technology companies. The focus is on production and the supply chain. In this context, concepts, tools, methods, technologies, and specific applications in industry are presented. As part of the course, students have the opportunity to gain insights into the digitalization processes of a German high-tech company.

Main topics of the lecture:

- Concepts and methods such as disruptive innovation and agile project management
- Overview of available technologies
- Practical approaches to innovation
- Applications in industry
- Excursion to ZEISS IQS

Learning Outcomes:

The students are able to …

- describe and explain the methods and concepts presented in the course.
- analyze and evaluate the suitability of digitalization technologies for value creation processes in the manufacturing industry.
- assess the applicability of methods such as disruptive innovation and agile project management.
- assess the practical challenges of digitalization in industry.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Aus organisatorischen Gründen ist die Anzahl der Teilnehmenden der Lehrveranstaltung begrenzt. Infolgedessen findet ein Auswahlprozess der Anmeldungen statt. Weitere Informationen zur Lehrveranstaltung und Bewerbung sind unter https://www.wbk.kit.edu/studium-und-lehre.php zu finden.

For organizational reasons, the number of participants in the course is limited. As a result, a selection process will carried out for registrations. Further information on the course and application can be found via https://www.wbk.kit.edu/studium-und-lehre.php.

T 7.90 Module component: Digitalization in Facility and Real Estate Management [T-BGU-108941]

Coordinators: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105592 - Digitalization in Facility Management

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	6 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6242907	Digitalization in Facility- and Real Estate Management	4 SWS	Lecture / Practice / 🗣	Lennerts, Mitarbeiter/innen
Exams					
WT 25/26	8246108941	Digitalization in Facility and Real Estate Management			Lennerts, Schmidt-Bäumler

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
project work incl. report, appr. 15 pages, and presentation/colloquium, appr. 15 min

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
180 hours

T 7.91 Module component: Digitization in the Railway System [T-MACH-113016]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106496 - Modern Mobility on Rails and Roads

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4,5 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2115920	Railway System Digitalisation	2 SWS	Lecture / 🗣	Jost, Cichon
Exams					
WT 25/26	76-T-MACH-113016	Railway System Digitalisation			Jost

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral examination
Duration: approx. 20 minutes
No tools or reference material may be used during the exam.

Additional Information
The course is offered in German.

Workload
135 hours

T 7.92 Module component: Dimensioning of Material Flow Systems in Production and Logistics [T-MACH-113950]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2117052	Dimensioning of material flow systems in production and logistics	3 SWS	Lecture / 🗣	Furmans
Exams					
WT 25/26	76-T-MACH-113950	Dimensioning of Material Flow Systems in Production and Logistics			Furmans

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment (Prüfungsleistung anderer Art) consists of an oral examination (approx. 20 minutes) and regular and active participation during the course.

Prerequisites
none

Recommendations

- The contents of the Bachelor course Material Flow Systems in Production and Logistics are assumed to be known and are necessary to follow the course.
- Basic statistical knowledge and understanding.
- Knowledge of a common programming language (Java, Python, ...).

Additional Information
As part of the inverted classroom model, the theoretical content and exercises are taught entirely online. The face-to-face events on campus are used exclusively to apply the knowledge learnt in realistic scenarios.

The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Dimensioning of material flow systems in production and logistics

2117052, WS 25/26, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Course content:

- Material flow elements (conveyor line, branch, merge)
- Description of networked Material Flow models with graphs, matrices, etc.
- Queueing theory: Calculation of waiting times, utilisation rates, etc.
- Storage and picking
- Shuttle systems, automated storage and retrieval systems
- Value stream analysis
- Lean manufacturing topics

Learning objectives:

After successfully completing the course, you will be able to do the following independently and as part of a team:

- Describe a material flow system accurately in a conversation with experts.
- Model and parameterise the system load and the typical material flow elements.
- Design a material flow system for a specific task.
- Set the performance of a system depending on the requirements.
- Conceptually expand the limits of today's methods and system components as needed.

Description:

The course is divided into 6 thematic blocks, each of which is divided into the following phases and dates:

Off-campus:

- self-study
- exercise

On-campus:

- classroom sessions with practical application

Organizational issues
Anmerkungen: Im Rahmen des Inverted Classroom Modells erfolgt die Vermittlung der theoretischen Inhalte sowie der Übungen vollständig online. Die Präsenzveranstaltungen auf dem Campus dienen ausschließlich dazu, das erlernte Wissen in realitätsnahen Szenarien praktisch anzuwenden.

Erfolgskontrolle: Die Erfolgskontrolle erfolgt in Form einer Prüfungsleistung anderer Art. Die Bewertung setzt sich aus einer mündlichen Prüfung und der regelmäßigen und aktiven Teilnahme an den Kursterminen zusammen.

Empfehlungen:

- (von Vorteil): Statistische Grundkenntnisse und –verständnis.
- (von Vorteil): Kenntnisse in einer gängigen Programmiersprache (Java, Python, …).
- (von Vorteil): Da die Vorlesung auf der Veranstaltung **2118181 – Materialfluss in Produktion und Logistik** aufbaut, werden Kenntnisse aus dieser Veranstaltung vorausgesetzt.

Literature
Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 7. Auflage 2019

T 7.93 Module component: Disassembly Process Engineering [T-BGU-101850]

Coordinators: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	6243803	Dismantling Techniques	2 SWS	Lecture / Practice / 🗣	Gentes
Exams					
WT 25/26	8240101850	Disassembly Process Engineering			Gentes
ST 2026	8240101850	Disassembly Process Engineering			Gentes

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.94 Module component: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

Coordinators: Hon.-Prof. Dr. Sven Spieckermann
Organisation: KIT Department of Business and Economics
Part of: M-MACH-104888 - Advanced Module Logistics
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2550488	Ereignisdiskrete Simulation in Produktion und Logistik	3 SWS	Lecture / 🗣	Spieckermann
Exams					
ST 2026	7900244	Discrete-Event Simulation in Production and Logistics			Spieckermann

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written paper and an oral exam of about 30-40 min (alternative exam assessment).

Prerequisites
None

Recommendations
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Additional Information
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is planned to be held every summer term.

The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from courses related to this module component:

V Ereignisdiskrete Simulation in Produktion und Logistik

2550488, SS 2026, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

Organizational issues
Den Bewerbungszeitraum finden Sie auf der Veranstaltungswebseite im Lehre-Bereich unter dol.ior.kit.edu

Literature

- Gutenschwager K., Rabe M., Spieckermann S. und S. Wenzel (2017): Simulation in Produktion und Logistik, Springer, Berlin.
- Banks J., Carson II J. S., Nelson B. L., Nicol D. M. (2010) Discrete-event system simulation, 5.Aufl., Pearson, Upper Saddle River.
- Eley, M. (2012): Simulation in der Logistik - Einführung in die Erstellung ereignisdiskreter Modelle unter Verwendung des Werkzeuges "Plant Simulation“, Springer, Berlin und Heidelberg
- Kosturiak, J. und M. Gregor (1995): Simulation von Produktionssystemen. Springer, Wien und New York.
- Law, A. M. (2015): Simulation Modeling and Analysis. 5th Edition, McGraw-Hill, New York usw.
- Liebl, F. (1995): Simulation. 2. Auflage, Oldenbourg, München.
- Noche, B. und S. Wenzel (1991): Marktspiegel Simulationstechnik. In: Produktion und Logistik. TÜV Rheinland, Köln.
- Pidd, M. (2004): Computer Simulation in Management Science. 5th Edition, Wiley, Chichester.
- Robinson S (2004) Simulation: the practice of model development and use. John Wiley & Sons, Chichester
- VDI (2014): Simulation von Logistik-, Materialfluß- und Produktionssystemen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

T 7.95 Module component: Drying of Dispersions [T-CIWVT-111433]

Coordinators: Prof. Dr.-Ing. Heike Karbstein
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading	Term offered	Version
Written examination	1,5 CP	graded	Each summer term	2

T 7.96 Module component: Dynamic Macroeconomics [T-WIWI-109194]

Coordinators: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-107010 - Economics in a Connected World
M-WIWI-107011 - Economics of Innovation and Growth

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	4

Courses					
WT 25/26	2560402	Dynamic Macroeconomics	2 SWS	Lecture /	Brumm, Schang
WT 25/26	2560403	Übung zu Dynamic Macroeconomics	1 SWS	Practice /	Hußmann, Kissling
Exams					
WT 25/26	7900261	Dynamic Macroeconomics			Brumm

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment is a written exam (60 min.).

Prerequisites
None.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Dynamic Macroeconomics

2560402, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
This course addresses macroeconomic questions on an advanced level. The main focus of this course is on quantitative dynamic models and their fundamental role in modern macroeconomics in explaining observed phenomena and their use as a laboratory for policy exercises.

The first part of the course introduces seminal workhorse models in the representative agent framework. We will cover the Ramsey model for optimal growth, the Real Business Cycle (RBC) model for business cycle dynamics, and the New Keynesian (NK) model for analysing monetary economics. The second part expands these basic models to incorporate household heterogeneity and incomplete markets. We will analyse the Aiyagari model and the state-of-the-art Heterogeneous Agent New Keynesian (HANK) model to investigate more realistic economic inequality and analyse the distributional impact of policies along the income and wealth distribution.

Alongside the economic models, the course introduces advanced methods to numerically solve, simulate and estimate quantitative models in economics. The course pursues a hands-on approach: students will gain not only theoretical insights but also learn numerical tools to solve dynamic economic models using the programming language Python. The course will be an excellent preparation for writing a thesis at the Chair of Macroeconomics and for engaging with economic research more generally.

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 7.97 Module component: Dynamic Systems of Technical Logistics [T-MACH-112113]

Coordinators: Dr.-Ing. Martin Mittwollen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	2

Courses					
ST 2026	2148605	Dynamic Systems of Technical Logistics (DSTL)	3 SWS	Lecture / Practice / 🗣	Mittwollen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral exam (approx. 20min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Recommendations
Knowledge out of **"Basics of Technical Logistics" (LV 2117057)** preconditioned.

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Dynamic Systems of Technical Logistics (DSTL)

2148605, SS 2026, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Materials handling = motion = dynamics

Insight into the structure, mode of operation, dynamics and safety of materials handling equipment along the process chain of technical logistics from raw material extraction through processing, distribution, storage and order picking to shipping.

- Bulk material mining, transport, handling, storage
- Stability and tipping safety when turning, slewing, driving cranes
- Overhead cranes - structure, dynamics, safety
- Conveyors in material handling systems (belt, chain, AGV, EMS, ...)
- Elevators - structure, dynamics, safety
- Material flow systems - structure, basic elements, information flow
- Storage and racking systems - structure, dynamics, order picking
- Storage and retrieval systems - structure, dynamics, safety

Organizational issues
DSTL und DSTL-P sind zeitlich so gegliedert, dass zunächst ausschließlich der Vorlesungs- und Übungsteil bis ca. Anfang Juni gehalten wird. Der anschließende Zeitraum ist ausschließlich für die (optionale) Projektarbeit vorgesehen.

DSTL-P ist nur als Ergänzung zu DSTL belegbar, nicht als eigenständige Einzelleistung

T 7.98 Module component: Dynamic Systems of Technical Logistics - Project [T-MACH-112114]

Coordinators: Dr.-Ing. Martin Mittwollen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Examination of another type	2 CP	graded	Each summer term	2

Courses					
ST 2026	2148606	Dynamic Systems of Technical Logistics - Project (DSTL-P)	1 SWS	Project /	Mittwollen

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The success control takes place in the form of an examination performance of a different kind. This is composed as follows:

assessment of a project report in the form of a presentation with commentary
assessment of the presentation followed by a colloquium

Prerequisites
T-MACH-112113 (Dynamic Systems of Technical Logistics) must have been started.

Additional Information
The course is offered in German

Workload
60 hours

Below you will find excerpts from courses related to this module component:

V Dynamic Systems of Technical Logistics - Project (DSTL-P)

2148606, SS 2026, 1 SWS, Language: German, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
Conveyor technology = motion = dynamics
Course content:
The knowledge acquired in the lecture DSTL will be extended and deepened together with the previous knowledge from GTL in the context of an independent project work based on an application case from the current research and project work at IFL. Analyses, research, design work, calculations and simulations are used.

Organizational issues
DSTL und DSTL-P sind zeitlich so gegliedert, ausschließlich der Vorlesungs- und Übungsteil bis ca. Anfang Juni gehalten wird. Der anschließende Zeitraum ist ausschließlich für die (optionale) Projektarbeit vorgesehen.

DSTL-P ist nur als Ergänzung zu DSTL belegbar, nicht als eigenständige Einzelleistung

T 7.99 Module component: Economic Decision Making [T-WIWI-114174]

Coordinators: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105312 - Marketing and Sales Management
M-WIWI-105714 - Consumer Research
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2500059	Economic Decision Making	3 SWS	Lecture / Practice / 🗣	Scheibehenne
Exams					
WT 25/26	7900173	Economic Decision Making			Scheibehenne

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment. The course format consists of a lecture and a corresponding exercise. The grading includes the following aspects:

- A written exam (60 minutes)
- A presentation during the exercise
- Regular attendance
- In-class assignments

The scoring system for the grading will be announced at the beginning of the course.

Prerequisites
Registration via the WiWi Portal is required for participation in the Übung. The Übung is a prerequisite for the exam.

Additional Information
The judgments and decisions that we make can have long ranging and important consequences for our (financial) well-being and individual health. Hence, the goal of this lecture is to gain a better understanding of how people make judgments and decisions and the factors that influences their behavior. We will look into simple heuristics and mental shortcuts that decision makers use to navigate their environment, in particular so in an economic context. Following this, the lecture will provide an overview into social and emotional influences on decision making. In the second half of the semester we will look into some more specific topics including self-control, nudging, and food choice. The last part of the lecture will focus on risk communication and risk perception. We will address these questions from an interdisciplinary perspective at the intersection of Psychology, Behavioral Economics, Marketing, Cognitive Science, and Biology. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates.
The workload of the class is 4.5 ECTS. This consists of 3 ETCS for the lecture and 1.5 ETCS for the Übung. Details about the Übung will be communicated at the first day of the class.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Economic Decision Making** — **Lecture / Practice (VÜ) On-Site**
2500059, WS 25/26, 3 SWS, Language: English, Open in study portal

Content
The judgments and decisions that we make can have long ranging and important consequences for our (financial) well-being and individual health. Hence, the goal of this lecture is to gain a better understanding of how people make judgments and decisions and the factors that influences their behavior. We will look into simple heuristics and mental shortcuts that decision makers use to navigate their environment, in particular so in an economic context. Following this, the lecture will provide an overview into social and emotional influences on decision making. In the second half of the semester we will look into some more specific topics including self-control, nudging, and food choice. The last part of the lecture will focus on risk communication and risk perception. We will address these questions from an interdisciplinary perspective at the intersection of Psychology, Behavioral Economics, Marketing, Cognitive Science, and Biology. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates.
The workload of the class is 4.5 ECTS. This consists of 3 ETCS for the lecture and 1.5 ETCS for the Übung. Details about the Übung will be communicated at the first day of the class

T 7.100 Module component: Economics of Innovation [T-WIWI-112822]

Coordinators: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-107010 - Economics in a Connected World
M-WIWI-107011 - Economics of Innovation and Growth

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2560236	Economics of Innovation	2 SWS	Lecture / 🗣	Ott
ST 2026	2560237	Exercises of Economics of Innovation	1 SWS	Practice / 🗣	Ott, Mirzoyan
Exams					
WT 25/26	7900077	Economics of Innovation			Ott
ST 2026	7900107	Economics of Innovation			Ott

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (60 minutes). The examination is offered every semester and can be repeated at any regular examination date.
A bonus can be earned by completing a short written assignment and presenting it in the tutorial. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the lecture.

Prerequisites
None

Recommendations
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Additional Information
Due to Prof. Dr. Ingrid Ott's research semester, the lectures for this course will not be offered in the summer semester 2026.

Below you will find excerpts from courses related to this module component:

V **Economics of Innovation** — **Lecture (V) On-Site**
2560236, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Learning objectives:

Students shall be given the ability to

- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- understand the relationships between market structure and the development of innovation
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Course content:

The course covers the following topics:

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Exam description:

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Organizational issues
Die Vorlesung wird im SoSe 2026 aufgrund eines Forschungssemesters nicht gelesen. Die Prüfung findet statt. Vorbereitungsmaterialien finden Sie im ILIAS.

Literature
Auszug:

- Aghion, P., Howitt, P. (2009), The Economics of Growth, MIT Press, Cambridge MA.
- de la Fuente, A. (2000), Mathematical Methods and Models for Economists. Cambridge University Press, Cambridge, UK.
- Klodt, H. (1995), Grundlagen der Forschungs- und Technologiepolitik. Vahlen, München.
- Linde, R. (2000), Allokation, Wettbewerb, Verteilung - Theorie, UNIBUCH Verlag, Lüneburg.
- Ruttan, V. W. (2001), Technology, Growth, and Development. Oxford University Press, Oxford.
- Scotchmer, S. (2004), Incentives and Innovation, MIT Press.
- Tirole, Jean (1988), The Theory of Industrial Organization, MIT Press, Cambridge MA.

T 7.101 Module component: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Coordinators: Prof. Dr. Patrick Jochem
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each summer term	1

Courses					
ST 2026	2581006	Efficient Energy Systems and Electric Mobility	2 SWS	Lecture / 🗣	Jochem
Exams					
WT 25/26	7981006	Efficient Energy Systems and Electric Mobility			Fichtner
ST 2026	7981006	Efficient Energy Systems and Electric Mobility			Fichtner

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
Literature:

Masters, G. M. & K. F. Hsu (2023). Renewable and efficient electric power systems. John Wiley & Sons. (Chapter 9).
Viral, R., Tomar, A., Asija, D., Rao, U. M., & Sarwar, A. (Eds.). (2024). Smart Grids for Renewable Energy Systems, Electric Vehicles and Energy Storage Systems. CRC Press.

Below you will find excerpts from courses related to this module component:

V Efficient Energy Systems and Electric Mobility

2581006, SS 2026, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

- Understand the concept of energy efficiency as applied to specific systems
- Obtain an overview of the current trends in energy efficiency
- Be able to determine and evaluate alternative methods of energy efficiency improvement
- Overview of technical and economical stylized facts on electric mobility
- Judging economical, ecological and social impacts through electric mobility

Organizational issues
Termine: 24.04., 08.05., 22.05., 05.06., 19.06., 03.07., 17.07., 24.07.26

Literature
Wird in der Vorlesung bekanntgegeben.

T 7.102 Module component: eFinance: Information Systems for Securities Trading [T-WIWI-110797]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture / 🗣	Weinhardt
WT 25/26	2540455	Übungen zu eFinance: Information Systems for Securities Trading	1 SWS	Practice / 🗣	Motz, Motz
Exams					
WT 25/26	7900182	eFinance: Information Engineering and Management for Securities Trading			Weinhardt
ST 2026	7900269	eFinance: Information Systems for Securities Trading			Weinhardt

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is monitored by means of ongoing elaborations and presentations of tasks and an examination (60 minutes) at the end of the lecture period. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-102600 - eFinance: Information Engineering and Management for Securities Trading must not have been started.

Additional Information
The course"eFinance: Information Systems for Securities Trading" covers different actors and their function in the securities industry in-depth, highlighting key trends in modern financial markets, such as Distributed Ledger Technology, Sustainable Finance, and Artificial Intelligence. Security prices evolve through a large number of bilateral trades, performed by market participants that have specific, well-regulated and institutionalized roles. Market microstructure is the subfield of financial economics that studies the price formation process. This process is significantly impacted by regulation and driven by technological innovation. Using the lens of theoretical economic models, this course reviews insights concerning the strategic trading behaviour of individual market participants, and models are brought market data. Analytical tools and empirical methods of market microstructure help to understand many puzzling phenomena in securities markets.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V eFinance: Information Systems for Securities Trading

2540454, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature

- Picot, Arnold, Christine Bortenlänger, Heiner Röhrl (1996): "Börsen im Wandel". Knapp, Frankfurt
- Harris, Larry (2003): "Trading and Exchanges - Market Microstructure for Practitioners"". Oxford University Press, New York

Weiterführende Literatur:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

T 7.103 Module component: Electric Power Transmission & Grid Control [T-ETIT-110883]

Coordinators: Prof. Dr.-Ing. Thomas Leibfried
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101164 - Generation and Transmission of Renewable Power

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	6 CP	graded	Each summer term	1 semesters	2

Courses					
ST 2026	2307376	Electric Power Transmission & Grid Control	2 SWS	Lecture / 🗣	Leibfried
ST 2026	2307377	Tutorial for 2307376 Electric Power Transmission & Grid Control	2 SWS	Practice / 🗣	Weber
Exams					
WT 25/26	7307376	Electric Power Transmission & Grid Control			Leibfried
ST 2026	7307376	Electric Power Transmission & Grid Control			Leibfried

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The examination takes place in form of a written examination lasting 120 minutes. The module grade is the grade of the written exam.

Prerequisites
none

T 7.104 Module component: Electronics and EMC [T-ETIT-100723]

Coordinators: Dr. Martin Sack
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101163 - High-Voltage Technology

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	2307378	Electronics and EMC	2 SWS	Lecture / 🗣	Sack
Exams					
WT 25/26	7307378	Electronics and EMC			Sack
ST 2026	7307378	Electronics and EMC			Sack

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in an overall oral examination (approx. 20 minutes).

Prerequisites
none

T 7.105 Module component: Emissions into the Environment [T-WIWI-102634]

Coordinators: Ute Karl
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2581962	Emissions into the Environment	2 SWS	Lecture / 🗣	Karl
Exams					
WT 25/26	7981962	Emissions into the Environment			Schultmann
ST 2026	7981962	Emissions into the Environment			Schultmann

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Recommendations
None

Workload
105 hours

Below you will find excerpts from courses related to this module component:

V Emissions into the Environment

2581962, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Emission sources/emission monitoring/emission reduction: The lecture gives an overview of relevant emissions of air pollutants and greenhouse gases, emission monitoring and pollutant abatement options together with relevant legal regulations at national and international level. In addition, the fundamentals of circular economy, waste management and recycling are explained.

Structure:

Air pollution control

- Introduction, terms and definitions
- Sources of air pollutants
- Legal framework of air quality control
- Technical measures to reduce air pollutant emissions

Circular economy, recycling and waste management

- Waste collection and logistics
- Dual systems for packaging waste
- Recycling
- Thermal and biological waste treatment
- Final waste disposal

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.106 Module component: Employment Law [T-INFO-111436]

Coordinators: Dr. Alexander Hoff
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	2

Courses					
ST 2026	24668	Employment Law	2 SWS	Lecture / 🗣	Steg
Exams					
WT 25/26	7500001	Employment Law			Matz
ST 2026	7500082	Employment Law			Sattler

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.107 Module component: Energetic Refurbishment [T-BGU-111211]

Coordinators: Prof. Dr.-Ing. Kunibert Lennerts
Dr.-Ing. Harald Schneider

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction
M-BGU-105592 - Digitalization in Facility Management
M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	1,5 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6240903	Energetic Refurbishment	1 SWS	Lecture / 🗣	Lennerts, Mitarbeiter/innen
Exams					
WT 25/26	8240111211	Energetic Refurbishment			Lennerts, Schneider

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
45 hours

T 7.108 Module component: Energy and Environment [T-WIWI-102650]

Coordinators: Ute Karl
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101452 - Energy Economics and Technology
M-WIWI-101468 - Environmental Economics

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each summer term	2

Courses					
ST 2026	2581003	Energy and Environment	2 SWS	Lecture / 🗣	Karl
Exams					
WT 25/26	7900302	Energy and Environment NEW			Karl
ST 2026	7900294	Energy and Environment NEW			Karl

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Workload
105 hours

Below you will find excerpts from courses related to this module component:

V Energy and Environment

2581003, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture focuses on the environmental impacts arising from fossil fuels use and on the methods for the evaluation of such impacts. The first part of the lecture describes the environmental impacts of air pollutants and greenhouse gases as well as technical measures for emission control. The second part covers methods of impact assessment and their use in environmental communication as well as methods for the scientific support of emission control strategies.

The topics include:

- Fundamentals of energy conversion
- Formation of air pollutants during combustion
- Technical measures to control emissions from fossil-fuel combustion processes
- External effects of energy supply (life cycle analyses of selected energy systems)
- Environmental communication on energy services (e.g. electricity labelling, carbon footprint)
- Integrated Assessment Modelling to support the European Clean Air Strategy
- Cost-effectiveness analyses and cost-benefit analyses for emission control strategies
- Monetary valuation of external effects (external costs)

Literature
Die Literaturhinweise sind in den Vorlesungsunterlagen enthalten (vgl. ILIAS)

T 7.109 Module component: Energy and Process Technology I [T-MACH-102211]

Coordinators: Prof. Dr.-Ing. Hans-Jörg Bauer
Prof. Dr. Dr. Michael Fischlschweiger
Dr.-Ing. Corina Schwitzke
Dr. Amin Velji

Organisation: KIT Department of Mechanical Engineering

Institute of Thermal Turbomachinery

Part of: M-MACH-101296 - Energy and Process Technology I

Type	Credits	Grading	Term offered	Version
Written examination	9 CP	graded	Each winter term	1

Courses					
WT 25/26	2157961	Energy and Process Technology I	6 SWS	Lecture / Practice / 🗣	Bauer, Wirbser, Mitarbeiter, Wagner, Schwitzke, Reichel
Exams					
WT 25/26	76-T-MACH-102211	Energy and Process Technology I			Bauer, Wirbser, Schwitzke, Wagner
ST 2026	76-T-MACH-102211	Energy and Process Technology I			Bauer, Wirbser, Schwitzke, Pritz, Wagner

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
none

Workload
270 hours

Below you will find excerpts from courses related to this module component:

V Energy and Process Technology I

2157961, WS 25/26, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The last thrid of the lecture deals with the topic **Thermal Turbomachinery**. The basic principles, the functionality and the scope of application of gas and steam tubrines for the generation of electrical power and propulsion technology are addressed.

The students are able to:

- describe and calculate the basic physical-technical processes
- apply the mathematical and thermodynamical description
- reflect on and explain the diagrams and schematics
- comment on diagrams
- explain the functionality of gas and steam turbines and their components
- name the applications of thermal turbomachinery and their role in the field of electricity generation and propulsion technology

T 7.110 Module component: Energy and Process Technology II [T-MACH-102212]

Coordinators: Prof. Dr. Dr. Michael Fischlschweiger
Dr.-Ing. Corina Schwitzke

Organisation: KIT Department of Mechanical Engineering

Institute of Thermal Turbomachinery

Part of: M-MACH-101297 - Energy and Process Technology II

Type	Credits	Grading	Term offered	Version
Written examination	9 CP	graded	Each summer term	1

Courses					
ST 2026	2170832	Energy and Process Technology II	6 SWS	Lecture / Practice / 🗣	Schwitzke, Pritz, Wirbser
Exams					
WT 25/26	76-T-MACH-102212	Energy and Process Technology II			Schwitzke, Wirbser, Bauer, Wagner
ST 2026	76-T-MACH-102212	Energy and Process Technology II			Wirbser, Schwitzke, Bauer, Pritz, Wagner

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
none

Workload
270 hours

Below you will find excerpts from courses related to this module component:

V Energy and Process Technology II

2170832, SS 2026, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Thermal Turbomaschinery - In the first part of the lecture deals with energy systems. Questions regarding global energy resources and their use, especially for the generation and provision of electrical energy, are addressed. Common fossile and nuclear power plants for the centralized supply with electrical power as well as concepts of power-heat cogeneration for the decentralized electrical power supply by means of block-unit heat and power plants, etc. are discussed. Moreover, the characteristics and the potential of renewable energy conversion concepts, such as wind and hydro-power, photovoltaics, solar heat, geothermal energy and fuel cells are compare and evaluated. The focus is on the description of the potentials, the risks and the economic feasibility of the different strategies aimed to protect resources and reduce CO2 emissions.

The students are able to:

- discuss and evaluate energy resources and reserves and their utility
- review the use of energy carriers for electrical power generation
- explain the concepts and properties of power-heat cogeneration, renewable energy conversion and fuel cells and their fields of application
- comment on and compare centralized and decentralized supply concepts
- calculate the potentials, riskis and economic feasibility of different strategies aiming at the protection of resources and the reduction of CO2 emissions
- name and judge on the options for solar energy utilization
- discuss the potential of geothermal energy and its utilization

T 7.111 Module component: Energy Efficient and Sustainable Tribological Systems [T-MACH-114016]

Coordinators: Prof. Dr. Martin Dienwiebel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each winter term	1

Assessment
oral exam, about 25 min

Prerequisites
Must not be used together with T-MACH-114015

Additional Information
The course is offered in English.

Workload
120 hours

T 7.112 Module component: Energy Efficient and Sustainable Tribological Systems (in German) [T-MACH-114015]

Coordinators: Prof. Dr. Martin Dienwiebel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	2182100	Energy Efficient and Sustainable Tribological Systems	2 SWS	Lecture / 🗣	Dienwiebel

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, about 25 min

Prerequisites
Must not be used together with T-MACH-114016

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Energy Efficient and Sustainable Tribological Systems

2182100, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

Friction, lubrication, and wear significantly influence the energy efficiency and carbon footprint of machines and technical processes. The lecture will focus on new technologies for reducing friction that can drastically reduce energy losses caused by friction and wear. Regenerative and bio-based materials and lubricants will also be presented.

Topics

- Review of key tribology concepts
- In-depth study of fundamentals (surface interactions, tribochemistry)
- Low-friction systems: Superlubrication
    - Structural superlubrication
    - Liquid superlubrication
    - Applications
- Sustainable tribological systems
    - Substitution of critical substances
    - Biologically inspired solutions
    - Bio-based lubricants

Learning objectives

The student

- can describe basic tribochemical processes,
- is able to explain concepts and principles for achieving superlubricating systems in technology and nature,
- can name current approaches for substituting critical substances in tribological systems.

Further information

Basic knowledge of physics, chemistry, and materials science is required. Participation in the Tribology lecture is advantageous.

Attendance: 33.5 hours

Self-study: 116.5 hours

Success is assessed in the form of an approximately 30-minute oral exam (according to §4(2), 2 SPO).

T 7.113 Module component: Energy Efficient Intralogistic Systems [T-MACH-105151]

Coordinators: Dr.-Ing. Meike Kramer
Dr. Frank Schönung

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2117500	Energy efficient intralogistic systems	2 SWS	Lecture / 🗣	Kramer, Schönung
Exams					
WT 25/26	76-T-MACH-105151	Energy Efficient Intralogistic Systems			Kramer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral, 30 min. examination dates after the end of each lesson period.

Prerequisites
none

Recommendations
The content of course “Basics of Technical Logistics I” (T-MACH-109919) should be known.

Additional Information
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.

The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Energy efficient intralogistic systems

2117500, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The content of course “Basics of Technical Logistics” should be knownn.

Literature
Keine.

T 7.114 Module component: Energy Market Engineering [T-WIWI-107501]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101411 - Information Engineering
M-WIWI-101446 - Market Engineering
M-WIWI-101451 - Energy Economics and Energy Markets
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2540464	Energy Market Engineering	2 SWS	Lecture / 🗣	Semmelmann, Miskiw
ST 2026	2540465	Übung zu Energy Market Engineering	1 SWS	Practice / 🗣	Resch
Exams					
WT 25/26	7900127	Energy Market Engineering			Weinhardt

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendations
None

Additional Information
Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".

The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

Below you will find excerpts from courses related to this module component:

V **Energy Market Engineering** — **Lecture (V) On-Site**
2540464, SS 2026, 2 SWS, Language: German/English, Open in study portal

Content
The lecture "Energy Market Engineering" addresses the design and analysis of energy markets considering current developments and challenges. A particular focus is on the integration of renewable energies and the associated market mechanisms and regulations.

Specifically, the following topics are covered:

- **Introduction to Market Engineering**: What design elements do markets and specifically auctions have in general, and what influence does this have on participant behavior.
- **Introduction to Energy Markets**: Fundamentals and current trends in the energy system, including climate change and the expansion of renewable energies.
- **Market Design and Products**: Various pricing models such as nodal pricing, zonal pricing, and the structure of capacity markets.
- **Grid Expansion, Distribution Networks, and Flexibility Markets**: Analysis of distribution network markets and the role of flexibility options like demand response and storage technologies.
- **Intermittent Generation and Grid Stability**: Challenges posed by fluctuating renewable energies and strategies to ensure grid stability.
- **Digitalization and Market Transparency**: The role of digitalization in improving market transparency and efficiency, including the use of smart metering systems and data-driven approaches.
- **Current Research Projects and Developments**: Presentation of ongoing research projects and their significance for the future design of energy markets.

Organizational issues
Die Vorlesung wird als zweiwöchige Blockveranstaltung gehalten. Die genauen Termine und Themenblöcke werden in der Auftaktveranstaltung sowie auf Ilias kommuniziert.

Literature

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.
- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

T 7.115 Module component: Energy Networks and Regulation [T-WIWI-107503]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading	Term offered	Version
Oral examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2540494	Energy Networks and Regulation	2 SWS	Lecture / 🗣	Rogat, Miskiw
WT 25/26	2540495	Übung zu Energy Networks and Regulation	1 SWS	Practice / 🗣	Rogat, Miskiw
Exams					
WT 25/26	7900198	Energy Networks and Regulation			Weinhardt

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of an oral examination (in accordance with §4(2), 1 SPO).
The examination is offered in the semester of the lecture.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V **Energy Networks and Regulation** — **Lecture (V) On-Site**
2540494, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
Learning Goals

The student,

- understands the business model of a network operator and knows its central tasks in the energy supply system,
- has a holistic overview of the interrelationships in the network economy,
- understands the regulatory and business interactions,
- is in particular familiar with the current model of incentive regulation with its essential components and understands its implications for the decisions of a network operator
- is able to analyse and assess controversial issues from the perspective of different stakeholders.

Content of teaching

The lecture “Energy Networks and Regulation” provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead (“Energiewende”, redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO
- Objectives of regulation: Fair price calculation and high standard access conditions
- The functioning of incentive regulation
- First major amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily?) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Literature

Linnemann, M. (2024). Energiewirtschaft für (Quer-)Einsteiger: Einmaleins der Stromwirtschaft. Deutschland: Springer Fachmedien Wiesbaden.

Averch, H.; Johnson, L.L (1962). Behavior of the firm under regulatory constraint, in: American Economic Review, 52 (5), S. 1052 – 1069.

Bundesnetzagentur (2006): Bericht der Bundesnetzagentur nach § 112a EnWG zur Einführung der Anreizregulierung nach § 21a EnWG, http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/Netzentgelte/Anreizregulierung/BerichtEinfuehrgAnreizregulierung.pdf?__blob=publicationFile&v=3.

Bundesnetzagentur (2015): Evaluierungsbericht nach § 33 Anreizregulierungsverordnung, https://www.bmwi.de/Redaktion/DE/Downloads/A/anreizregulierungsverordnung-evaluierungsbericht.pdf?__blob=publicationFile&v=1.

Filippini, M.; Wild, J.; Luchsinger, C. (2001) : Regulierung der Verteilnetzpreise zu Beginn der Marktöffnung. Erfahrungen in Norwegen und Schweden, Bundesamt für Energie, Bern, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/34/066/34066585.pdf.

Gómez, T. (2013): Monopoly Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 151 – 198, Springer-Verlag, London.

Gómez, T. (2013): Electricity Distribution, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 199 – 250, Springer-Verlag, London.

Pérez-Arriaga, I.J. (2013): Challenges in Power Sector Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 647 – 678, Springer-Verlag, London.

Rivier, M.; Pérez-Arriaga, I.J.; Olmos, L. (2013): Electricity Transmission, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 251 – 340, Springer-Verlag, London.

T 7.116 Module component: Energy Trading and Risk Management [T-WIWI-112151]

Coordinators: N.N.
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each summer term	2

Courses					
ST 2026	2581020	Energy Trading and Risk Management	2 SWS	Lecture / 🗣	Kraft, Fichtner, Beranek
Exams					
WT 25/26	7981020	Energy Trading and Risk Management			Fichtner
ST 2026	7981020	Energy Trade and Risk Management			Fichtner

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The lecture "Energiehandel und Risikomanagement" will be held in English under the title "Energy Trading and Risk Management" from the summer semester 2022. The examination for the English-language lecture will be offered in English from the summer semester 2022.
The assessment consists of a written exam (60 minutes). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Workload
105 hours

Below you will find excerpts from courses related to this module component:

V Energy Trading and Risk Management

2581020, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction to Markets, Mechanisms and Interaction
2. Electricity Trading (platforms, products, mechanisms)
3. Balancing Energy Markets and Congestion Management
4. Coal Markets (reserves, supply, demand, and transport)
5. Investments and Capacity Markets
6. Oil and Gas Markets (supply, demand, trade, and players)
7. Trading Game
8. Risk Management in Energy Trading

T 7.117 Module component: Engine Measurement Techniques [T-MACH-105169]

Coordinators: Dr.-Ing. Sören Bernhardt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2134137	Engine measurement techniques	2 SWS	Lecture / 🗣	Bernhardt
Exams					
WT 25/26	76-T-MACH-105169	Engine Measurement Techniques			Koch
ST 2026	76-T-MACH-105169	Engine Measurement Techniques			Bernhardt

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral examination, Duration: 0,5 hours, no auxiliary means

Prerequisites
none

Recommendations
T-MACH-102194 Combustion Engines I

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Engine measurement techniques

2134137, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

1. Grohe, H.:Messen an Verbrennungsmotoren
2. Bosch: Handbuch Kraftfahrzeugtechnik
3. Veröffentlichungen von Firmen aus der Meßtechnik
4. Hoffmann, Handbuch der Meßtechnik
5. Klingenberg, Automobil-Meßtechnik, Band C

T 7.118 Module component: Engineering Hydrology [T-BGU-108943]

Coordinators: Dr. rer. nat. Ralf Loritz
Dr. Franziska Villinger

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	2

Courses					
ST 2026	6200617	Engineering Hydrology	2 SWS	Lecture / Practice /	Villinger, Loritz
Exams					
WT 25/26	8230108943	Engineering Hydrology			Ehret, Villinger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.119 Module component: Engineering Interactive Systems: AI & Wearables [T-WIWI-113460]

Coordinators: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2540420	Engineering Interactive Systems: AI & Wearables	3 SWS	Lecture / 🔀	Mädche, Feick, Kretzer
Exams					
WT 25/26	7900195	Engineering Interactive Systems: AI & Wearables			Mädche

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendations
None

Additional Information
The course is held in English.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Engineering Interactive Systems: AI & Wearables

2540420, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
Siehe Englische Literatur

T 7.120 Module component: Entrepreneurship [T-WIWI-102864]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each term	1

Courses					
WT 25/26	2545001	Entrepreneurship	2 SWS	Lecture /	Malik, Terzidis, Dang
ST 2026	2545001	Entrepreneurship	2 SWS	Lecture /	Terzidis, Dang
Exams					
WT 25/26	7900045	Entrepreneurship			Terzidis
ST 2026	7900002	Entrepreneurship			Terzidis

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Assessment
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Students are offered the opportunity to earn a grade bonus through separate assignments. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the lecture.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Entrepreneurship

2545001, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The lecture as an obligatory part of the module "Entrepreneurship" introduces the basic concepts of entrepreneurship. Important concepts and empirical facts are presented that relate to the conception and implementation of newly founded companies.

The focus here is on the introduction to methods for generating innovative business ideas, for transferring patents into business concepts and general principles of business modelling and business planning. In particular approaches such as Lean Startup and Effectuation as well as concepts for the financing of young enterprises are treated.

A "KIT Entrepreneurship Talk" is part of each session, in which experienced founder and entrepreneur personalities report on their experiences in practice of the establishment of an enterprise. Dates and speakers will be announced on the EnTechnon homepage.

Learning objectives:

The studentsare introduced to the topic Entrepreneurship. After successful attendance of the meeting they are to have an overview of the subranges of the Entrepreneurships and be able to understand basic concepts of the Entrepreneurships and apply key concepts.

Workload:

Total effort with 3 credit points: approx. 90 hours
Presence time: 30 hours
Pre- and postprocessing of the LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Examination:

The assessment of success takes place in the form of a written examination (60 min.) (according to §4(2), 1 SPO). The grade is the grade of the written exam.

A grade bonus can be earned through successful participation in a case study in the Entrepreneurship lecture. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to 0.3 or 0.4.The bonus only applies if you have passed the exam with at least a 4.0. More details will be provided in the lecture. Participation in the case study is voluntary.

Exam date: tba

Organizational issues
VL findet jeweils Mo, 15:45 - 19:00 an folgenden Terminen statt:
27.10.2025
03.11.2025
10.11.2025
17.11.2025
24.11.2025
01.12.2025
08.12.2025 (inkl. Prep Session)

Literature
Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

R.C. Dorf, T.H. Byers: Technology Ventures – From Idea to Enterprise., (McGraw Hill 2008)

Füglistaller, Urs, Müller, Christoph and Volery, Thierry (2008): Entrepreneurship

Hisrich, Robert D.; Ramadani, Veland (2017): Effective entrepreneurial management. Strategy, planning, risk management, and organization. Cham, Switzerland: Springer.

Ries, Eric (2011): The Lean Startup.

Osterwalder, Alexander (2010): Business Model Generation.

V **Entrepreneurship** — **Lecture (V)**
2545001, SS 2026, 2 SWS, Language: English, Open in study portal — **On-Site**

Content
The lecture as a compulsory part of the module "Entrepreneurship" introduces the basic concepts of entrepreneurship. Important concepts and empirical facts are introduced, which relate to the conception and implementation of newly founded companies.

The focus here is on introducing methods for generating innovative business ideas, translating patents into business concepts, and general principles of business modeling and business planning. In particular, approaches such as Lean-Startup and Effectuation as well as concepts for financing young companies are covered.

A "KIT Entrepreneurship Talk" is part of each session, in which experienced founder and entrepreneur personalities report on their experiences in the practice of the establishment of an enterprise. Dates and speakers will be announced on the EnTechnon homepage.

Learning objectives:

The students will be introduced to the topic of entrepreneurship. After successful attendance of the course they should have an overview of the sub-areas of entrepreneurship and be able to understand basic concepts of entrepreneurship and apply key concepts.

Workload:

The total effort with 3 credit points: approx. 90 hours
Presence time: 30 hours
Pre- and postprocessing of the LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Examination:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation)

A grade bonus can be earned by successfully participating in a case study as part of the Entrepreneurship lecture. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to 0.3 or 0.4. The bonus only applies if you have passed the exam with at least a 4.0. More details will be provided in the lecture. Participation in the case study is voluntary.

Exam dates: tbd

Organizational issues
VL findet jeweils Di, 15:45 - 19:00 an folgenden Terminen statt:

21.04.2026
28.04.2026
05.05.2026
12.05.2026
19.05.2026
02.06.2026
09.06.2026 (inkl. Prep Session)

16.06.2026 (Klausur)

Literature
Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship

Ries, Eric (2011): The Lean Startup

Osterwalder, Alexander (2010): Business Model Generation

Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

R.C. Dorf, T.H. Byers: Technology Ventures – From Idea to Enterprise., (McGraw Hill 2008)

Hisrich, Robert D.; Ramadani, Veland (2017): Effective entrepreneurial management. Strategy, planning, risk management, and organization. Cham, Switzerland: Springer.

T 7.121 Module component: Entrepreneurship Research [T-WIWI-102894]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each summer term	1

Courses					
ST 2026	2545002	Entrepreneurship Research	2 SWS	Seminar / 🗣	Kuschel, Malik
Exams					
ST 2026	7900052	Entrepreneurship Research			Terzidis

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The performance review is done via a so called other methods of performance review (term paper) (alternative exam assessment). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

Prerequisites
None

Recommendations
None

Additional Information
The topics will be prepared in groups. The presentation of the results is done during a a block period seminar at the end of the semester. Students have to be present all day long during the seminar.

Below you will find excerpts from courses related to this module component:

V Entrepreneurship Research

2545002, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

In this course, the students choose from various relevant and current research topics in entrepreneurship and independently develop a topic that suits them in small teams. Initially, there is an introduction to standard methods such as systematic literature review, design science, qualitative and quantitative data analysis, and more. The seminar topic must be scientifically prepared and presented in 15-20 pages as part of a written elaboration. The seminar results are presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

The foundations of independent scholarly work (literature review, argumentation + discussion, citation of literature sources, application of qualitative, quantitative, and simulation methods) are developed as part of the written elaboration. The competencies acquired in the seminar can be utilized in preparing for a potential master's thesis. Therefore, the seminar is mainly aimed at students who intend to write their thesis at the Chair of Entrepreneurship and Technology Management and wish to gain substantial experience in entrepreneurship research.

Organizational issues
Registration is via the Wiwi-Portal.

Seminar dates will probably be (as announced in Wiwi-Portal):

Wednesday, 29.04.2026, 10.00-16.00
Wednesday, 20.05.2026, 10.00-16.00
Wednesday, 24.06.2026, 09.00-12.00

Literature
Will be announced in the seminar.

T 7.122 Module component: Entrepreneurship Seasonal School [T-WIWI-113151]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Assessment
Alternative exam assessment. The grade is composed of the presentation and the written elaboration. Details on the design of the examination will be announced in the course.

Prerequisites
The Seasonal School is intended for advanced bachelor's and all master's students (all disciplines). Participation in the selection process is a prerequisite.

Recommendations
Basic knowledge of business administration, attendance of the lecture Entrepreneurship as well as openness and interest in intercultural exchange are recommended. Solid knowledge of the English language is an advantage.

Additional Information
Entrepreneurship Seasonal School

Workload
90 hours

T 7.123 Module component: Environmental and Resource Policy [T-WIWI-102616]

Coordinators: Rainer Walz
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2560548	Environmental and Ressource Policy	2 SWS	Lecture / Practice	Walz
Exams					
WT 25/26	7900252	Environmental and Resource Policy			Walz

Assessment
See German version

Recommendations
It is recommended to already have knowledge in the area of industrial organization and economic policy. This knowledge may be acquired in the courses*Introduction to Industrial Organization* [2520371] and*Economic Policy*[2560280].

Below you will find excerpts from courses related to this module component:

V Environmental and Ressource Policy

2560548, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Literature
Weiterführende Literatur:

Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg
OECD: Environmental Performance Review Germany, Paris

T 7.124 Module component: Environmental Communication [T-BGU-101676]

Coordinators: Dr. rer. nat. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4 CP	graded	Each term	1 semesters	2

Courses					
WT 25/26	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
ST 2026	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
Exams					
WT 25/26	8244101676	Environmental Communication			Kämpf

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Non exam assessment (following §4(2), 3 of the examination regulation).

Prerequisites
Examination Prerequisite Environmental Communication must be passend.

Recommendations
None

Additional Information
none

Workload
135 hours

T 7.125 Module component: Environmental Economics and Sustainability [T-WIWI-102615]

Coordinators: Prof. Dr. Rainer Walz
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	2

Courses					
WT 25/26	2521547	Umweltökonomik und Nachhaltigkeit (mit Übung)	2 SWS	Lecture / Practice	Walz
Exams					
WT 25/26	7900250	Environmental Economics and Sustainability			Walz

Assessment
See German version

Prerequisites
None

Recommendations
It is recommended to already have knowledge in the area of macro- and microeconomics. This knowledge may be acquired in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014].

Workload
90 hours

T 7.126 Module component: Environmental Law [T-BGU-111102]

Coordinators: Dr. Ulrich Smeddinck
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	6111177	Environmental Law	2 SWS	Lecture / 🗣	Smeddinck
Exams					
WT 25/26	8262111102_1	Environmental Law			Smeddinck
WT 25/26	8262111102_2	Environmental Law			Smeddinck

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written exam with 120 min

Prerequisites
None

Additional Information
None

Workload
90 hours

T 7.127 Module component: EU Data Protection Law [T-INFO-113887]

Coordinators: Gustavo Gil Gasiola
Organisation: KIT Department of Informatics
Part of: M-INFO-106754 - Public Economic and Technology Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2424019	EU Data Protection Law	2 SWS	Lecture / 🗣	Gil Gasiola
Exams					
WT 25/26	7500378	EU Data Protection Law			Zufall

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is carried out as a written examination (§ 4 Abs. 2 No. 1 SPO) lasting 60 minutes.

Prerequisites
None

Additional Information
Competency Goals:

Students are able to comprehend the EU data protection regulation, including the General Data Protection Regulation and related EU data regulations.

They know the foundations of data protection rules, including fundamental concepts (e.g., “personal data”, “processing”, “data subject”). They are also familiar with the principles of personal data processing (lawfulness, limited purpose, transparency, accountability) as well as the rights of the data subject.

They can identify the main obligations of the controller and the processor.

Students understand the conditions for the transfer of personal data to third countries.

They can identify the other regulations that govern data in the European Union.

Students are able to read and understand legal text related to data regulation.

They can understand and solve simple data protection cases.

Content:

The General Data Protection Regulation (GDPR) of the European Union is a milestone in protecting individuals from the unlawful use of their data. In a data-driven society, economy, and government, this protection has become essential to guarantee fundamental rights. In addition to its direct impact on the legal systems of all Member States, the GDPR has a major influence on third countries that have adopted similar regulations (e.g. Switzerland, Argentina, Brazil, South Africa, and many others). In this way, the EU Data Protection Regulation has established itself as the “gold standard” of data protection, providing guidance to address the challenges posed by new technologies and new ways of creating, using and sharing personal data. Understanding the structure of data protection in the EU is therefore essential to grasp its impact on individual rights, public administration, business models, and even technological development.
This lecture aims to provide a structured overview of the EU Data Protection Regulation, and to offer tools to understand the regulatory structure of the EU Data Regulation. The lecture will cover the following topics:
- Introduction to EU law
- Development of the EU data protection regulation
- Legal structure of data protection in the EU
- Role of national and sectoral laws
- Data protection as fundamental right
- Principles of data protection
- Lawfulness of personal data processing
- Anonymization and pseudonymization of personal data
- Special categories of personal data
- Rights of the data subject
- Transfer of personal data to third countries
- Responsibility of the controller and the processor
- Security of personal data and personal data breach
- Open Data Directive
- Data Governance Act
- Data Act

Workload

- Attendance time to the lectures = 15 x 90 min = 22 h 30 min
- Self-study during the semester = 47 h 30 min
- Preparation for the exam = 20 h
- Total = 90 h

Below you will find excerpts from courses related to this module component:

V **EU Data Protection Law** **Lecture (V)**
2424019, WS 25/26, 2 SWS, Language: English, Open in study portal **On-Site**

Content
The General Data Protection Regulation (GDPR) of the European Union is a milestone in protecting individuals from the unlawful use of their data. In a data-driven society, economy, and government, this protection has become essential to guarantee fundamental rights. In addition to its direct impact on the legal systems of all Member States, the GDPR has a major influence on third countries that have adopted similar regulations (e.g. Switzerland, Argentina, Brazil, South Africa, and many others). In this way, the EU Data Protection Regulation has established itself as the "gold standard" of data protection, providing guidance to address the challenges posed by new technologies and new ways of creating, using and sharing personal data. Understanding the structure of data protection in the EU is therefore essential to grasp its impact on individual rights, public administration, business models, and even technological development.

This lecture aims to provide a structured overview of the EU Data Protection Regulation, and to offer tools to understand the regulatory structure of the EU Data Regulation. The lecture will cover the following topics:

- Introduction to EU law
- Development of the EU data protection regulation
- Legal structure of data protection in the EU
- Role of national and sectoral laws
- Data protection as fundamental right
- Principles of data protection
- Lawfulness of personal data processing
- Anonymization and pseudonymization of personal data
- Special categories of personal data
- Rights of the data subject
- Transfer of personal data to third countries
- Responsibility of the controller and the processor
- Security of personal data and personal data breach
- Open Data Directive
- Data Governance Act
- Data Act

Organizational issues
Winter term 2025/26:

IMPORTANT

The sessions on 29.10., 5.11. and 12.11. will take place online via Zoom. All other sessions will take place in person in Seminar Room Nr. 303 at Vincenz-Prießnitz-Straße 3, in Karlsruhe.
Zoom link: https://kit-lecture.zoom-x.de/j/63132854819?pwd=6kyXgfIG7H2SNwLX4qyerDasd56C5L.1

Wintersemester 2025/26:

WICHTIG

Die Sitzungen am 29.10., 5.11. und 12.11. finden online über Zoom statt. Alle anderen Sitzungen finden persönlich im Seminarraum Nr. 303 in der Vincenz-Prießnitz-Straße 3 in Karlsruhe statt.

Zoomlink: https://kit-lecture.zoom-x.de/j/63132854819?pwd=6kyXgfIG7H2SNwLX4qyerDasd56C5L.1

T 7.128 Module component: European and International Law [T-INFO-101312]

Coordinators: Ulf Brühann
Organisation: KIT Department of Informatics
Part of: M-INFO-106754 - Public Economic and Technology Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	24666	Europäisches und Internationales Recht	2 SWS	Lecture / 🗣	Brühann
Exams					
WT 25/26	7500048	European and International Law			Zufall
ST 2026	7500084	European and International Law			Zufall

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from courses related to this module component:

V Europäisches und Internationales Recht

24666, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course will be held in German.

The total workload for this course unit is 90 hours for 3 credit points, of which 22.5 hours are spent in attendance.

Organizational issues
Die drei folgenden Blockveranstaltungen finden jeweils im Seminarraum Nr. 313 (Geb. 07.08) statt:

- *Montag, den 27.04.2026, 09:30 - 17:00 (Mittagspause wird flexibel gehalten);*
- *Montag, den 01.06.2026, 09:30 - 17:00 (Mittagspause wird flexibel gehalten);*
- *Montag, den 29.06.2026, 09:30 - 17:00 Uhr (Mittagspause wird flexibel gehalten.*

(Stand per 13.11.2025)

Literature
Literatur wird in der Vorlesung angegeben.

Weiterführende Literatur

Erweiterte Literaturangaben werden in der Vorlesung bekannt gegeben.

T 7.129 Module component: Examination Prerequisite Environmental Communication [T-BGU-106620]

Coordinators: Dr. rer. nat. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	0 CP	pass/fail	Each term	1 semesters	1

Courses					
WT 25/26	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
ST 2026	6224905	Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
Exams					
WT 25/26	8244106620	Examination Prerequisite Environmental Communication			Kämpf

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
2 literature annotations, appr. 150 words each, and short presentation, appr. 10 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
45 hours

T 7.130 Module component: Exercise Transportation Data Analysis [T-BGU-113971]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	0 CP	pass/fail	Each summer term	1 semesters	1

Courses					
ST 2026	6232802	Traffic Management and Telematics	2 SWS	Lecture / Practice /	Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
programming exercise with Python

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
10 hours

T 7.131 Module component: Exercise Transportation Data Analysis [T-BGU-113671]

Coordinators: Prof. Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	0 CP	pass/fail	Each winter term	1 semesters	1

Courses					
WT 25/26	6232901	Empirical Data in Transportation	2 SWS	Lecture / Practice / 🗣	Kagerbauer
Exams					
WT 25/26	8245113671	Exercise Transportation Data Analysis			Kagerbauer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Exercise to qualitative and quantitative analyses of travel surveys, appr. 2 pages

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
10 hours

T 7.132 Module component: Exercises: Membrane Technologies [T-CIWVT-113235]

Coordinators: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading	Term offered	Version
Coursework	1 CP	pass/fail	Each summer term	1

Courses					
ST 2026	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice /	Horn, Saravia, und Mitarbeitende
Exams					
ST 2026	7233011	Exercises for Membrane Technologies			Horn, Saravia

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Learning control is a completed coursework: Submission of exercises, membrane design and short presentation (5 minutes, group work).

T 7.133 Module component: Experimental Research in Economics and Information Systems [T-WIWI-115061]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101505 - Experimental Economics
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2540489	Experimental Economics	2 SWS	Lecture / 🗣	Knierim
WT 25/26	2540493	Übung zu Experimental Economics	1 SWS	Practice / 🗣	del Puppo

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (60 min).

Prerequisites
None

Additional Information
The language of the course is English.

Below you will find excerpts from courses related to this module component:

V Experimental Economics

2540489, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2. Aufl. 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

T 7.134 Module component: Extraordinary Additional Course in the Module Cross-Functional Management Accounting [T-WIWI-108651]

Coordinators: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each term	1

Assessment
The assessment depends on which extraordinary course becomes part of the module "Cross-Functional Management Accounting".

.

Prerequisites
None

Additional Information
The pupose of this placeholder is to make it possible zu include an extraordinary course in the module "Cross-Functional Management Accounting". Proposals for specific courses have to be approved in advance by the module coordinator.

T 7.135 Module component: Extrusion Technology in Food Processing [T-CIWVT-112174]

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101119 - Specialization in Food Process Engineering
M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2211310	Extrusion Technology in Food Processing	2 SWS	Block / 🗣	Emin
Exams					
WT 25/26	7211310	Extrusion Technology in Food Processing			Emin
ST 2026	7211310	Extrusion Technology in Food Processing			Emin

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an oral exam lasting about 20 minutes.

Prerequisites
None.

T 7.136 Module component: Fabrication Processes in Microsystem Technology [T-MACH-102166]

Coordinators: Dr. Klaus Bade
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each term	1

Courses					
WT 25/26	2143882	Fabrication Processes in Microsystem Technology	2 SWS	Lecture /	Bade
Exams					
WT 25/26	76-T-MACH-102166	Fabrication Processes in Microsystem Technology			Bade

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Oral examination, 20 minutes

Prerequisites
none

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Fabrication Processes in Microsystem Technology

2143882, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature

M. Madou
Fundamentals of Microfabrication
CRC Press, Boca Raton, 1997

W. Menz, J. Mohr, O. Paul
Mikrosystemtechnik für Ingenieure
Dritte Auflage, Wiley-VCH, Weinheim 2005

L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
2nd Edition, ACS, Washington DC, 1994

T 7.137 Module component: Facility and Real Estate Management II [T-BGU-111212]

Coordinators: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105592 - Digitalization in Facility Management
M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	1,5 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6242909	Facility and Real Estate Management II	1 SWS	Lecture / 🗣	Lennerts, Mitarbeiter/innen
Exams					
WT 25/26	8240111212	Facility and Real Estate Management II			Lennerts, Schmidt-Bäumler

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
45 hours

T 7.138 Module component: Facility Management in Hospitals [T-BGU-108004]

Coordinators: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	6 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	6242905	Facility Management in Hospitals	4 SWS	Lecture / Practice / 🗣	Lennerts, Faeghinezhad, Mitarbeiter/innen
Exams					
WT 25/26	8240108004	Facility Management in Hospitals			Lennerts, Schmidt-Bäumler

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
term paper appr. 10 pages, with final presentation appr. 10 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
180 hours

T 7.139 Module component: Financial Analysis [T-WIWI-102900]

Coordinators: Dr. Torsten Luedecke
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2530205	Financial Analysis	2 SWS	Lecture / 🗣	Luedecke
ST 2026	2530206	Übungen zu Financial Analysis	2 SWS	Practice / 🗣	Luedecke
Exams					
WT 25/26	7900059	Financial Analysis			Ruckes, Luedecke
ST 2026	7900075	Financial Analysis			Luedecke

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
See German version.

Prerequisites
None

Recommendations
Basic knowledge in corporate finance, accounting, and valuation is required.

Below you will find excerpts from courses related to this module component:

V Financial Analysis

2530205, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

T 7.140 Module component: Financial Econometrics [T-WIWI-103064]

Coordinators: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2520022	Financial Econometrics I	2 SWS	Lecture / 🗣	Schienle
WT 25/26	2520023	Übungen zu Financial Econometrics I	2 SWS	Practice / 🗣	Buse
Exams					
WT 25/26	7900126	Financial Econometrics			Schienle
ST 2026	7900223	Financial Econometrics			Schienle

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendations
It is recommended that students have substantive knowledge of the course “Economics III: Introduction to Econometrics”.

Additional Information
The course will be held in English.

Below you will find excerpts from courses related to this module component:

V Financial Econometrics I

2520022, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives:

The student

- shows a broad knowledge of fincancial econometric estimation and testing techniques
- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

Content:

ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

Requirements:

It is recommended to attend the course *Economics III: Introduction to Econometrics* [2520016] prior to this course.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Literature

Taylor, S. J. (2005): "Asset Price Dynamics, Volatility, and Prediction", Princeton University Press.

Tsay, R. S. (2005): "Analysis of Financial Time Series: Financial Econometrics", Wiley, 2nd edition.

Cochrane, J. H. (2005): "Asset Pricing", revised edition, Princeton University Press.

Campbell, J. Y., A. W. Lo, and A. C. MacKinlay (1997): "The Econometrics of Financial Markets", Princeton University Press.

Hamilton, J. D. (1994): "Time Series Analysis", Princeton University Press.

Additional literature will be discussed in the lecture.

T 7.141 Module component: Financial Econometrics II [T-WIWI-110939]

Coordinators: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	3

Courses					
ST 2026	2521302	Financial Econometrics II	2 SWS	Lecture / 🗣	Schienle, Buse
ST 2026	2521303	Übung zu Financial Econometrics II	2 SWS	Practice / 🗣	Buse, Schienle
Exams					
ST 2026	7900081	Financial Econometrics II			Schienle

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written examination (90 minutes). If the number of participants is low, an oral examination will be held instead.

Prerequisites
None

Recommendations
It is recommended that students have substantive knowledge of the course **"Financial Econometrics."**

Additional Information
The course will be held in English.

Workload
135 hours

T 7.142 Module component: Financial Intermediation [T-WIWI-102623]

Coordinators: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2530232	Financial Intermediation	2 SWS	Lecture / 🗣	Ruckes
WT 25/26	2530233	Übung zu Finanzintermediation	1 SWS	Practice	Ruckes, Benz
Exams					
WT 25/26	7900063	Financial Intermediation			Ruckes
ST 2026	7900078	Financial Intermediation			Ruckes

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Financial Intermediation

2530232, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Terminankündigungen des Instituts beachten

Literature
Weiterführende Literatur:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

T 7.143 Module component: Food Chemistry Basics [T-CHEMBIO-109442]

Coordinators: Prof. Dr. Mirko Bunzel
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each summer term	3

Courses					
ST 2026	6601	Grundlagen der Lebensmittelchemie I	2 SWS	Lecture / 🗣	Bunzel
Exams					
WT 25/26	71109442	Food Chemistry Basics			Bunzel
ST 2026	71109442	Food Chemistry Basics			Bunzel

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 7.144 Module component: Food Science and Functionality [T-CIWVT-111535]

Coordinators: Prof. Dr. Bernhard Watzl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each winter term	1

Assessment
The examination is an oral examination with a duration of about 30 minutes (section 4 subsection 2 number 2 SPO).

Prerequisites
None

T 7.145 Module component: Food Science and Functionality [T-CIWVT-108801]

Coordinators: Dr. Stephanie Seifert
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
Learning control is an oral examination lasting approx. 30 minutes.

Prerequisites
None

T 7.146 Module component: Freight Transport [T-BGU-106611]

Coordinators: Dr. Eckhard Szimba
Prof. Dr.-Ing. Peter Vortisch

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	2

Courses					
ST 2026	6232809	Freight Transport	2 SWS	Lecture / Practice / 🗣	Szimba
Exams					
WT 25/26	8245106611	Freight Transport			Vortisch

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.147 Module component: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Coordinators: Hon.-Prof. Dr. Bernhard Ulrich Kehrwald
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2133108	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture / 🗣	Kehrwald
Exams					
WT 25/26	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald
ST 2026	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald

Legend: 💻 Online, 🌍 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral examination, Duration: ca. 25 min., no auxiliary means

Prerequisites
none

Additional Information
The course is offered in German.

Below you will find excerpts from courses related to this module component:

V **Fuels and Lubricants for Combustion Engines** — Lecture (V) On-Site
2133108, WS 25/26, 2 SWS, Language: German, Open in study portal

Literature
Skript

T 7.148 Module component: Fundamentals for Financial -Quant and -Machine Learning Research [T-WIWI-111846]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105894 - Foundations for Advanced Financial -Quant and -Machine Learning Research

Type	Credits	Grading	Term offered	Version
Examination of another type	9 CP	graded	Irregular	1

Assessment
The examination is an alternative exam assessment with a maximum score of 100 points to be achieved. These points are distributed over 4 worksheets to be submitted during the semester. The worksheets cover the respective material of the module and are handed out, worked on and assessed in lecture weeks 3 (10 points), 6 (20 points), 9 (30 points) and 12 (40 points).

The module-wide exam (all 4 worksheets) must be taken in the same semester.

The worksheets are a mixture of analytical tasks and programming tasks with financial data.

Recommendations

- Strongly recommended to have good knowledge in financial econometrics (MLE, OLS, GLS, ARMA-GARCH), mathematics (differential equations, difference equations and optimization), investments (CAPM, factor models), asset pricing (SDF, SDF pricing), derivatives (Black-Scholes, risk-neutral pricing), and programming of statistical concepts (Java or R or Python or Matlab or C or ...)
- Strongly recommended to have a strong interest for interdisciplinary research work in statistics, programming, applied math and financial economics.
- Students lacking the prior knowledge might find the resources of the Chair helpful: www.youtube.com/c/cram-kit.

Additional Information
Teaching and learning format: Lecture and exercise.

Workload
270 hours

T 7.149 Module component: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Coordinators: Prof. Dr. Olaf Deutschmann
Prof. Dr. Jan-Dierk Grunwaldt
Dr.-Ing. Heiko Kubach
Hon.-Prof. Dr. Egbert Lox

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture / 🗣	Lox, Grunwaldt, Deutschmann
Exams					
ST 2026	76-T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment			Lox

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral examination, Duration approx. 25 min., no auxiliary means

Prerequisites
none

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Fundamentals of catalytic exhaust gas aftertreatment

2134138, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Wenn Sie beabsichtigen, an der Vorlesung teilzunehmen, melden Sie sich bitte unter info@ifkm.kit.edu mit dem Betreff "Anmeldung Vorlesung Lox" an. Das hilft uns bei der Planung. Der Dozent hat eine sehr weite Anreise und wir möchten verhindern, dass die Mindestteilnehmerzahl nicht erreicht wird.

T 7.150 Module component: Fundamentals of National and International Group Taxation [T-WIWI-111304]

Coordinators: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2560133	Fundamentals of National and International Group Taxation	3 SWS	Lecture / 🗣	Wigger, Gutekunst
Exams					
WT 25/26	790kobe	Fundamentals of National and International Group Taxation			Wigger
ST 2026	790kobe	Fundamentals of National and International Group Taxation			Wigger

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written (90 min.) examination (in accordance with §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Recommendations
It is recommended to attend the course “Basics of German Company Tax Law and Tax Planning” beforehand.

Workload
135 hours

T 7.151 Module component: Fundamentals of Water Quality [T-CIWVT-106838]

Coordinators: Dr. Michael Wagner
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading	Term offered	Version
Oral examination	6 CP	graded	Each winter term	2

Courses					
WT 25/26	2233230	Fundamentals of Water Quality	2 SWS	Lecture / 🗣	Horn, Wagner
WT 25/26	2233231	Fundamentals of Water Quality - Exercises	1 SWS	Practice / 🗣	Wagner, und Mitarbeitende
Exams					
WT 25/26	7233230	Fundamentals of Water Quality			Wagner

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control ist an oral exam lasting approx. 20 minutes.

Prerequisites
None.

T 7.152 Module component: Gear Cutting Technology [T-MACH-102148]

Coordinators: Hon.-Prof. Dr. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2149655	Gear Technology	2 SWS	Lecture / 🗣	Klaiber
Exams					
WT 25/26	76-T-MACH-102148	Gear Technology			Klaiber

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral Exam (20 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Gear Technology** — Lecture (V) On-Site
2149655, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
Based on the gearing theory, manufacturing processes and machine technologies for producing gearings, the needs of modern gear manufacturing will be discussed in the lecture. For this purpose, various processes for various gear types are taught which represent the state of the art in practice today. A classification in soft and hard machining and furthermore in cutting and non-cutting technologies will be made. For comprehensive understanding the processes, machine technologies, tools and applications of the manufacturing of gearings will be introduced and the current developments presented. For assessment and classification of the applications and the performance of the technologies, the methods of mass production and manufacturing defects will be discussed. Sample parts, reports from current developments in the field of research and an excursion to a gear manufacturing company round out the lecture.

Learning Outcomes:

The students …

- can describe the basic terms of gearings and are able to explain the imparted basics of the gearwheel and gearing theory.
- are able to specify the different manufacturing processes and machine technologies for producing gearings. Furthermore they are able to explain the functional principles and the dis-/advantages of these manufacturing processes.
- can apply the basics of the gearing theory and manufacturing processes on new problems.
- are able to read and interpret measuring records for gearings. are able to make an appropriate selection of a process based on a given application
- can describe the entire process chain for the production of toothed components and their respective influence on the resulting workpiece properties.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.153 Module component: Global Logistics [T-MACH-115017]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-101282 - Global Production and Logistics
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	2

Courses					
ST 2026	2149600	Global Logistics	2 SWS	Lecture / 🗣	Furmans
Exams					
ST 2026	76-T-MACH-115017	Global Logistics			Furmans

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Global Logistics** — **Lecture (V) On-Site**
2149600, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Content:

Characteristics of global trade

- Incoterms
- Customs clearance, documents and export control

Global transport and shipping

- Maritime transport, esp. container handling
- Air transport

Modeling of supply chains

- SCOR model
- Value stream analysis

Location planning in cross-border-networks

- Application of the Warehouse Location Problem
- Transport Planning

Inventory Management in global supply chains

- Stock keeping policies
- Inventory management considering lead time and shipping costs

Media:

presentations, black board

Workload:

regular attendance: 21 hours
self-study: 99 hours

Students are able to:

- assign basic problems of planning and operation of global supply chains and plan them with apropriate methods,
- describe requirements and characteristics of global trade and transport, and
- evaluate characteristics of the design from logistic chains regarding their suitability.

Exam:

The exam consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The main exam is offered every summer semester. A second date for the exam is offered in winter semester only for students that did not pass the main exam.

Literature
Weiterführende Literatur:

- Arnold/Isermann/Kuhn/Tempelmeier. HandbuchLogistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren,Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, OldenbourgVerlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Neumann-Morlock. Operations-Research,Hanser-Verlag, 1993
- Tempelmeier. Bestandsmanagement in SupplyChains, Books on Demand 2006
- Schönsleben. IntegralesLogistikmanagement, Springer, 1998

T 7.154 Module component: Global Manufacturing [T-WIWI-112103]

Coordinators: Dr. Henning Sasse
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2581956	Global Manufacturing	2 SWS	Lecture /	Sasse
Exams					
WT 25/26	7981956	Global Manufacturing			Schultmann
ST 2026	7981956	Global Manufacturing			Schultmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Workload
105 hours

Below you will find excerpts from courses related to this module component:

V Global Manufacturing

2581956, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

Organizational issues
Blockveranstaltung, siehe Homepage

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.155 Module component: Global Optimization I [T-WIWI-102726]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
Exams					
WT 25/26	7900004_WS2526_NK	Global Optimization I			Stein
ST 2026	7900205_SS2026_HK	Global Optimization I			Stein

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is in the form of a written examination in English (60 min.) (according to § 4(2), 1 SPO). The successful completion of the exercises is required for admission to the written exam.

The exam is offered in the lecture of semester and the following semester.

The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

Prerequisites
None

Recommendations
None

Additional Information
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from courses related to this module component:

V **Global Optimization I** — **Lecture (V) On-Site**
2550134, SS 2026, 2 SWS, Language: English, Open in study portal

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature
O. Stein, Basic Concepts of Global Optimization, Springer, 2024

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.156 Module component: Global Optimization I and II [T-WIWI-103638]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	9 CP	graded	Each summer term	1

Courses					
ST 2026	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
ST 2026	2550135	Exercise to Global Optimization I	1 SWS	Practice / 🗣	Stein, Beck
ST 2026	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 25/26	7900006_WS2526_NK	Global Optimization I and II			Stein
ST 2026	7900207_SS2026_HK	Global Optimization I and II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of the lecture is a written examination in English (120 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendations
None

Additional Information
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from courses related to this module component:

V **Global Optimization I** — **Lecture (V) On-Site**
2550134, SS 2026, 2 SWS, Language: English, Open in study portal

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature
O. Stein, Basic Concepts of Global Optimization, Springer, 2024

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

V

Global Optimization II

2550136, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature
O. Stein, Basic Concepts of Global Optimization, Springer, 2024

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.157 Module component: Global Optimization II [T-WIWI-102727]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
ST 2026	2550137	Exercise to Global Optimization II	1 SWS	Practice / 🗣	Stein, Beck
Exams					
WT 25/26	7900005_WS2526_NK	Global Optimization II			Stein
ST 2026	7900206_SS2026_HK	Global Optimization II			Stein

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of the lecture is a written examination in English (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Additional Information
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from courses related to this module component:

V **Global Optimization II** — **Lecture (V) On-Site**
2550136, SS 2026, 2 SWS, Language: English, Open in study portal

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature
O. Stein, Basic Concepts of Global Optimization, Springer, 2024

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.158 Module component: Global Production [T-MACH-114800]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each winter term	1

Courses					
WT 25/26	2149613	Global Production	2 SWS	Lecture /	Lanza
Exams					
WT 25/26	76- T-MACH-114800-WING	Global Production			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Written Exam (60 min)

A grade bonus can be earned for successful participation in online case studies. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the course.

Prerequisites
T-MACH-108848 - Globale Produktion und Logistik - Teil 1: Globale Produktion must not be commenced.
T-MACH-105158 - Globale Produktion und Logistik - Teil 1: Globale Produktion must not be commenced.
T-MACH-110337 - Globale Produktion und Logistik must not be commenced.

Additional Information
The course is offered in English.

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V **Global Production**
2149613, WS 25/26, 2 SWS, Language: English, Open in study portal
Lecture (V)
Blended (On-Site/Online)

Content
The course examines the planning, design and operation of global production networks of manufacturing companies. It gives an overview of the influencing factors and challenges of global production. In-depth knowledge of common methods and procedures for planning, designing and managing global production networks is imparted.

Therefore, the lecture first of all discusses the connections and interdependencies between the business strategy and the production strategy and illustrates necessary tasks for the definition of a production strategy. Methods for site selection, for the site-specific adaptation of product design and production technology as well as for the establishment of new production sites and for the adaptation of existing production networks to changing framework conditions are subsequently taught within the context of the design of the network footprint. With regard to the management of global production networks, the lecture addresses challenges associated with coordination, procurement and order management in global networks.

The lecture is complemented by an exercise that discusses the use of Industry 4.0 applications in the context of global production as well as current trends with regard to the planning, design and management of global production networks. The exercise is not relevant for Mechanical Engineering

The topics include:

- Basic conditions and influencing factors of global production (historical development, targets, chances and threats)
- Framework for planning, designing and managing global production networks
- Production strategies for global production networks
    - From business strategy to production strategy
    - Tasks of the production strategy (product portfolio management, circular economy, planning of production depth, production-related research and development)
- Design of global production networks
    - Basic types of network structures
    - Planning process for the design of the network footprint
    - Adaptation of the network footprint
    - Site selection
    - Location-specific adaptation of production technology and product design
- Management of global production networks
    - Network coordination
    - Procurement process
    - Order management

Exercise contents only for WiWis:
Exercise for Global Production coverring topics with respect to trends in resilience, sustainability and digitalisation in global production networks.

Learning Outcomes:

The students …

- can explain the challenges and enablers of global production networks and evaluate methods for decision support.
- are able to explain factors influencing decision-making in the design and operation of a global production network.
- are able to distinguish between corporate and business unit strategy as well as forms of growth and outsourcing.
- can explain the objectives of production and production network strategies as well as the ideal-typical forms of strategy
- are able to identify ideal-typical network structures of global production networks.
- can apply a network adjustment, taking into account the relevant aspects.
- can systematically analyse, evaluate and select new locations in the global production network.
- are able to apply challenges and solutions for location-specific manufacturing technology and product design.
- can evaluate the suitability of different forms of co-location of R&D and site roles for the sites in a production network.
- are able to explain the role distribution of sites, the management of external suppliers, order processing and demand planning in global production networks.

Workload MACH:
regular attendance: 21 hours
self-study: 99 hours

Workload WiWi:
regular attendance: 26 hours
self-study: 124 hours

Recommendations:
Combination with Strategic Decision-Making in Global Production Network Design: A Seminar on Optimisation and Simulation (76-T-MACH-113372) is recommended.

Literature
Medien
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt

empfohlene Sekundärliteratur:
Abele, E. et al: Handbuch Globale Produktion, Hanser Fachbuchverlag, 2006 (deutsch)

Media
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

recommended secondary literature:
Abele, E. et al: Global Production – A Handbook for Strategy and Implementation, Springer 2008 (english)

T 7.159 Module component: Graph Theory and Advanced Location Models [T-WIWI-102723]

Coordinators: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	2

Courses					
ST 2026	2500033	Exercises for Graph Theory and Advanced Location Models	1.5 SWS	Practice / 🏘	Hoffmann
ST 2026	2500050	Graph Theory and Advanced Location Models	3 SWS	Lecture / 🗣	Nickel
Exams					
ST 2026	7900209	Graph Theory and Advanced Location Models			Nickel

Legend: 🖥 Online, 🏘 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of the course (lecture and exercise) is a 60-minute written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendations
It is recommended that students have knowledge of Operations Research, such as that taught in the course "Introduction to Operations Research".

Additional Information
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 7.160 Module component: Growth and Development [T-WIWI-112816]

Coordinators: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-107010 - Economics in a Connected World
M-WIWI-107011 - Economics of Innovation and Growth

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2561503	Growth and Development	2 SWS	Lecture / 🗣	Ott
WT 25/26	2561504	Exercise for Growth and Development	1 SWS	Practice / 🗣	Ott, Ghoniem
Exams					
WT 25/26	7900078	Growth and Development			Ott
ST 2026	7900105	Growth and Development			Ott

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (60 minutes). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Recommendations
It is recommended that students have basic micro- and macro-economic knowledge, as taught for example in the courses **Economics I** and **Economics II**. In addition, it is recommended that they have an interest in quantitative-mathematical modelling.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Growth and Development** — **Lecture (V) On-Site**
2561503, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
This course is intended as an introduction to the field of advanced macroeconomics with a special focus on economic growth. Lectures aim to deal with the theoretical foundations of exogenous and endogenous growth models. The importance of growth for nations and discussion of some (well-known) growth theories together with the role of innovation, human capital and environment will therefore be primary focuses of this course.

Learning objective:

Students shall be given the ability to understand, analyze and evaluate selected models of endogenous growth theory.

Course content:

- Intertemporal consumption decision
- Growth models with exogenous saving rates: Solow
- Growth models with endogenous saving rates: Ramsey
- Growth and environmental resources
- Basic models of endogenous growth
- Human capital and economic growth
- Modelling of technological progress
- Diversity Models
- Schumpeterian growth
- Directional technological progress
- Diffusion of technologies

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Exam description:

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Literature
Auszug:

- Acemoglu, D. (2009): Introduction to modern economic growth. Princeton University Press, New Jersey.
- Aghion, P., Howitt, P. (2009): Economics of growth, MIT-Press, Cambridge/MA.
- Barro, R.J., Sala-I-Martin, X. (2003): Economic Growth. MIT-Press, Cambridge/MA.
- Sydsaeter, K., Hammond, P. (2008): Essential mathematics for economic analysis. Prentice Hall International, Harlow.
- Sydsæter, K., Hammond, P., Seierstad, A., Strom, A., (2008): Further Mathematics for Economic Analysis, Second Edition, Pearson Education Limited, Essex.

T 7.161 Module component: Heat Economy [T-WIWI-102695]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each summer term	2

Courses					
ST 2026	2581001	Heat Economy	2 SWS	Lecture / 🗣	Fichtner
Exams					
WT 25/26	7981001	Heat Economy			Fichtner
ST 2026	7981001	Heat Economy			Fichtner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written (60 minutes) or oral exam (30 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendations
None

Additional Information
See German version.

Below you will find excerpts from courses related to this module component:

V **Heat Economy** — **Lecture (V) On-Site**
2581001, SS 2026, 2 SWS, Language: German, Open in study portal

Organizational issues
Block, Seminarraum Standort West - siehe Institutsaushang

T 7.162 Module component: High-Voltage Technology [T-ETIT-110266]

Coordinators: Prof. Dr.-Ing. Thomas Leibfried
Dr.-Ing. Michael Suriyah

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-ETIT-101163 - High-Voltage Technology

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	6 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2307360	High-Voltage Technology	2 SWS	Lecture / 🗣	Suriyah
WT 25/26	2307362	Tutorial for 2307362High-Voltage Technology	2 SWS	Practice / 🗣	Badent, Wöhr
Exams					
WT 25/26	73730360	High-Voltage Technology			Badent

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success conraol takes place in the form of a written examination lasting 120 minutes.

Prerequisites
none

T 7.163 Module component: High-Voltage Test Technique [T-ETIT-101915]

Coordinators: Dr.-Ing. Rainer Badent
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101164 - Generation and Transmission of Renewable Power

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2307392	High-Voltage Test Technique	2 SWS	Lecture / 🗣	Badent
WT 25/26	2307394	Tutorial for 2307392 High-Voltage Test Technique	2 SWS	Practice / 🗣	Braun
Exams					
WT 25/26	7307392	High-Voltage Test Technique			Badent
ST 2026	7307392	High-Voltage Test Technique			Badent

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in an overall oral examination (approx. 20 minutes) on the selected course.

Prerequisites
none

Recommendations
High voltage technology

T 7.164 Module component: Human Factors in Autonomous Driving [T-WIWI-113059]

Coordinators: Prof. Dr. Alexey Vinel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2511452	Human Factors in Autonomous Driving	2 SWS	Lecture /	Vinel, Bied, Schrapel
WT 25/26	2511453	Exercises Human Factors in Autonomous Driving	1 SWS	Practice /	Vinel, Bied, Schrapel
Exams					
WT 25/26	79AIFB_HFAD_C6	Human Factors in Autonomous Driving (Registration extended until 16.02.2026)			Vinel
ST 2026	791-AIFB-HFAD-NK	Human Factors in Autonomous Driving (registration until 20.07.2026)			Vinel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment of this course is a written examination (60 min) or an oral exam (approx. 20 min).

The exam takes place every semester and can be repeated at every regular examination date.

Workload
135 hours

T 7.165 Module component: Human Factors in Security and Privacy [T-WIWI-109270]

Coordinators: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	3

Assessment
The assessment of this course (lecture and exercise) is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation. Only those who have successfully participated in the exercises and the lecture will be admitted to the examination.

Prerequisites
Both need to be done:

- Pass Quiz on Paper for Graphical Passwords
- Presentation of Results Exercise 2

+ 9 of the following 11 need to be done:

- Submit ILIAS certificate until Oct 24
- Pass Quiz on InfoSec Lecture
- Active participation exercise 1 Part 1 - Evaluation and analyses methods
- Pass Quiz Paper Discussion 1 - User Behaviour and motivation theories
- Active participation exercise 1 Part 2
- Pass Quiz Paper Discussion 2 - User Behaviour and motivation theories
- Pass Quiz Paper Discussion 3 - Security Awareness
- Active participation exercise 1 Part 3
- Pass Quiz Paper Discussion 4 - Graphical Authentication
- Pass Quiz Paper Discussion 5 - Shoulder Surfing Authentication
- Active participation exercise 2

Recommendations
The prior attendance of the lecture "Information Security" is strongly recommended.

Additional Information
Please note: This course is only offered irregularly.

The lecture units are held partly in German and partly in English.

Workload
135 hours

T 7.166 Module component: Hydrogen and reFuels - Energy Conversion in Combustion Engines [T-MACH-111585]

Coordinators: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2134155	Hydrogen and reFuels - Energy Conversion in Combustion Engines	3 SWS	Lecture / Practice / 🗣	Koch
Exams					
WT 25/26	76-T-MACH-111585	Hydrogen and reFuels - Energy Conversion in Combustion Engines			Kubach, Koch
ST 2026	76-T-MACH-105564	Hydrogen and reFuels - Energy Conversion in Combustion Engines			Koch

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 25 minutes, no auxillary means

Prerequisites
T-MACH-113979 must not have been started.

Workload
120 hours

T 7.167 Module component: Ignition Systems [T-MACH-105985]

Coordinators: Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Version
Oral examination	4 CP	graded	1

Courses					
WT 25/26	2133125	Ignition systems	3 SWS	Lecture / 🗣	Toedter
Exams					
WT 25/26	76-T-MACH-105985	Ignition systems			Koch
ST 2026	76-T-MACH-105985	Ignition systems			Toedter

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, 20 min

Prerequisites
none

Additional Information
This course is offered in German.

Workload
120 hours

T 7.168 Module component: Incentives in Organizations [T-WIWI-105781]

Coordinators: Prof. Dr. Petra Nieken
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101505 - Experimental Economics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2573003	Incentives in Organizations	2 SWS	Lecture / 🗣	Nieken
ST 2026	2573004	Übung zu Incentives in Organizations	2 SWS	Practice / 🗣	Nieken, Mitarbeiter, Gorny
Exams					
WT 25/26	7900201	Incentives in Organizations			Nieken
ST 2026	7900132	Incentives in Organizations			Nieken

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (60 min). The exam takesplace in every semester. Re-examinations are offered at every ordinaryexamination date. In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendations
It is recommended that students have knowledge in microeconomics, game theory, and statistics.

Below you will find excerpts from courses related to this module component:

V Incentives in Organizations

2573003, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Aim

The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics.
- understands how econometric methods can be used to analyze performance and compensation data.
- knows incentive schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical data from companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Workload

The total workload for this course is: approximately 135 hours.

Lecture: 32 hours

Preparation of lecture: 52 hours

Exam preparation: 51 hours

Literature

Slides, Additional case studies and research papers will be announced in the lecture.

Literature (complementary):

Managerial Economics and Organizantional Architecture, Brickley / Smith / Zimmerman, McGraw-Hill Education, 2015

Behavioral Game Theory, Camerer, Russel Sage Foundation, 2003

Personnel Economics in Practice, Lazear / Gibbs, Wiley, 2014

Introduction to Econometrics, Wooldridge, Andover, 2014

Econometric Analysis of Cross Section and Panel Data, Wooldridge, MIT Press, 2010

T 7.169 Module component: Industrial Mobile Robotics Lab [T-MACH-113701]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Coursework	4 CP	pass/fail	Each term	3

Courses					
WT 25/26	2117073	Industrial Mobile Robotics Lab	2 SWS	Practical course / 🗣	Furmans
ST 2026	2117073	Industrial Mobile Robotics Lab	3 SWS	Practical course / 🗣	Furmans
Exams					
WT 25/26	76-T-MACH-113701	Industrial Mobile Robotics Lab			Furmans
ST 2026	76-T-MACH-113701	Industrial Mobile Robotics Lab			Furmans

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Certificate through colloquium with presentation, documentation of the work results and fulfilment of the attendance requirement.

Prerequisites
T-MACH-105230 must not be started.

Recommendations
Basic knowledge of Python programming and basic knowledge of technical logistics of advantage.

Additional Information
The number of participants is limited to 15 students.
The selection procedure is based on a letter of motivation in which the following questions should be answered:

Why do you want to attend the course?
What skills and previous knowledge do you have?
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Industrial Mobile Robotics Lab

2117073, WS 25/26, 2 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
Mobile robots have become a standard in the industry, especially in the field of intralogistics. This course is designed to teach students how to operate and control mobile robotic systems. This course will give students a valuable practical experience in this area.

For self-study, videos on the various relevant topics will be made available before the start of the course. After, the students will work on implementing a robot control and fleet management system. A simulation environment will also be provided for the development process, allowing testing without hardware in the early phases of the project. The implementation will be based on a standardized communication interface - the VDA 5050 - which enables a uniform data exchange between the system participants. A Kickoff event, several Milestones and a final live demonstration of the impleemeted solution will give the students the needed input and feedback as well a a chance to present their devloped concepts.

Organizational issues
During the course, students will initially work independently on the assignment and then in teams. Regular consultation hours and additional input sessions will be offered. Progress will be presented in two interim milestones.

The number of participants is limited. Selection will be based on an application process. Applications can be submitted via the following link: https://plus.campus.kit.edu/signmeup/procedures/4859. Applications should include previous experience and motivation for the internship.

Basic programming skills in Python are required.

The course language is English.

Planned time frame for the course:
Start: November 5, 2025 - End: December 17, 2025

For questions please refer to pietro.schumacher@kit.edu.

Literature
VDA 5050: https://www.vda.de/en/topics/automotive-industry/vda-5050

V

Industrial Mobile Robotics Lab

2117073, SS 2026, 3 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
Mobile robots have become a standard in the industry, especially in the field of intralogistics. This course is designed to teach students how to operate and control mobile robotic systems. This course will give students a valuable practical experience in this area. For self-study, videos on the various relevant topics will be made available before the start of the course. After, the students will work on implementing a robot control and fleet management system. A simulation environment will be provided for the development process, allowing testing without hardware in the early phases of the project. The implementation will be based on a standardized communication interface - the VDA 5050 - which enables a uniform data exchange between the system participants. An online and offline kickoff event, two milestones, consultation hours and a final live demonstration of the implemeted solution will give the students the needed input and feedback as well the chance to present their devloped concepts.

Organizational issues
During the course, students will initially work independently on the assignment and then in teams. Regular consultation hours and additional input sessions will be offered. Progress will be presented in two interim milestones.

Important information about the course:

- The number of participants is limited. Selection will be based on an application process. Applications can be submitted via the following link: https://plus.campus.kit.edu/signmeup/procedures/5878. Applications should include previous experience and motivation for the internship.
- In addition, make sure you can attend all the following **mandatory dates** as **attendance is required for participation in this course**. **Non-attendence will result in de-registration.** The dates are as follows:

  Kickoff: 13.05.26, 14:00 - 17:15
  Milestone 1: 20 min timeslot on the 03.06.26, 14:00 - 17:15
  Milestone 2: 10.06.26, 14:00 - 17:15
  Milestone 3: 24.06.26, 14:00 - 17:15

- Applicants will be inivited to an online info event where the course will be presented:
  Online info: 06.05.26, 14:00 - 15:30 (Teams-link will be sent to you before the event)

- Basic programming **skills in Python are required**.
- The course language is **English**.
- Planned time frame for the course:
  Start: May 13, 2026 - End: June 24, 2026

For questions please refer to pietro.schumacher@kit.edu.

Literature
VDA 5050: https://www.vda.de/en/topics/automotive-industry/vda-5050

T 7.170 Module component: Information Management for Public Mobility Services [T-BGU-106608]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	3 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	6232905	Information Management for Public Mobility Services	2 SWS	Block / 🗣	Vortisch
Exams					
WT 25/26	8245106608	Information Management for Public Mobility Services			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
lecture accompanying exercises, appr. 5 pieces

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.171 Module component: Innovation and Project Management in Rail Vehicle Engineering [T-MACH-113068]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106496 - Modern Mobility on Rails and Roads

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	5

Courses					
WT 25/26	2115921	Innovation and Project Management in Rail Vehicle Engineering	2 SWS	Lecture / 🗣	Lang, Cichon
ST 2026	2115921	Innovation and Project Management in Rail Vehicle Engineering	2 SWS	Lecture / 🗣	Lang, Cichon
Exams					
WT 25/26	76-T-MACH-113068	Innovation and Project Management in Rail Vehicle Engineering			Lang, Cichon
ST 2026	76-T-MACH-113068	Innovation and Project Management in Rail Vehicle Engineering			Lang, Cichon

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Graded examination:
2/3 of the examination: 20-minute oral examination on the content of the lecture
1/3 of the examination performance of another type: unit accompanying the lecture as part of a 10-minute presentation and a practical application from innovation and project management

Additional Information
The course is offered in German.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Innovation and Project Management in Rail Vehicle Engineering

2115921, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives

The aim of this course is to familiarise students with the fundamentals of innovation and project management in the context of rail vehicle development. Creativity techniques are applied in a practical manner to the challenges faced by the rail system, such as aspects of sustainability. Students also learn about the various organisational, systemic, economic and technological challenges involved in a project and its management.

Course content

- Fundamentals of innovation management
- Challenges and aspects of sustainability in the railway system
- Autonomous testing of various creativity techniques
- Moderation of creativity workshops
- Techniques for idea generation and idea evaluation
- Fundamentals and methods of project management
- Practical challenges in project management
- Tools in project management
- Project team organisation and role distribution

Learning goals

Students will learn basic methods for identifying problem areas, developing new and creative solutions, and evaluating them.
They will be able to initiate an innovation workshop and moderate, conduct, document, and reflect on it in a targeted manner using creativity methods they have applied autonomously.
Students will be able to apply methods for structural planning, process planning, risk, cost, and quality management using examples.

Organizational issues

Benotete Prüfungsleistung:

2/3 der Prüfungsleistung: 20-minütige mündliche Prüfung über die Lehrinhalte der Vorlesung
1/3 der Prüfungsleistung anderer Art: vorlesungsbegleitende Einheit im Rahmen einer 10-minütigen Präsentation und einer praktischen Anwendung aus dem Innovations- und Projektmanagement

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V

Innovation and Project Management in Rail Vehicle Engineering

2115921, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives

The aim of this course is to familiarise students with the fundamentals of innovation and project management in the context of rail vehicle development. Creativity techniques are applied in a practical manner to the challenges faced by the rail system, such as aspects of sustainability. Students also learn about the various organisational, systemic, economic and technological challenges involved in a project and its management.

Course content

- Fundamentals of innovation management
- Challenges and aspects of sustainability in the railway system
- Autonomous testing of various creativity techniques
- Moderation of creativity workshops
- Techniques for idea generation and idea evaluation
- Fundamentals and methods of project management
- Practical challenges in project management
- Tools in project management
- Project team organisation and role distribution

Learning goals

Students will learn basic methods for identifying problem areas, developing new and creative solutions, and evaluating them.
They will be able to initiate an innovation workshop and moderate, conduct, document, and reflect on it in a targeted manner using creativity methods they have applied autonomously.
Students will be able to apply methods for structural planning, process planning, risk, cost, and quality management using examples.

Organizational issues
Benotete Prüfungsleistung:

2/3 der Prüfungsleistung: 20-minütige mündliche Prüfung über die Lehrinhalte der Vorlesung
1/3 der Prüfungsleistung anderer Art: vorlesungsbegleitende Einheit im Rahmen einer 10-minütigen Präsentation und einer praktischen Anwendung aus dem Innovations- und Projektmanagement

Max. 12 Teilnehmer

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

T 7.172 Module component: Innovation Lab [T-ETIT-110291]

Coordinators: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr. Werner Nahm
Prof. Dr.-Ing. Eric Sax
Prof. Dr. Wilhelm Stork
Prof. Dr.-Ing. Thomas Zwick

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-WIWI-105011 - Student Innovation Lab (SIL) 2

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	9 CP	graded	Each term	2 semesters	1

Courses					
WT 25/26	2303192	Innovation Lab	2 SWS	Project / 🗣	Hohmann, Zwick, Sax, Stork, Nahm, Schmalen, Rost
ST 2026	2303192	Innovation Lab	2 SWS	Project / 🗣	Hohmann, Zwick, Sax, Stork, Terzidis
Exams					
WT 25/26	7303192	Innovation Lab			Hohmann, Zwick, Stork, Sax, Nahm

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success control takes place in the form of other types of examination and includes:

- Submission of a Technical Report with requirements list and system architecture
- Submission of the reflection of the Gate Plans
- Presentation of the High-fidelity

Prerequisites
none

T 7.173 Module component: Innovation Management: Concepts, Strategies and Methods [T-WIWI-102893]

Coordinators: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	2545100	Innovation Management: Concepts, Strategies and Methods	2 SWS	Lecture / 🖧	Weissenberger-Eibl
Exams					
WT 25/26	7900145	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl
ST 2026	7900144	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Innovation Management: Concepts, Strategies and Methods

2545100, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application. The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particularly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addition to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of integrated knowledge.

Aim: Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

Organizational issues
Wichtig! Bitte treten Sie dem **ILIAS-Kurs zur Vorlesung** bei, damit wir Ihnen weitere Informationen mitteilen können.

Literature
Eine ausführliche Literaturliste wird mit den Vorlesungsunterlagen zur Verfügung gestellt.

Eine Einführung bei: Vahs,D./Brem,A. (2013): Innovationsmanagement. Von der Idee zur erfolgreichen Vermarktung, 4. Auflage, Stuttgart 2013.

T 7.174 Module component: Innovation2Business – Innovation Strategy in the Industrial Corporate Practice [T-MACH-112882]

Coordinators: Prof. Dr.-Ing. Albert Albers
Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2145182	Innovation2Business – Innovation Strategy in the Industrial Corporate Practice	2 SWS	Lecture / 🗣	Albers
Exams					
WT 25/26	76-T-MACH-112882	Innovation2Business – innovation strategy in the industrial corporate practice			Albers

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written exam based on the lecture handout and materials, duration 90 minutes

Prerequisites
none

Recommendations
None

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Innovation2Business – Innovation Strategy in the Industrial Corporate Practice

2145182, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
lecture block at the Bühl & Herzogenaurach locations with plant tours & fireside evenings + exam-preparatory Q&A.
Exam: written, limited to 30 seats (recommended for: Master's degree; mechanical engineering, industrial engineering, electrical engineering, computer science) → see module manual for details.
In this lecture series, use Schaeffler as an example to learn how global companies continuously transform themselves to grow sustainably and become
maintain a leading position in the global market in the long term through business-oriented innovation.
Together we will go through the most important elements of the innovation and development process and learn about the successes and learnings based on
vivid examples from practice.
Join the fireside evenings with the speakers to discuss the lecture content and beyond in a relaxed atmosphere.
The event is limited to 30 students and is free for you (meals, bus transfers & accommodations).

Organizational issues
Vorlesung findet an Schaeffler-Standorten (Herzogenaurach und Bühl) statt.

Sprache: Unterlagen Englisch, Vortragssprache Englisch

T 7.175 Module component: Integrated Design Project in Water Resources Management [T-BGU-111275]

Coordinators: PD Dr.-Ing. Uwe Ehret
Dr.-Ing. Frank Seidel

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	6 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	6224801	Integrated Design Project in Water Resources Management	4 SWS	Lecture / Practice / 🗣	Ehret, Seidel

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
project work, report approx. 15 pages with presentation approx. 15 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
180 hours

T 7.176 Module component: Integrated Photonics [T-ETIT-114418]

Coordinators: Prof. Dr.-Ing. Christian Koos
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Microoptics
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading	Version
Oral examination	6 CP	graded	1

Courses					
WT 25/26	2309440	Integrated Photonics	2 SWS	Lecture / 🗣	Koos, N.N.
WT 25/26	2309441	Tutorial to Integrated Photonics	2 SWS	Practice / 🗣	Koos, N.N., Khairy
Exams					
WT 25/26	7300021	Integrated Photonics			Koos

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment takes place in the form of an oral examination (approx. 25 minutes); appointments individually on demand.

Prerequisites
none

T 7.177 Module component: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-109054]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101272 - Integrated Production Planning

Type	Credits	Grading	Term offered	Version
Written examination	9 CP	graded	Each summer term	1

Courses					
ST 2026	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice / 🗣	Lanza
Exams					
WT 25/26	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written Exam (120 min)

Prerequisites
"T-MACH-108849 - Integrierte Produktionsplanung im Zeitalter von Industrie 4.0" as well as "T-MACH-102106 Integrierte Produktionsplanung" must not be commenced.

Additional Information
The course is offered in German.

Workload
270 hours

Below you will find excerpts from courses related to this module component:

V **Integrated Production Planning in the Age of Industry 4.0** — **Lecture / Practice (VÜ) On-Site**
2150660, SS 2026, 6 SWS, Language: German, Open in study portal

Content
Integrated Production Planning in the age of Industry 4.0 will be taught in the context of this engineering science lecture. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the lecture:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (PPS, process simulation as a validation tool, planning of conveyor technology and storage systems for linking production and IT systems in the I4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The lecture contents are complemented by numerous current practical examples with a strong Industry 4.0 reference. Aspects of sustainability are anchored in all units and thus basic knowledge of sustainable production planning is taught. Within the exercises the lecture contents are deepened and applied to specific problems and tasks.

Learning Outcomes:

The students …

- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.
- know the basic features of sustainable production planning and can apply underlying knowledge.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine dienstags 14.00 Uhr und donnerstags 14.00 Uhr, Übungstermine donnerstags 15.45 Uhr. Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.178 Module component: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Coordinators: Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / 🗣	Schlichtenmayer
Exams					
WT 25/26	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written Exam (60 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Integrative Strategies in Production and Development of High Performance Cars

Lecture (V)
On-Site

2150601, SS 2026, 2 SWS, Language: German, Open in study portal

Content
The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:

- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrative R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Learning Outcomes:

The students …

- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.179 Module component: Intelligent Agent Architectures [T-WIWI-111267]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2540525	Intelligent Agent Architectures	2 SWS	Lecture / 🗣	Geyer-Schulz
WT 25/26	2540526	Übung zu Intelligent Agent Architectures	1 SWS	Practice / 🗣	Geyer-Schulz
Exams					
WT 25/26	79011480	Intelligent Agent Architectures (WS 2025/2026)			Geyer-Schulz
ST 2026	7900069	Intelligent Agent Architectures (Nachklausur WS 2025/2026)			Geyer-Schulz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Please note: this exam will no longer be offered after August 2026.

Prerequisites
None

Recommendations
It is recommended to additionally review the Bachelor-level lecture "Customer Relationship Management" from the module "CRM and Servicemanagement".

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Intelligent Agent Architectures** — **Lecture (V) On-Site**
2540525, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
Course content:

The lecture is structured in three parts:

In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload:

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Learning Goals:

Students have special knowledge of software architectures and of the methods which are used in their development (Systems analysis, formal methods for the specification of interfaces and algebraic semantic, UML, and, last but not least, the mapping of conceptual architectures to IT architectures.

Students know important architectural patterns and they can – based on their CRM knowledge – combine these patterns for innovative CRM applications.

Assessment:

The assessment consists of a written exam of 1-hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from exercise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: 0

Literature

- P. Clements *u. a.*, *Documenting Software Architectures. Views and Beyond*. Upper Saddle River: Addison-Wesley, 2011.
- Fowler, *Patterns of Enterprise Application Architecture*. Amsterdam: Addison-Wesley Longman, 2002.
- S. Russell und P. Norvig, *Artificial Intelligence: A Modern Approach*, 3. Aufl. Harlow Essex England: Pearson New International Edition, 2014.
- V. N. Vapnik, *The Nature of Statistical Learning Theory*. New York: Springer, 1995.

T 7.180 Module component: Intelligent Agents and Decision Theory [T-WIWI-110915]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2540537	Intelligent Agents and Decision Theory	2 SWS	Lecture	Geyer-Schulz
ST 2026	2540538	Übung zu Intelligent Agents and Decision Theory	1 SWS	Practice	Bell
Exams					
WT 25/26	7900294	Intelligent Agents and Decision Theory (Nachklausur SoSe 2025)			Geyer-Schulz
ST 2026	7900268	Intelligent Agents and Decision Theory (Nachklausur SoSe 2026)			Geyer-Schulz
ST 2026	7900306	Intelligent Agents and Decision Theory			Geyer-Schulz

Assessment
Written examination (60 minutes). The exam is held in each semester and can be repeated at any regular examination date. Details of the grading system and any exam bonus that may be achieved from the practice are announced in the course.

Please note: this course, exercises and exam will be not longer be offered after August 2026.

Prerequisites
None

Recommendations
We assume knowledge in statistics, operations research and microeconomics as taught in the Bachelor program (VWL I, Operations Research I + II, Statistics I + II) and a familiarity with preferably the Python programming language.

Additional Information
Please note: this course, exercises and exam will be not longer be offered after August 2026.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Intelligent Agents and Decision Theory

2540537, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content

The key assumption of this lecture is that the concept of artificial intelligence is inseparably linked to the economic concept of rationality of agents. We consider different classes of decision problems - decisions under certainty, risk and uncertainty - from an economic, managerial and AI-engineering perspective:

From an economic point of view, we analyze how to act rationally in these situations based on classic utility theory. In this regard, the course also introduces the relevant parts of decision theory for dealing with

- multiple conflicting objectives,
- incomplete, risky and uncertain information about the world,
- assessing utility functions, and
- quantifying the value of information ...

From an engineering perspective, we discuss how to develop practical solutions for these decision problems, using appropriate AI components. We introduce

- a general, agent-based design framework for AI systems,

as well as AI methods from the fields of

- search (for decisions under certainty),
- inference (for decions under risk) and
- learning (for decisions under uncertainty).

Where applicable, the course highlights the theoretical ties of these methods with decision theory.

We conclude with a discussion of ethical and philosophical issues concerning the development and use of AI.

Learning objectives

Students are able to design, analyze, implement, and evaluate intelligent agents.

Lecture Outline

1. Introduction: Artificial intelligence and the economic concept of rationality
2. Intelligent Agents: A general, agent-based design framework for AI systems
3. Decision under certainty: Assessing utility functions for decisions with multiple objectives
4. Search: Linear programming for decisions under certainty
5. Decisions under risk: The expected utility principle
6. Information systems: Improving economic decisions under risk
7. Inference: Bayesian networks for decisions under risk
8. Learning: Bayesian Networks (Basics)
9. Learning: Bayesian Networks (Algorithms I)
10. Learning: Bayesian Networks (Algorithms II)

Note: This rough outline may be subject to change.

Literature

Bamberg, Coenenberg & Krapp (2019). Betriebswirtschaftliche Entscheidungslehre (16th ed.). Verlag Franz Vahlen GmbH.

Fishburn (1988). Nonlinear preference and utility theory. Baltimore: Johns Hopkins University Press.

Keeney & Raiffa (1993). Decisions with multiple objectives: preferences and value trade-offs. Cambridge University Press.

Nickel, S., Stein, O., & Waldmann, K.-H. (2014). Operations Research (2nd ed.). Springer Berlin Heidelberg.

Russell & Norvig (2016). Artificial Intelligence: A Modern Approach (3rd Global Edition). Pearson.

Koller, D., & Friedman, N. (2009). Probabilistic graphical models: principles and techniques. MIT Press.

Sutton & Barto (2018). Reinforcement learning: An introduction. Cambridge: MIT press.

T 7.181 Module component: International Entrepreneurship and Brand Development [T-WIWI-114893]

Coordinators: Prof. Dr. Ann-Kristin Kupfer
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-105312 - Marketing and Sales Management
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	see Annotations	1

Courses					
WT 25/26	2572189	International Entrepreneurship and Brand Development	4 SWS	Block / 🗣	Terzidis, Kupfer
Exams					
WT 25/26	7900156	International Entrepreneurship and Brand Development			Kupfer, Terzidis

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Non exam assessment. The grade is based on the presentation, the subsequent discussion and the written elaboration.

Additional Information
Please contact the Marketing and Sales Research Group for further information.

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V International Entrepreneurship and Brand Development

2572189, WS 25/26, 4 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content
This course is offered as part of the EUCOR programme in cooperation with EM Strasbourg. Max. 10 students of KIT and max. 10 students of EM Strasbourg will develop a sales presentation in tandems (teams of 2). This is based on the value proposition of a business model.

- An application is required to participate in this event. The application phase usually takes place at the beginning of the lecture period. Further information on the application process can be found on the website of the Institute for Entrepreneurship and Technology and the Institute for Customer Insights (CIN) shortly before the start of the lecture period.

Total workload for 6 ECTS: about 180 hours.

T 7.182 Module component: International Finance [T-WIWI-102646]

Coordinators: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	see Annotations	1

Courses					
ST 2026	2530570	International Finance	2 SWS	Lecture / 🗣	Walter, Uhrig-Homburg
Exams					
WT 25/26	7900052	International Finance			Uhrig-Homburg
ST 2026	7900097	International Finance			Uhrig-Homburg

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The success control takes place in form of a written examination (60 min). If the number of participants is low, an oral examination may also be offered. The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Recommendations
None

Additional Information
The course is offered as a 14-day or block course.

Below you will find excerpts from courses related to this module component:

V International Finance

2530570, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Kickoff am Mittwoch, 29.04.26, 16:00 - 19:15 Uhr im Raum 320 im Geb. 09.21 (Blücherstr. 17). Die Veranstaltung wird samstags als Blockveranstaltung angeboten (nach dem Kickoff nach Absprache).

Literature
Weiterführende Literatur:

- Eiteman, D. et al., Multinational Business Finance, 13. Auflage, 2012.
- Solnik, B. und D. McLeavey, Global Investments, 6. Auflage, 2008.

T 7.183 Module component: Internet Law [T-INFO-101307]

Coordinators: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	2

Courses					
WT 25/26	2424354	Internet Law	2 SWS	Lecture /	Idelberger
Exams					
WT 25/26	7500060	Internet Law			Matz
ST 2026	7500057	Internet Law			Sattler

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment is carried out as a written examination (§ 4 Abs. 2 No. 1 SPO) lasting 120 minutes.

Prerequisites
The course **Ausgewählte Rechtsfragen des Internetrechts T-INFO-108462** may not have started.

Recommendations
None.

Additional Information
Lecture (with written exam) **Internet Law** T-INFO-101307 is offered in the winter semester.

Colloquium (other type of examination) **Selected Legal Issues in Internet Law** T-INFO-108462 is offered in the summer semester.

T 7.184 Module component: Introduction to Bionics [T-MACH-111807]

Coordinators: apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101293 - Microsystem Technology
M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	3

Courses					
ST 2026	2142151	Introduction to Biomimetics	2 SWS	Lecture / 🗣	Hölscher
Exams					
WT 25/26	76-T-MACH-102172	Introduction into Biomimetics			Hölscher
ST 2026	76-T-MACH-102172	Introduction into Biomimetics			Hölscher

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam (duration: 60 minutes)

Prerequisites
none

Additional Information
Module component T-MACH-102172 may not be started

Below you will find excerpts from courses related to this module component:

V Introduction to Biomimetics

2142151, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.

The students should be able analyze, judge, plan and develop biomimetic strategies and products.

Basic knowledge in physics and chemistry

The successfull attandence of the lecture is controlled by a written examination.

Organizational issues
Im ILIAS werden Materialien (Videos, Originalliteratur, Übungen) zur Vertiefung zur Verfügung gestellt.

Für die schriftliche Klausur werden zwei Termine angeboten (erste Woche nach Vorlesungsende im Sommersemester und eine Woche vor Vorlesungsbeginn im Wintersemester).

Literature
Folien und Literatur werden in ILIAS zur Verfügung gestellt.

T 7.185 Module component: Introduction to Food Law [T-CHEMBIO-108091]

Coordinators: Prof. Dr. Thomas Kuballa
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading	Term offered	Version
Coursework	1,5 CP	pass/fail	Each winter term	2

Courses					
WT 25/26	6627	Einführung in das Lebensmittelrecht	1 SWS	Lecture	Kuballa
Exams					
WT 25/26	71B108091	Introduction to Food Law			Kuballa
WT 25/26	71B108091-2	Introduction to Food Law			Kuballa

Prerequisites
none

T 7.186 Module component: Introduction to Hydrogeology [T-BGU-101499]

Coordinators: Prof. Dr. Nico Goldscheider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each winter term	2

Courses					
WT 25/26	6339050	Introduction to Hydrogeology	4 SWS	Lecture / Practice /	Goldscheider
Exams					
WT 25/26	8210_101499	Introduction to Hydrogeology			Goldscheider
ST 2026	8210_101499_	Introduction to Hydrogeology			Goldscheider

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Written exam with 90 minutes

Prerequisites
none

Workload
150 hours

T 7.187 Module component: Introduction to Microsystem Technology - Practical Course [T-MACH-108312]

Coordinators: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics
M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Coursework	3 CP	pass/fail	Each term	3

Courses					
WT 25/26	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
ST 2026	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
Exams					
WT 25/26	76-T-MACH-108312	Introduction to Microsystem Technology - Practical Course			Last
ST 2026	76-T-MACH-108312	Introduction to Microsystem Technology - Practical Course			Last

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
This practical course concludes with a written examination (duration 1 h). The assessment is not graded and may be repeated until it is passed.

Prerequisites
none

Additional Information
Please note that from the winter semester 2025/2026, the option to choose between the "Practical Training in Basics of Microsystem Technology" and "Introduction to Microsystem Technology - Practical Course" in the module M-MACH-101287 "Microsystem Technology" will no longer be available.

From this point onwards, students will only be able to choose the "Introduction to Microsystem Technology - Practical Course" component.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Introduction to Microsystem Technology - Practical Course

2143877, WS 25/26, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Organizational issues
Das Praktikum findet in den Laboren des IMT am CN statt. Treffpunkt: Bau 301, vor dem Eingang.

Das "Laborpraktikum" ist das selbe wie das "Praktikum", nur unbenotet! Beide mit schriftlicher Klausur.

Wer teilnehmen möchte, muss sich ab 19.1.2026, 8h00 über das Campussystem unter Veranstaltungen (nicht unter Prüfungen!) auf die Warteliste setzen. Die endgültige Entscheidung, ob man teilnehmen kann, erfolgt erst 10.2.2026.

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V Introduction to Microsystem Technology - Practical Course

2143877, SS 2026, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
In the practical training includes nine experiments:

1. X-ray optics
2. UVL + REM
3. Micromixer
4. Atomic force microscopy
5. 3D-Printing
6. Light dirffraction at Chromium masks
7. Moulding
8. SAW-bio-sensors
9. Nano3D-printer - material transfer of thin foils
10. Electro spinning

Each student takes part in only four experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Organizational issues
Das Praktikum findet 14.-18.9.2026 an vier halben Tagen in den Laboren des IMT am KIT-CN statt. Treffpunkt: Eingang Bau 301.

Das "Laborpraktikum" ist das selbe wie das "Praktikum", nur unbenotet! Beide mit schriftlicher Klausur in der Woche danach, voraussichtlich am 24.9.2026.

Wer teilnehmen möchte, muss sich ab 6.7.2026, 8h00 über das Campussystem unter Veranstaltungen (nicht unter Prüfungen!) auf die Warteliste setzen. Die endgültige Entscheidung, ob man teilnehmen kann, erfolgt erst 31.8.2026.

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 7.188 Module component: Introduction to Microsystem Technology I [T-MACH-105182]

Coordinators: Dr. Vlad Badilita
Dr. Mazin Jouda
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	3

Courses					
WT 25/26	2141861	Introduction to Microsystem Technology I	2 SWS	Lecture / 🗣	Korvink, Badilita
Exams					
WT 25/26	76-T-MACH-105182	Introduction to Microsystem Technology I			Korvink, Badilita

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written examination (60 min)

Prerequisites
T-MACH-114035 and T-MACH-114100 must not have started

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Introduction to Microsystem Technology I

2141861, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Mikrosystemtechnik für Ingenieure, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.189 Module component: Introduction to Microsystem Technology II [T-MACH-105183]

Coordinators: Dr. Vlad Badilita
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	3

Courses					
ST 2026	2142874	Introduction to Microsystem Technology II	2 SWS	Lecture / 🗣	Korvink, Badilita
Exams					
WT 25/26	76-T-MACH-105183	Introduction to Microsystem Technology II			Korvink, Badilita

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written examination (60 min)

Prerequisites
T-MACH-114035 and T-MACH-114101 must not have started

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Introduction to Microsystem Technology II

2142874, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

Organizational issues
Topic: Grundlagen der Mikrosystemtechnik II (MST II) SS 21
Time: Thursdays 14:00 - 15:30

10.91 Redtenbacher-Hörsaal

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.190 Module component: Introduction to Nanotechnology [T-MACH-111814]

Coordinators: apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering
KIT Department of Business and Economics
Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	2

Courses					
ST 2026	2142152	Introduction to Nanotechnology	2 SWS	Lecture / 🗣	Hölscher
Exams					
WT 25/26	76-T-MACH-105180	Introduction into Nanotechnology			Hölscher, Dienwiebel
ST 2026	76-T-MACH-105180	An Introduction into Nanotechnology			Hölscher

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam 90 min

Prerequisites
none

Additional Information
T-MACH-111814 may not be started

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Introduction to Nanotechnology

2142152, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Nanotechnology deals with the fabrication and analysis of nanostructures. The topics of the lecture include

- the most common measurement principles of nanotechnology especially scanning probe methods
- the analysis of physical and chemical properties of surfaces
- interatomic forces and their influence on nanostructures
- methods of micro- and nanofabrication and lithography
- basic models of contact mechanics and nanotribology
- important functional characteristics of nanodevices

Basic knowledge in mathematics and physics is assumed

The successfull attandence of the lecture is controlled by a 30 minutes oral exam.

Organizational issues
Es werden im ILIAS Materialien (Videos, Originalliteratur, Übungen) zum Vertiefung zur Verfügung gestellt.

Für die mündlichen Prüfungen werden zwei Termine angeboten (erste Woche nach Vorlesungsende im Sommersemester und eine Woche vor Vorlesungsbeginn im Wintersemester).

Literature
Alle Folien und Originalliteratur werden auf ILIAS zur Verfügung gestellt.

T 7.191 Module component: Introduction to Sensory Analysis with Practice [T-CIWVT-111534]

Coordinators: Prof. Dr. Katharina Scherf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	1,5 CP	graded	Each summer term	1

Courses					
WT 25/26	6630		1 SWS	Lecture	Hofsäß
ST 2026	6630	Einführung in die Sensorik mit Übungen	1 SWS	Lecture / 🗣	N.N., Bunzel
Exams					
WT 25/26	7206630	Introduction to Sensory Analysis with Practice			Hofsäß
ST 2026	7206630	Introduction to Sensory Analysis with Practice			Bunzel

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 7.192 Module component: Introduction to Stochastic Optimization [T-WIWI-106546]

Coordinators: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	3

Courses					
ST 2026	2550470	Introduction to Stochastic Optimization	2 SWS	Lecture / 🖳	Rebennack
ST 2026	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice / 🗣	Rebennack, Kandora
ST 2026	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	2 SWS	Others	Rebennack, Kandora
Exams					
WT 25/26	7900242	Introduction to Stochastic Optimization			Rebennack
ST 2026	7900311	Introduction to Stochastic Optimization			Rebennack

Legend: 🖳 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites
None.

Workload
135 hours

T 7.193 Module component: IT-Fundamentals of Logistics [T-MACH-105187]

Coordinators: Prof. Dr.-Ing. Frank Thomas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	4

Assessment
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Additional Information
The course is offered in German

Workload
120 hours

T 7.194 Module component: Joint Entrepreneurship Summer School [T-WIWI-109064]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Irregular	1

Courses					
ST 2026	2545021	Joint Entrepreneurship School China	4 SWS	Seminar / 🗣	Kleinn, Terzidis
Exams					
ST 2026	7900346	Joint Entrepreneurship Summer School (China)			Terzidis

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The learning control of the program (Summer School) consists of two parts:
A) **Investor Pitch**:
Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.

B) **Written elaboration:**
The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyzes and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.

The grade consists of 50% presentation performance and 50% written preparation. The points system for the assessment is determined by the lecturer of the course. It will be announced at the beginning of the course.

Prerequisites
The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

Recommendations
We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

Additional Information
The working language during the Summer School is English. A one-week stay in China is part of the Summer School.

Below you will find excerpts from courses related to this module component:

V Joint Entrepreneurship School China

2545021, SS 2026, 4 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
During the Summer School in Shanghai and Karlsruhe, students develop a business model of technologies and patents developed at KIT in workshops in German-Chinese tandems over the period of two weeks.

Click on our website for detailed information and a video: https://etm.entechnon.kit.edu/english/1095.php

Organizational issues
Dates:

- Briefing: April / May
- Karlsruhe: Presumably: July /August 2026
- Shanghai: Presumably: September 2026
- Deliverables: November 2026

T 7.195 Module component: KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics [T-WIWI-111109]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-104080 - Designing Interactive Information Systems
M-WIWI-105714 - Consumer Research
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Irregular	1 semesters	1

Assessment
The assessment of the success of the lecture is carried out as a non-exam assessment. Grading will be based on a continuous basis throughout the semester. The assessment consists of:

- A written paper, and
- a group presentation with subsequent discussion and question and answer session of 30 minutes.

For particularly active and constructive participation in the discussions of other papers during the final presentation, a bonus of one grade level (0.3 or 0.4) can be achieved on the passed exam. Details on the grading will be announced at the beginning of the event.

Additional Information
The number of participants is limited due to laboratory capacity and to ensure optimal supervision of the project groups. Places are allocated on the basis of preferences and suitability for the topics. Previous knowledge in the field of experimental economic research is particularly important.

The course cannot be offered in the summer semester 2024.

Workload
135 hours

T 7.196 Module component: Knowledge Discovery [T-WIWI-102666]

Coordinators: Dr.-Ing. Tobias Käfer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	4

Courses					
WT 25/26	2511303	Knowledge Discovery, Graph Neural Networks, and Language Models	3 SWS	Lecture / Practice /	Käfer, Shao, Noullet, Kubelka
Exams					
WT 25/26	79AIFB_KD_D1	Knowledge Discovery (Registration extended until 16.02.2026)			Käfer
ST 2026	791-AIFB-KD-NK	Knowledge Discovery (Registration until 20.07.2026)			Käfer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The Knowledge Discovery course is assessed through a written examination with a duration of 60 minutes. Depending on the number of participants, the examiner may replace the written exam with an oral examination lasting approximately 30 minutes

Prerequisites
None

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Knowledge Discovery, Graph Neural Networks, and Language Models

2511303, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content
This course represents an advanced, methodologically oriented course in the field of Artificial Intelligence. The course offers an in-depth examination of modern methods for knowledge extraction and processing at the interface of graph-based machine learning and natural language processing.

In the area of text-based methods, the lecture focuses on large language models (LLMs) such as ChatGPT, LLAMA, and DeepSeek, examining their underlying principles, training methods, and applications. Additional language processing techniques from text mining are also covered extensively.

In the area of graph-based methods, the lecture is dedicated to graph representation learning, which focuses on forming useful representations of graph data. The mathematical foundations of graph and geometric deep learning are covered, and applications in areas such as explainable artificial intelligence are highlighted.

Learning obectives:

Students

- Explain the core concepts of text mining, large language models (LLMs), and graph neural networks (GNNs).
- Compare and select different neural architectures and graph models in terms of structure, performance, and interpretability.
- Implement corresponding systems in practice, including data preprocessing, model selection, and evaluation.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

T 7.197 Module component: Knowledge-Driven Artificial Intelligence [T-WIWI-114863]

Coordinators: Prof. Dr. Harald Sack
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2511606	Knowledge-driven Artificial Intelligence	2 SWS	Lecture / 🗣	Sack, Malakzadeh Mahani, Patronilo, Nahani, Yargan, Gader
ST 2026	2511607	Exercises to Knowledge-driven Artificial Intelligence	1 SWS	Practice / 🗣	Sack, Tietz, Malekzadeh Mahani, Ondraszek
Exams					
ST 2026	791-AIFB-KDAI-HK	Knowledge-Driven Artificial Intelligence (Registration until 20.07.2026)			Sack

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V Knowledge-driven Artificial Intelligence

2511606, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
- The Art of Understanding

- From Numbers to Insights
- Data, Information, and Knowledge
- Natural Language and Successful Communication
- The Art of Understanding
- The Principles of Learning

- Basic Machine Learning

- Machine Learning Fundamentals
- How to evaluate a Machine Learning Experiment?
- Evaluation and Generalisation Problems
- Supervised and Unsupervised ML
- Basic ML Algorithms
- Linear Regression
- Decision Trees
- k-means Clustering
- Neural Networks and Deep Learning

- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques and Challenges
- Regular Expressions, Tokenisation and Word Normalisation
- Statistical Language Models (N-Gram Model)
- Naive Bayes Text Classification
- Distributional Semantics and Neural Language Models
- Word Embeddings

- Knowledge Graphs

- Knowledge Representations and Ontologies
- Resource Description Framework (RDF)
- Modeling with RDFS
- Querying RDF(S) with SPARQL
- Popular Knowledge Graphs - Wikidata and DBpedia
- Ontologies with the Web Ontology Language (OWL)
- Linked Data Quality Assurance with SHACL
- The Graph in Knowledge Graphs

- Neurosymbolic AI

- Symbolic and Subsymbolic AI
- Knowledge Graph Embeddings and KG Completion
- The Limits of AI
- KDAI Master Thesis Topics

Learning objectives:

- The students know the fundamentals and measures of information theory and are able to apply those in the context of Knowledge-driven AI.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students know the fundamentals of basic machine learning technologies. The students are able to apply these skills for simple prediction and classification tasks.
- The students know the basic principles of neurosymbolic AI.

Literature

- Machine Learning:
  G. Rebala, A. Ravi, S. Churiwala, An Introduction to Machine Learning, Springer, 2019. (available via KIT network)
- Natural Language Processing:
  D. Jurafsky, J.H. Martin, Speech and Language Processing, 3rd ed. Draft, 2023.
- Knowledge Graphs:
  A. Hogan, The Web of Data, Springer, 2020. (available via KIT network)

T 7.198 Module component: Laboratory Production Metrology [T-MACH-108878]

Coordinators: Dr.-Ing. Martin Benfer
Prof. Dr.-Ing. Gisela Lanza

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	5 CP	graded	Each summer term	5

Courses					
ST 2026	2150550	Laboratory Production Metrology	3 SWS	Practical course / 🗣	Lanza, Benfer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative Test Achievement: Group presentation of 15 min at the beginning of each experiment and evaluation of the participation during the experiments

and

Oral Exam (15 min)

Prerequisites
T-MACH-114827 must not have been started.

Additional Information
The course is offered in German.

For organizational reasons the number of participants for the course is limited. Hence al selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Laboratory Production Metrology

2150550, SS 2026, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
During this course, students get to know measurement systems that are used in a production system. In the age of Industry 4.0, sensors are becoming more important. Therefore, the application of in-line measurement technology such as machine vision and non-destructive testing is focussed. Additionally, laboratory based measurement technologies such as computed tomography are addressed. The students learn the theoretical background as well as practical applications for industrial examples. The students use sensors by themselves during the course. Additionally, they are trained on how to integrate sensors in production processes and how to analyze measurement data with suitable software.

The following topics are addressed:

- Classification and examples for different measurement technologies in a production environment
- Machine vision with optical sensors
- Information fusion based on optical measurements
- Robot-based optical measurements
- Non-destructive testing by means of acoustic measurements
- Coodinate measurement technology
- Industrial computed tomography
- Measurement uncertainty evaluation
- Analysis of production data by means of data mining

Learning Outcomes:

The students …

- are able to name, describe and mark out different measurement technologies that are relevant in a production environment.
- are able to conduct measurements with the presented in-line and laboratory based measurement systems.
- are able to analyze measurement results and asses the measurement uncertainty of these.
- are able to deduce whether a work piece fulfills quality relevant specifications by analysing measurement results.
- are able to use the presented measurement technologies for a new task.

Workload:

regular attendance: 31,5 hours
self-study: 88,5 hours

Organizational issues
Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

For organizational reasons the number of participants for the course is limited. Hence a selection process will take place. Applications are made via the homepage of wbk (KIT - wbk Institute of Production Science Education).

Literature
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt. Ebenso wird auf gängie Fachliteratur verwiesen.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/). Additional reference to literature will be provided, as well.

T 7.199 Module component: Large Diesel and Gas Engines for Ship Propulsions [T-MACH-110816]

Coordinators: Dr. German Weisser
Organisation:
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	2134154	Large Diesel and Gas Engines for Ship Propulsions	2 SWS	Lecture / 🗣	Weisser
Exams					
ST 2026	76-T-MACH-110816	Großdiesel- und -gasmotoren für Schiffsantriebe			Weisser

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, 20 minutes

Prerequisites
None

Additional Information
This course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Large Diesel and Gas Engines for Ship Propulsions

2134154, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
ACHTUNG: abweichend von den hier aufgeführten regelmäßigen Mittwoch-Terminen muss die Vorlesung als Blockveranstaltung in KW 30 (Di. bis Fr.) durchgeführt werden. Genaue Informationen entnehmen Sie bitte dem entsprechenden Iliaskurs.

T 7.200 Module component: Large-scale Optimization [T-WIWI-106549]

Coordinators: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	3

Exams			
WT 25/26	7900244	Large-scale Optimization	Rebennack

Assessment
The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites
None.

Workload
135 hours

T 7.201 Module component: Laser Physics [T-ETIT-100741]

Coordinators: Prof. Dr. Marc Eichhorn
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Microoptics
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2301480	Laserphysics	2 SWS	Lecture / 🗣	Eichhorn
WT 25/26	2301481	Exercise for 2301480 Laserphysics	1 SWS	Practice / 🗣	Eichhorn
Exams					
WT 25/26	7301480	Laser Physics			Eichhorn

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The exam will be taken as an oral examination (about 20 minutes). The individual appointments for examination are offered regularly at two previously determined dates.

Prerequisites
none

T 7.202 Module component: Lean Construction [T-BGU-108000]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4,5 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6241901	Lean Construction	4 SWS	Lecture / Practice /	Haghsheno, Mitarbeiter/innen
Exams					
WT 25/26	8246108000	Lean Construction			Haghsheno

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
written exam, 70 min.

Prerequisites
none

Recommendations
none

Additional Information
The number of participants is limited to 50. Registration modalities will be published in time on the institute's homepage or in the corresponding ILIAS course. Students of Profile 2 'Project Management and Lean Construction' in the degree program 'Technology and Management in Construction Management' always receive a confirmation of participation (basic module). Any necessary selection for the remaining places will be made with priority given to students from Civil Engineering (study focus module), Technology and Management in Construction Management (specialization module) and Industrial Engineering (elective module in Engineering Sciences), taking into account the degree program and the student's progress.

Workload
140 hours

Below you will find excerpts from courses related to this module component:

V Lean Construction

6241901, WS 25/26, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
At the beginning of this module, the theoretical foundations of Lean Philosophy and Lean Construction are presented and deepened through learning simulations and exercises. Subsequently, industry and specialist lectures examine methods such as takt planning and takt control, the Last Planner System™, value stream analysis, and cooperative contract forms in both theory and practice. Furthermore, general project management aspects in construction projects such as construction site logistics, cost and quality management are addressed from a Lean perspective.

As part of the project work, students work in small groups on selected problem areas, present the results, and prepare a written report. This written report, together with the group presentation, is evaluated as a partial module assessment.

Organizational issues
Die Anmeldung zum Kurs findet über das in CAS hinterlegte Anmeldeverfahren statt.

Die Teilnehmerzahl ist auf 50 beschränkt.

Erste Vorlesung: 27.10.2025. Weitere Termine: siehe zugehöriger ILIAS-Kurs

Literature

Gehbauer, F. (2013) *Lean Management Im Bauwesen*. Skript des Instituts für Technologie und Management im Baubetrieb, Karlsruher Institut für Technologie (KIT).
Liker, J. & Meier, D. (2007) *Praxisbuch, der Toyota Weg: für jedes Unternehmen*. Finanzbuch Verlag.
Rother, M., Shook, J., & Wiegand, B. (2006). *Sehen lernen: mit Wertstromdesign die Wertschöpfung erhöhen und Verschwendung beseitigen*. Lean Management Institut.

T 7.203 Module component: Learning Factory “Global Production“ [T-MACH-105783]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Each winter term	5

Courses					
WT 25/26	2149612	Learning Factory “Global Production“	4 SWS	/	Lanza
Exams					
WT 25/26	76-T-MACH-105783	Learning Factory "Global Production"			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative test achievement (graded):

- Knowledge acquisition in the context of the seminar (4 achievements approx. 20 min each) with weighting 35%.
- Interaction between participants with weighting 20%.
- Scientific colloquium (in groups of 3 students approx. 45 min each) with weighting 45%.

Prerequisites
none

Additional Information
The course is offered in German.

For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/lernfabrik.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V Learning Factory “Global Production“

2149612, WS 25/26, 4 SWS, Language: German, Open in study portal **Blended (On-Site/Online)**

Content
The Learning Factory Global Production serves as a modern teaching environment for the challenges of global production. These challenges are brought to life using the example of electric motor manufacturing under real production conditions. The course is divided into e-learning units and face-to-face sessions. The e-learning units serve to teach essential basics and deepen specific topics (e.g., site selection, Industry 4.0, and production network planning). The face-to-face sessions focus on the case-specific application of relevant methods for planning and controlling global production systems. The Lean & Industry 4.0 unit examines classic methods and tools for designing lean production systems (e.g., Kanban and JIT/JIS, line balancing). A Six Sigma project is used to teach essential methods for quality assurance in complex production systems and to provide practical experience. The “Agile Global Production Networks” unit examines the operation and design of global production networks. Participants are familiarized with the basics of global production and immediately apply the methods they have learned to the assembly of electric motors. The Circular Production module offers insights into the theoretical and practical complexities and solution strategies of remanufacturing.

Main focus of the lecture:

- Site selection
- Lean & Industry 4.0
- Six Sigma 4.0 – Quality management in production
- Agile global production networks
- Circular production

Learning Outcomes:

Students are able to …

- evaluate and select location alternatives using appropriate methods and procedures.
- apply lean management methods and tools to plan and control location-appropriate production systems.
- use the Six Sigma system in a targeted manner and are capable of goal-oriented process management.
- depending on company-specific circumstances, apply methods for planning global production networks, outline a suitable network, and classify and evaluate it based on specific criteria.
- apply methods of circular production and demonstrate how products can be designed for circularity.
- apply the methods and approaches learned for problem solving in a global production environment and reflect on their effectiveness.

Workload:

e-Learning: ~ 36 h
regular attendence: ~ 64 h
self-study: ~ 80 h

Organizational issues
Termine werden über die Institutshomepage bekanntgegeben.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Teilnehmer begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php)

Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.

Die Studierenden sollten Vorkenntnisse in mindestens einem der folgenden Bereiche haben:

- Integrierte Produktionsplanung
- Globale Produktion und Logistik
- Qualitätsmanagement

For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/studium-und-lehre.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Literature
Medien:
E-Learning Plattform ilias, Powerpoint, Fotoprotokoll. Die Medien werden über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
E-learning platform ilias, powerpoint, photo protocol. The media are provided through ilias (https://ilias.studium.kit.edu/).

T 7.204 Module component: Liberalised Power Markets [T-WIWI-107043]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101451 - Energy Economics and Energy Markets
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading	Term offered	Version
Written examination	5,5 CP	graded	Each winter term	3

Courses					
WT 25/26	2581998	Liberalised Power Markets	2 SWS	Lecture / 🗣	Fichtner
WT 25/26	2581999	Übungen zu Liberalised Power Markets	2 SWS	Practice / 🗣	Signer, Fichtner, Beranek
Exams					
WT 25/26	7900160	Liberalised Power Markets NEW			Fichtner
ST 2026	7900205	Liberalised Power Markets NEW			Fichtner

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Recommendations
None

Workload
165 hours

Below you will find excerpts from courses related to this module component:

V Liberalised Power Markets

2581998, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.1. Unbundling Dimensions of liberalised power markets
2.2. Central dispatch versus markets without central dispatch
2.3. The short-term market model
2.4. The long-term market model
2.5. Market flaws and market failure
2.6. Regulation in liberalised markets

3. The power (sub)markets

3.1 Day-ahead market
3.2 Intraday market
3.3 (Long-term) Forwards and futures markets
3.4 Emission rights market
3.5 Market for ancillary services
3.6 The “market” for renewable energies
3.7 Future market segments

4. Grid operation and congestion management

4.1. Grid operation
4.2. Congestion management

5. Market power

5.1. Defining market power
5.2. Indicators of market power
5.3. Reducing market power

6. Future market structures in the electricity value chain

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.2. Unbundling Dimensions of liberalised power markets
2.3. Central dispatch versus markets without central dispatch
2.4. The short-term market model
2.5. The long-term market model
2.6. Market flaws and market failure
2.7. Regulation in liberalised markets

3. The power (sub)markets

3.1 Day-ahead market
3.2 Intraday market
3.3 (Long-term) Forwards and futures markets
3.4 Emission rights market
3.5 Market for ancillary services
3.6 The “market” for renewable energies
3.7 Future market segments

4. Grid operation and congestion management

4.1. Grid operation
4.2. Congestion management

5. Market power

5.1. Defining market power
5.2. Indicators of market power
5.3. Reducing market power

6. Future market structures in the electricity value chain

Literature
Weiterführende Literatur:

Power System Economics; Steven Stoft, IEEE Press/Wiley-Interscience Press, 0-471-15040-1

T 7.205 Module component: Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context [T-WIWI-113107]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2581995	Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context	2 SWS	Lecture / 🗣	Treml, Schultmann, Schneider
Exams					
WT 25/26	7981995	Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context			Schultmann
ST 2026	7981995	Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context			Schultmann

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral (approx. 30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context

Lecture (V) On-Site

2581995, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
The lecture focuses on the analysis of the environmental impacts of products and processes using Life Cycle Assessment (short: LCA). Structure and steps are conveyed in detail and selected further developments are shown. In order to record the methodology and classify potential environmental impacts, the practical development of what has been learned is also focused on using LCA software and interactive formats.

Topics include:

- Significance and areas of application
- Calculation models
- Attributional/Consequential LCA
- Life Cycle Sustainability Assessment, Social LCA and Life Cycle Costing
- Limitations
- Development of a Case Study

Literature
werden in der Veranstaltung bekannt gegeben

T 7.206 Module component: Logistics and Supply Chain Management [T-MACH-110771]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105298 - Logistics and Supply Chain Management

Type	Credits	Grading	Term offered	Version
Examination of another type	9 CP	graded	Each summer term	6

Courses					
ST 2026	2118078	Logistics and Supply Chain Management	6 SWS	Lecture / 🗣	Seibold, Furmans, Alicke

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The success control takes place in the form of an examination performance of a different kind. This is composed as follows:

- 50% assessment of a written examination (60 min) during the semester break
- 50% assessment of an oral examination (approx. 20 min) during the semester break

To pass the examination, both examination performances must be passed.

Prerequisites
None

Additional Information
The module component cannot be taken if one of the module components "T-MACH-102089 – Logistics - Organisation, Design and Control of Logistic Systems" and "T-MACH-105181 – Supply Chain Management" have been taken.

The course is offered in English.

Workload
270 hours

Below you will find excerpts from courses related to this module component:

V **Logistics and Supply Chain Management** — **Lecture (V) On-Site**
2118078, SS 2026, 6 SWS, Language: English, Open in study portal

Content
In the lecture "Logistics and Supply Chain Management", comprehensive and well-founded fundamentals of crucial issues in logistics and supply chain management are presented. Furthermore, the interaction of different design elements of supply chains is emphasized. For this purpose, both qualitative and quantitative models are presented and applied. Additionally, methods for mapping and evaluating logistics systems and supply chains are described. The contents of the lecture are deepened in exercises and case studies and comprehension is partially reviewed in case studies. The contents will be illustrated, among other things, on the basis of supply chains in the automotive industry.

Among others, the following topics are covered:

- Inventory Management
- Forecasting
- Bullwhip Effect
- Supply Chain Segmentation and Collaboration
- Key Performance Indicators
- Supply Chain Risk Management
- Production Logistics
- Location Planning
- Route Planning

It is intended to provide an interactive format in which students can also contribute (and work alone or in groups). Since logistics and supply chain management requires working in an international environment and therefore many terms are derived from English, the lecture will be held in English.

Plenary: The plenary sessions take place on Mondays from 09:45 - 13:00 and from 14:00 - 17:15.

Exercises: There are a total of five exercise sessions, which take place on Thursdays from 2:00 p.m. to 3:30 p.m. The scheduling can be found in Ilias from 20 April 2026.
Examination dates: This is a different type of examination. The date of the written exam will be announced on ILIAS as soon as defined. The oral exams are scheduled for the two weeks before that. An oral exam lasts 20 minutes.
Contact persons: In the summer semester 2026, the contact persons for organisational matters are Etienne Hoffmann and Alexander Ernst. Please contact us at
log-scm∂ifl.kit.edu

T 7.207 Module component: Long-Distance and Air Traffic [T-BGU-106301]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6232904	Long-distance and Air Transportation	2 SWS	Lecture /	Magdolen, Dozenten
Exams					
WT 25/26	8245106301	Long-distance and Air Traffic			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.208 Module component: Machine Learning 1 - Basic Methods [T-WIWI-106340]

Coordinators: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	4

Courses					
WT 25/26	2511500	Machine Learning 1 - Fundamental Methods	2 SWS	Lecture / 🗣	Zöllner
WT 25/26	2511501	Exercises to Machine Learning 1 - Fundamental Methods	1 SWS	Practice / 🗣	Zöllner, Polley, Fechner
Exams					
WT 25/26	79AIFB_ML1_Deutsch	Machine Learning 1 - Basic Methods (Registration extended until Feb 16 – Late registration: Waitlist only, seat not guaranteed)			Zöllner
WT 25/26	79AIFB_ML1_English	Machine Learning 1 - Basic Methods (written exam in English, Registration extended until 16.02.2026)			Zöllner
ST 2026	791-AIFB-ML1-dt-NK	Machine Learning 1 - Basic Methods (Registration until 20.07.2026)			Zöllner
ST 2026	791-AIFB-ML1-en-NK	Machine Learning 1 - Basic Methods (written exam in English, registration until 20.07.2026)			Zöllner

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (60 minutes). The examination is offered every semester and can be repeated at any regular examination date.

A grade bonus can be earned by successfully completing exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None.

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V Machine Learning 1 - Fundamental Methods

2511500, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course prepares students for the rapidly evolving field of machine learning by providing a solid foundation, covering core concepts and techniques to get started in the field. Students delve into different methods in supervised, unsupervised, and reinforcement learning, as well as various model types, ranging from basic linear classifiers to more complex methods, such as deep neural networks. Topics include general learning theory, support vector machines, decision trees, neural network fundamentals, convolutional neural networks, recurrent neural networks, unsupervised learning, reinforcement learning, and Bayesian learning.

The course is accompanied by a corresponding exercise, where students gain hands-on experience by implementing and experimenting with different machine learning algorithms, helping them to apply machine learning algorithms on real world problems.

By the end of the course, students will have acquired a solid foundation in machine learning, enabling them to apply state-of-the-art algorithms to solve complex problems, contribute to research efforts, and explore advanced topics in the field.

Learning obectives:

- Students acquire knowledge of the fundamental methods in the field of machine learning.
- Students can classify, formally describe and evaluate methods of machine learning.
- Students can use their knowledge to select suitable models and methods for selected problems in the field of of machine learning.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Machine Learning - Tom Mitchell
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 7.209 Module component: Machine Learning 2 - Advanced Methods [T-WIWI-106341]

Coordinators: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics
M-WIWI-101637 - Analytics and Statistics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	5

Courses					
ST 2026	2511502	Machine Learning 2 - Advanced Methods	2 SWS	Lecture / 🗣	Zöllner, Fechner, Polley, Stegmaier
ST 2026	2511503	Exercises for Machine Learning 2 - Advanced Methods	1 SWS	Practice / 🗣	Zöllner, Fechner, Polley, Stegmaier
Exams					
WT 25/26	79AIFB_ML2_Deutsch	Machine Learning 2 – Advanced Methods (exam in German, Registration extended until 16.02.2026)			Zöllner
WT 25/26	79AIFB_ML2E_B1	Machine Learning 2 – Advanced Methods (exam in English, Registration extended until 16.02.2026)			Zöllner
ST 2026	791-AIFB-ML2-dt-HK	Machine Learning 2 – Advanced Methods (written exam in German, registration until 20.07.2026)			Zöllner
ST 2026	791-AIFB-ML2-en_HK	Machine Learning 2 – Advanced Methods (written exam in English, registration until 20.07.2026)			Zöllner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (70 minutes). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None.

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V Machine Learning 2 - Advanced Methods

2511502, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Machine learning has become a central driver of innovation in science, engineering, and industry. Recent advances in learning algorithms and model architectures have enabled capabilities that were previously out of reach, such as high-quality image, video, and text generation, robust perception in complex environments, and intelligent decision-making under uncertainty. These developments are transforming how intelligent systems interact with the world and are increasingly deployed in large-scale, safety-critical, and autonomous applications.

This lecture provides an in-depth overview of the methods that enable these capabilities. It covers state-of-the-art network architectures, including transformers and graph neural networks, as well as modern generative models such as GANs and diffusion models. In addition, the lecture introduces model-free and model-based reinforcement learning for sequential decision-making and addresses practical aspects such as large-scale training, uncertainty-aware learning, active learning, and advanced computer vision. Through this integrated perspective, students gain a solid understanding of the principles, strengths, and limitations of modern machine learning methods and learn how to apply them in complex real-world systems.

Learning objectives:

- **Students have advanced knowledge of state-of-the-art machine learning methods and architectures**, including modern deep learning models, generative approaches, and reinforcement learning, as well as their theoretical foundations, assumptions, and application domains.
- **Students are able to formally describe, classify, and analyze advanced machine learning methods and architectures**, and to apply these methods within complex inference and decision-making systems while accounting for practical constraints such as data availability, scalability, robustness, and uncertainty.
- **Students are capable of critically evaluating advanced machine learning methods and architectures** and of selecting and justifying appropriate models and learning strategies for given problems in machine learning, based on problem characteristics, methodological trade-offs, and application requirements.

Recommendations: Attending the lecture Machine Learning 1 or a comparable lecture is very helpful in understanding this lecture.

Notes:

- The lecture will be taught in German with English slides. The exam can be taken in either German or English.
- The time of the exam is 70 minutes.

Literature
Weiterführende Literatur

- Probabilistic Machine Learning: An Introduction - Kevin P. Murphy
- Probabilistic Machine Learning: Advanced Topics - Kevin P. Murphy
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 7.210 Module component: Machine Learning and Optimization in Energy Systems [T-WIWI-113073]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each winter term	4

Courses					
WT 25/26	2581050	Machine Learning and Optimization in Energy Systems	3 SWS	Lecture / Practice / 🗣	Dengiz, Yilmaz, Kleinebrahm
Exams					
WT 25/26	7900179	Machine Learning and Optimization in Energy Systems			Fichtner
ST 2026	7900207	Machine Learning and Optimization in Energy Systems			Fichtner

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (60 min) or an oral exam (30 min) depending on the number of participants.

Workload
105 hours

Below you will find excerpts from courses related to this module component:

V Machine Learning and Optimization in Energy Systems

2581050, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Goals:
Participants should know about the most common optimization and machine learning approaches for the application in energy systems. They should understand the basic principles of the methods and should be able to apply them for solving important problems of future energy systems with high shares of renewable energy sources.

Content:
In the beginning, the essential transition of the energy system into a smart grid and the need for methods from the field of optimization and machine learning are explained. The course can be subdivided into an optimization part and a larger machine learning part. In the optimization part, the basics of optimization approaches that are used in energy systems are shown. Further, heuristic methods and approaches from the field of multiobjective optimization are introduced. In the machine learning part, the most important methods from the field of unsupervised learning, supervised learning and reinforcement learning are introduced and their application in future energy systems are investigated.

Amongst the considered applications are power plant dispatch, intelligent heating with heat pumps, charging strategies for electric vehicles, clustering of energy data for energy system models and electricity demand and renewable generation forecasting.

We also offer a voluntary computer exercise that deepens the understanding of the methods and applications covered in the lecture. The students will have the opportunity to solve problems from the energy domain by using optimization and machine learning approaches implemented in the programming language Python.

The course's general focus is on the application of the methods in the energy field and not on the mathematical details of the different approaches.

The total workload for this course is approximately 105 hours:

- Attendance: 30 hours
- Self-study: 30 hours
- Exam preparation: 45 hours

T 7.211 Module component: Machine Tools and High-Precision Manufacturing Systems [T-MACH-110963]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101286 - Machine Tools and Industrial Handling

Type	Credits	Grading	Term offered	Version
Oral examination	9 CP	graded	Each winter term	2

Courses					
WT 25/26	2149910	Machine Tools and High-Precision Manufacturing Systems	6 SWS	Lecture / Practice / 🗣	Fleischer
Exams					
WT 25/26	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral exam (approx. 45 minutes)

Prerequisites
T-MACH-102158 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-109055 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-110962 - Machine Tools and High-Precision Manufacturing Systems must not be commenced.

Additional Information
The course is offered in German.

Workload
270 hours

Below you will find excerpts from courses related to this module component:

V **Machine Tools and High-Precision Manufacturing Systems** — **Lecture / Practice (VÜ) On-Site**
2149910, WS 25/26, 6 SWS, Language: German, Open in study portal

Content
The lecture gives an overview of the construction, use and application of machine tools and high-precision manufacturing systems. In the course of the lecture a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools and high-precision manufacturing systems is conveyed. First, the main components of the systems are systematically explained and their design principles as well as the integral system design are discussed. Subsequently, the use and application of machine tools and high-precision manufacturing systems will be demonstrated using typical machine examples. Based on examples from current research and industrial applications, the latest developments are discussed, especially concerning the implementation of Industry 4.0 and artificial intelligence.
Guest lectures from industry round off the lecture with insights into practice.

The individual topics are:

- Structural components of dynamic manufacturing Systems
- Feed axes: High-precision positioning
- Spindles of cutting machine Tools
- Peripheral Equipment
- Machine control unit
- Metrological Evaluation
- Maintenance strategies and condition Monitoring
- Process Monitoring
- Development process for machine tools and high-precision manufacturing Systems
- Machine examples

Learning Outcomes:

The students …

- are able to assess the use and application of machine tools and high-precision manufacturing systems and to differentiate between them in terms of their characteristics and design.
- can describe and discuss the essential elements of machine tools and high-precision manufacturing systems (frame, main spindle, feed axes, peripheral equipment, control unit).
- are able to select and dimension the essential components of machine tools and high-precision manufacturing systems.
- are capable of selecting and evaluating machine tools and high-precision manufacturing systems according to technical and economic criteria.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING/TVWL:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine montags und mittwochs, Übungstermine donnerstags.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Lectures on Mondays and Wednesdays, tutorial on Thursdays.
The tutorial dates will announced in the first lecture.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.212 Module component: Management Accounting 1 [T-WIWI-102800]

Coordinators: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	see Annotations	2

Courses					
ST 2026	2579900	Management Accounting 1	2 SWS	Lecture / 🖥	Wouters
ST 2026	2579901	Tutorial Management Accounting 1 (Bachelor)	2 SWS	Practice / 🗣	Dickemann
ST 2026	2579902	Tutorial Management Accounting 1 (Master)	2 SWS	Practice / 🗣	Dickemann
Exams					
WT 25/26	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
WT 25/26	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (120 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Recommendations
We recommend that you take part in our exercise for the lecture.

Additional Information
The course "Management Accounting 1" and the corresponding assessment for first-time examinees will be offered for the last time in the **summer semester 2026**.

The exercise is offered separately for Bachelor's students as well as for students in the Master's transfer and Master's program.

Note for exam registration:

- Bachelor students: 79-2579900-B Management Accounting 1 (Bachelor)
- Students in the Master's transfer and Master's program: 79-2579900-M Management Accounting 1 (Master's transfer and Master)

Below you will find excerpts from courses related to this module component:

V Management Accounting 1

2579900, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics.
- They can use financial information for various purposes in organizations.

Examination:

- The assessment consists of a written exam (120 minutes) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Organizational issues
Bitte beachten Sie:
- die Vorlesung Management Accounting 1 wird letztmalig im SoS 2026 und
- die Vorlesung Management Accounting 2 wird letztmalig im WS 2026/27 angeboten.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

V **Tutorial Management Accounting 1 (Bachelor)** — **Practice (Ü) On-Site**
2579901, SS 2026, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

Organizational issues
Bitte beachten Sie:
- die Übung Management Accounting 1 wird letztmalig im SoS 2026 und
- die Übung Management Accounting 2 wird letztmalig im WS 2026/27 angeboten.

V **Tutorial Management Accounting 1 (Master)** — **Practice (Ü) On-Site**
2579902, SS 2026, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

Organizational issues
Bitte beachten Sie:
- die Übung Management Accounting 1 wird letztmalig im SoS 2026 und
- die Übung Management Accounting 2 wird letztmalig im WS 2026/27 angeboten.

T 7.213 Module component: Management Accounting 2 [T-WIWI-102801]

Coordinators: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	see Annotations	2

Courses					
WT 25/26	2579903	Management Accounting 2	2 SWS	Lecture / 🖥	Wouters
WT 25/26	2579904	Tutorial Management Accounting 2 (Bachelor)	2 SWS	Practice / 🗣	Letmathe
WT 25/26	2579905	Tutorial Management Accounting 2 (Master)	2 SWS	Practice / 🗣	Letmathe
Exams					
WT 25/26	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
WT 25/26	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (120 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendations
It is recommended:

- to take part in the course "Management Accounting1" before this course
- participation in the exercise for the lecture "Management Accounting 2"

Additional Information
The course "Management Accounting 2" and the corresponding assessment for first-time examinees will be offered for the last time in the **winter semester 2026/2027**.

The exercise for the lecture is offered separately for Bachelor's students as well as for students in the Master's transfer and Master's program.

Note for exam registration: Bachelor students:

- 79-2579903-B Management Accounting 2 (Bachelor)
- Students in the Master's transfer and Master's program: 79-2579903-M Management Accounting 2 (Master's transfer and Master)

Below you will find excerpts from courses related to this module component:

V Management Accounting 2

2579903, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Recommendations:

- It is recommended to take part in the course "Management Accounting 1" before this course.

Examination:

- The assessment consists of a written exam (120 min) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Verlag: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- Zusätzlich werden Artikel auf ILIAS zur Vergügung gestellt.

V **Tutorial Management Accounting 2 (Bachelor)** — **Practice (Ü) On-Site**
2579904, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

V **Tutorial Management Accounting 2 (Master)** — **Practice (Ü) On-Site**
2579905, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

T 7.214 Module component: Management of IT-Projects [T-WIWI-113968]

Coordinators: Prof. Dr.-Ing. Sascha Alpers
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2511214	IT Project Management	2 SWS	Lecture / 🗣	Alpers
ST 2026	2511215	Exercise IT Project Management	1 SWS	Practice / 🗣	Rybinski
Exams					
WT 25/26	79AIFB_ITP_C3	IT Project Management (Registration extended until 16.02.2026)			Oberweis
ST 2026	791-AIFB-ITPM-HK	IT Project Management (Registration until 20.07.2026)			Oberweis

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (written exam) lasting 60 minutes.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-102667 - Management of IT-Projects must not have been started.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V IT Project Management

2511214, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Contents:

The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Learning objectives:

Students

- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropiate to current project phases and project contexts,
- consider organisational and social impact factors.

Recommendations:

Knowledge about Software Engineering is helpful.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004
- Project Management Institute Standards Committee. A Guide to the Project Management Body of Knowledge (PMBoK guide). Project Management Institute. Four Campus Boulevard. Newton Square. PA 190733299. U.S.A.

V

Exercise IT Project Management

2511215, SS 2026, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Content

The general conditions, influencing factors and methods in the planning, execution and control of IT projects are dealt with. In particular, the following topics will be dealt with: Project environment, project organization, project structure plan, effort estimation, project infrastructure, project control, decision-making processes, negotiation, time management.

T 7.215 Module component: Market Research [T-WIWI-107720]

Coordinators: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101647 - Data Science: Evidence-based Marketing
M-WIWI-105312 - Marketing and Sales Management
M-WIWI-105714 - Consumer Research
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	3

Courses					
ST 2026	2571150	Market Research	2 SWS	Lecture / 🗣	Klarmann
ST 2026	2571151	Market Research Tutorial	1 SWS	Practice / 🗣	Klarmann
Exams					
WT 25/26	7900053	Market Research			Klarmann
ST 2026	7900015	Market Research			Klarmann

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of success takes place through a written exam (70 minutes) with additional aids in the sense of an open book exam. Further details will be announced during the lecture.

Prerequisites
None

Recommendations
None

Additional Information
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

Below you will find excerpts from courses related to this module component:

V **Market Research** — **Lecture (V) On-Site**
2571150, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

The aim of this lecture is to give an overview of essential statistical methods. In the lecture students learn the practical use as well as the correct handling of different statistical survey methods and analysis procedures. In addition, emphasis is put on the interpretation of the results after the application of an empirical survey. The derivation of strategic options is an important competence that is required in many companies in order to react optimally to customer needs.

The assessment is carried out (according to §4(2), 3 SPO) in the form of a written open book exam.

The total workload for this course is approximately 135.0 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45.0 hours

Exam and exam preparation: 60.0 hours

Please note that this course has to be completed successfully by students interested in master thesis positions at the chair of marketing.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.216 Module component: Marketing Analytics [T-WIWI-103139]

Coordinators: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101647 - Data Science: Evidence-based Marketing

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each winter term	6

Courses					
WT 25/26	2572170	Marketing Analytics	2 SWS	Lecture / 🗣	Klarmann
WT 25/26	2572171		1 SWS	Practice / 🗣	Jacob
Exams					
WT 25/26	7900082	Marketing Analytics			Klarmann

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative (according to §4(2), 3 of the examination regulation) exam assessment (working on tasks in groups during the lecture).

Prerequisites
None

Recommendations
It is strongly recommended to complete the course "Market Research" prior to taking the "Marketing Analytics" course.

Additional Information
"Marketing Analytics" is offered as a block course with an alternative exam assessment.
Starting in the winter semester 22/23, the course will be scheduled to be completed after two thirds of the semester. For further information, please contact the Marketing and Sales Research Group (marketing.iism.kit.edu). Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing and Sales Research Group.

Below you will find excerpts from courses related to this module component:

V Marketing Analytics

2572170, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

Students

- receive based on the course market research an overview of advanced empirical methods
- learn in the course of the lecture to handle advanced data collection and data analysis methods
- are based on the acquired knowledge able to interpret results and derive strategic implications

Total workload for 4.5 ECTS: ca. 135 hours.

In order to attend Marketing Analytics, students are required to have passed the course Market Research.

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu).

Literature

- Hanssens, Dominique M., Parsons, Leonard J., Schultz, Randall L. (2003), Market response models: Econometric and time series analysis, 2nd ed, Boston.
- Gelman, Andrew, Hill, Jennifer (2006), Data analysis using regression and multilevel/hierarchical models, New York.
- Cameron, A. Colin, Trivedi, Pravin K. (2005), Microeconometrics: methods and applications, New York.
- Chapman, Christopher, Feit, Elea M. (2015), R for Marketing Research and Analytics, Cham.
- Ledolter, Johannes (2013), Data mining and business analytics with R, New York.

V 2572171, WS 25/26, 1 SWS, Language: English, Open in study portal **Practice (Ü) On-Site**

Content
Tasks parallel to the lecture to work on in a group of students.

Organizational issues
Blockveranstaltung: genaue Uhrzeiten und Raum werden noch bekannt gegeben

T 7.217 Module component: Master's Thesis [T-WIWI-103142]

Coordinators: Studiendekan der KIT-Fakultät für Informatik
Studiendekan des KIT-Studienganges
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101659 - Master's Thesis

Type	Credits	Grading	Language	Version
Final Thesis	30 CP	graded	D	1

Assessment
see module description

Prerequisites
see module description

Final Thesis
This module component represents a final thesis. The following periods have been supplied:

Submission deadline	6 months
Maximum extension period	3 months
Correction period	8 weeks

T 7.218 Module component: Matching Theory [T-WIWI-113264]

Coordinators: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101500 - Microeconomic Theory

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	see Annotations	1

Courses					
WT 25/26	2500042	Matching Theory	3 SWS	Lecture / Practice / 🗣	Okulicz
Exams					
WT 25/26	7900347	Matching Theory			Puppe

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The examination will be offered for the last time in the summer semester 2026. Success is assessed in the form of a written examination lasting 90 minutes.

Additional Information
The course is no longer offered.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Matching Theory

2500042, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
How should we organize recruitment of students to schools? Could we improve the placement of doctors to hospitals? Why there always seems to be a better roommate to the one you currently have? Matching Theory answers all these questions and more. During the course we will formally study mathematical systems of allocating goods and people, and see their many real life applications from organizing kidney exchange to improving dating apps. The course will cover three main topics in Matching Theory and Market Design: (1) assignment problems (e.g., allocation of social housing), (2) two-sided matching (e.g., allocation of children to schools), (3) transferable-utility matching (e.g., labor market).

The students are expected to:

1. Understand the mathematical properties of allocations and commonly used mechanism
2. Understand the connection between Matching Theory and real-life allocation systems
3. Be able to use their knowledge to propose solutions for novel real-life problems

Workload:

- Attendance time – Lecture (2 SWS × 15 weeks): 30 h
- Attendance time – Tutorial (1 SWS × 15 weeks): 15 h
- Self-study – Lecture: 45 h
- Self-study – Tutorial: 25 h
- Exam preparation: 20 h
- **Total workload: 135 h**

T 7.219 Module component: Mathematical Methods for Production Systems [T-MACH-113914]

Coordinators: Dr.-Ing. Marion Baumann
Prof. Dr.-Ing. Kai Furmans

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems

Type	Credits	Grading	Term offered	Version
Oral examination	6 CP	graded	Each summer term	1

Courses					
ST 2026	2118081	Mathematical methods for Production Systems	4 SWS	Lecture / 🗣	Baumann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Additional Information
The course is offered in English.

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V Mathematical methods for Production Systems

2118081, SS 2026, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Media:

lecture notes, presentations

Learning Content:

- single server systems: M/M/1, M/G/1: priority rules, model of failures
- networks: open and closed approximations, exact solutions and approximations
- discrete-time modeling of queuing systems

Learning Goals:

Students are able to:

- Describe queueing systems with analytical solvable stochastic models,
- Derive approches for modeling and controlling material flow and production systems based on models of queueing theory,
- Use simulation and exakt methods.

Recommendations:

- Basic knowledge of statistic
- recommended compusory optional subject: Stochastics

Workload:

regular attendance: 42 hours
self-study: 198 hours

Organizational issues

- **Im Sommersemester 2026 ist die Veranstaltung auf maximal 30 Teilnehmer beschränkt.**
- **Die Anmeldung erfolgt durch Beitritt zum ILIAS-Kurs und Ausfüllen des Anmeldungsformulars (erforderliche Felder beim Beitritt zum ILIAS-Kurs).**
- **Die Anmeldung ist vom 01.03.2026 bis zum 31.03.2026 möglich. Die verfügbaren Plätze werden anschließend vergeben.**

Literature

Ronald W. Wolff (1989) Stochastic Modeling and the Theory of Queues, Englewood Cliffs, NJ : Prentice-Hall.
John A. Buzacott, J. George Shanthikumar (1993) Stochastic Models of Manufacturing Systems, Upper Saddle River, NJ : Prentice Hall.

T 7.220 Module component: Mathematics for High Dimensional Statistics [T-WIWI-111247]

Coordinators: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Oral examination	4,5 CP	graded	Irregular	1

Assessment
The assessment of the course (lecture and exercise) consists of an oral exam (approx. 30 min.) taking place in the recess period.

Prerequisites
None

Recommendations
Basic knowledge of mathematics and statistics is assumed.
Knowledge in multivariate statistics is an advantage, but not necessary for the course.

T 7.221 Module component: Media Management [T-WIWI-112711]

Coordinators: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-106258 - Digital Marketing

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2572192	Media Management	2 SWS	Lecture / 🗣	Kupfer
WT 25/26	2572193	Media Management Exercise	1 SWS	Practice / 🗣	Kupfer, Mitarbeiter, Schmitt
Exams					
WT 25/26	7900135	Media Management			Kupfer
ST 2026	7900004	Media Management			Kupfer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of an examination of another type. The following aspects are included in the assessment:

- Elaboration and presentation of a group task
- Written exam

Further details on the organization of the performance and the points system for the assessment will be announced in the lecture.

Prerequisites
None

Recommendations
Students are highly encouraged to actively participate in class.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Media Management

2572192, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn the theoretical foundations of media management and its most important concepts. They learn both about the key characteristics of both media products and media markets. They further get to know essential business models of media markets. Special emphasis will be given to understanding media consumers and the marketing mix of media products. A tutorial offers the opportunity to apply the key learnings of the lecture.

The learning objectives are as follows:

- Getting to know the theoretical foundations of media management
- Evaluating strategies for media products and services as media-specific marketing mix instruments
- Fostering critical and analytical thinking skills and the application of knowledge to marketing problems
- Improvement of skills and competences in the area of project management within the framework of group work
- Improvement of foreign language skills (business English)

Total time required for 4.5 credit points: approx. 135 hours

Attendance time: 30 hours

Self-study: 105 hours

Organizational issues
Appointments to be announced.

T 7.222 Module component: Membrane Technologies in Water Treatment [T-CIWVT-113236]

Coordinators: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each summer term	1

Courses					
ST 2026	2233010	Membrane Technologies in Water Treatment	2 SWS	Lecture / 🗣	Horn, Saravia
ST 2026	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice / 🏵	Horn, Saravia, und Mitarbeitende
Exams					
WT 25/26	7233010	Membrane Technologies in Water Treatment			Horn, Saravia
ST 2026	7233010	Membrane Technologies in Water Treatment			Horn, Saravia

Legend: 💻 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an written examination lasting 90 minutes.

Prerequisites
Prerequisite: Submission of exercises, membrane design and short presentation (5 minutes, group work).

T 7.223 Module component: Metal Forming [T-MACH-105177]

Coordinators: Prof. Dr.-Ing. Thomas Herlan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	2

Courses					
ST 2026	2150681	Metal Forming	2 SWS	Lecture / 🗣	Herlan
Exams					
WT 25/26	76-T-MACH-105177	Metal Forming			Herlan

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral Exam (20 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Metal Forming** — Lecture (V) On-Site
2150681, SS 2026, 2 SWS, Language: German, Open in study portal

Content
At the beginning of the lecture the basics of metal forming are briefly introduced. The focus of the lecture is on massive forming (forging, extrusion, rolling) and sheet forming (car body forming, deep drawing, stretch drawing). This includes the systematic treatment of the appropriate metal forming Machines and the corresponding tool technology. Aspects of tribology, as well as basics in material science and aspects of production planning are also discussed briefly. The plastic theory is presented to the extent necessary in order to present the numerical simulation method and the FEM computation of forming processes or tool design. The lecture will be completed by product samples from the forming technology.

The topics are as follows:

- Introduction and basics
- Hot forming
- Metal forming machines
- Tools
- Metallographic fundamentals
- Plastic theory
- Tribology
- Sheet forming
- Extrusion
- Numerical simulation
- Sustainability in forming technology
- I4.0 and AI applications
- Production planning and quality assurance

Learning Outcomes:

The students …

- are able to reflect the basics, forming processes, tools, Machines and equipment of metal forming in an integrated and systematic way.
- are capable to illustrate the differences between the forming processes, tools, machines and equipment with concrete examples and are qualified to analyze and assess them in terms of their suitability for the particular application.
- are also able to transfer and apply the acquired knowledge to other metal forming problems.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Vorlesungstermine freitags, wöchentlich.
Die konkreten Termine werden in der ersten Vorlesung bekannt gegeben und auf der Institutshomepage und ILIAS veröffentlicht.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T 7.224 Module component: Methods and Models in Transportation Planning [T-BGU-101797]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6232701	Calculation Methods and Models in Traffic Planning	2 SWS	Lecture / Practice / 🗣	Vortisch, Mitarbeiter/innen
Exams					
WT 25/26	8240101797	Methods and Models in Transportation Planning			Vortisch
ST 2026	8240101797	Methods and Models in Transportation Planning			Vortisch

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
None

Recommendations
None

Additional Information
None

Workload
90 hours

T 7.225 Module component: Methods in Economics [T-WIWI-114054]

Coordinators: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-107011 - Economics of Innovation and Growth

Type	Credits	Grading	Term offered	Version
Examination of another type	1,5 CP	graded	Each summer term	1

Courses					
ST 2026	2560240	Methods in Economics	1 SWS	Lecture / 🗣	Ott
Exams					
ST 2026	7900108	Methods in Economics			Ott

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of success of the lecture will be in the form of an examination of another type.

Prerequisites
None

Recommendations
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012] and Economics II [2600014]. Further, it is assumed that students have interest in using quantiative-mathematical methods.

Additional Information
Due to Prof. Dr. Ingrid Ott's research semester, the lectures for this course will not be offered in the summer semester 2026.

Below you will find excerpts from courses related to this module component:

V Methods in Economics

2560240, SS 2026, 1 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
The economic exploitation of inventions is an important part of innovation economics. Intellectual property rights such as patents or trademarks play a central role. Within this workshop, the recording, processing and analysis of such intellectual property rights will be deepened, e.g. considering specific technologies. Students will learn how to work with relational databases, the econometric evaluation of recorded data, and methods for visualising them.

Learning objectives:

The student

- learns to query data sources.
- is able to analyse data with statistical methods.
- visualises and interprets data evaluations (e.g. using dashboards or methods of network analysis).

Recommendations:

An interest in working with data, basic knowledge on databases as well as basic knowledge in economics and statistics are advantageous.

Workload:

The total workload for this course is approximately 45 hours.

- Classes: ca. 5 h
- Self-study: ca. 40 h

Assessment:

Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

Organizational issues
The course is structured along three meetings. The first of which is getting an individual assignment, the second meeting to guide/ direct the students, whereas the third meeting is assignment as a group project.

Meeting 1 will take place on **30.04.2026** in **Building 01.87, B5.25**.

Meeting 2 will take place on **04.06.2026** in **Building 01.87, B5.25**.

Meeting 3 will take place on **23.07.2026** in **Building 01.87, B5.25**.

The exact time will be announced later.

Students are offered the opportunity to participate in this course jointly with the course “Seminar in Economic Policy”, within the module “Economics of Innovation and Growth”. The work in both courses will be strongly related to each other, as students will work on the same topic from two different perspectives. Students in the course “Seminar in Economic Policy” will be provided with the opportunity to write a paper that addresses the results found by the students in the course “Methods in Economics”. Taking both courses together will enable the students to earn 4.5 ECTS.

Literature
Relevante Literatur wird in der Vorlesung bekanntgegeben.
(Relevant literature will be announced in the lecture.)

T 7.226 Module component: Methods in Innovation Management [T-WIWI-110263]

Coordinators: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Assessment
The assessment is an alternative exam assessment consisting of a presentation (25%) and a written paper (75%). The points system for the assessment is determined by the lecturer of the course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
Prior attendance of the course “Innovation Management: Concepts, Strategies and Methods” is recommended.

Additional Information
Teaching and learning format: Seminar

Workload
90 hours

T 7.227 Module component: Micro- and Nanosystem Integration for Medical, Fluidic and Optical Applications [T-MACH-108809]

Coordinators: apl. Prof. Dr. Ulrich Gengenbach
Dr. Liane Koker
apl. Prof. Dr. Ingo Sieber

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Assessment
Oral exam (Duration: 30min)

Prerequisites
T-MACH-105695 "Selected topics of system integration for micro- and nanotechnology" must not be started.

Workload
120 hours

T 7.228 Module component: Micro- and nanotechnology in implant technology [T-MACH-111030]

Coordinators: Dr. Ralf Ahrens
Dr. Patrick Wolfgang Doll

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2141871	Micro- and nanotechnology in implant technology	2 SWS	Lecture / 🗣	Doll, Ahrens, Guber
ST 2026	2141871	Micro- and nanotechnology in implant technology	2 SWS	Lecture / 🗣	Doll, Ahrens, Guber

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral Exam (20 min.)

Prerequisites
None

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Micro- and nanotechnology in implant technology** — **Lecture (V) On-Site**
2141871, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
siehe oben

V **Micro- and nanotechnology in implant technology** — **Lecture (V) On-Site**
2141871, SS 2026, 2 SWS, Language: German, Open in study portal

Content
siehe oben

T 7.229 Module component: Microactuators [T-MACH-101910]

Coordinators: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101292 - Microoptics
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	3

Courses					
ST 2026	2142881	Microactuators	2 SWS	Lecture / 🗣	Kohl
Exams					
ST 2026	76-T-MACH-101910	Microactuators			Kohl
ST 2026	76T-MACH-101910_2	Microactuators			Kohl

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
T-MACH-114036 must not be started

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Microactuators

2142881, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
- Basic knowledge in the material science of the actuation principles
- Layout and design optimization
- Fabrication technologies
- Selected developments
- Applications

The lecture includes amongst others the following topics:

- Microelectromechnical systems: linear actuators, microrelais, micromotors
- Medical technology and life sciences: Microvalves, micropumps, microfluidic systems
- Microrobotics: Microgrippers, polymer actuators (smart muscle)
- Information technology: Optical switches, mirror systems, read/write heads

Literature
- Folienskript "Mikroaktorik"
- D. Jendritza, Technischer Einsatz Neuer Aktoren: Grundlagen, Werkstoffe, Designregeln und Anwendungsbeispiele, Expert-Verlag, 3. Auflage, 2008
- M. Kohl, Shape Memory Microactuators, M. Kohl, Springer-Verlag Berlin, 2004
- N.TR. Nguyen, S.T. Wereley, Fundamentals and applications of Microfluidics, Artech House, Inc. 2002
- H. Zappe, Fundamentals of Micro-Optics, Cambride University Press 2010

T 7.230 Module component: Microbiology for Engineers [T-CIWVT-108871]

Coordinators: Prof. Dr. Thomas Schwartz
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each summer term	1

Prerequisites
None

T 7.231 Module component: Mixed Integer Programming I [T-WIWI-102719]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Courses					
WT 25/26	2550138	Mixed-integer Programming I	2 SWS	Lecture / 🗣	Stein
WT 25/26	2550139	Exercises Mixed Integer Programming I	2 SWS	Practice / 🗣	Stein, Beck, Neussel
ST 2026	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 25/26	7900180_WS2526_HK	Mixed Integer Programming I			Stein
ST 2026	7900014_SS2026_NK	Mixed Integer Programming I			Stein

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of *Mixed Integer Programming II* [25140]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Additional Information
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from courses related to this module component:

V **Mixed-integer Programming I** — **Lecture (V) On-Site**
2550138, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, and portfolio optimization with limitations on the number of securities. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *linear* optimization problems and is structured as follows:

- Introduction, solvability, and basic concepts
- LP relaxation and error bounds for roundings
- Branch-and-bound method
- Gomory's cutting plane method
- Benders decomposition

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *nonlinear* optimization problems forms the contents of the lecture "Mixed-integer Programming II".

Learning objectives:

The student

- knows and understands the fundamentals of linear mixed integer programming,
- is able to choose, design and apply modern techniques of linear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

V Mixed-integer Programming II

2550140, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 7.232 Module component: Mixed Integer Programming II [T-WIWI-102720]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Courses					
ST 2026	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🗣	Stein
ST 2026	2550141	Exercise to Mixed-integer Programming II	1 SWS	Practice / 🗣	Stein, Schwarze
Exams					
ST 2026	7900009_SS2026_HK	Mixed Integer Programming II			Stein

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.
The examination is held in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of *Mixed Integer Programming I* [2550138]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Additional Information
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from courses related to this module component:

V Mixed-integer Programming II

2550140, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 7.233 Module component: Mobility Services and New Forms of Mobility [T-BGU-103425]

Coordinators: Prof. Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	1

Courses					
ST 2026	6232811	Mobility Services and New Forms of Mobility	2 SWS	Lecture / 🗣	Kagerbauer
Exams					
WT 25/26	8240103425	Mobility Services and new Forms of Mobility			Kagerbauer
ST 2026	8240103425	Mobility Services and new Forms of Mobility			Kagerbauer

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
None

Recommendations
None

Additional Information
None

Workload
90 hours

T 7.234 Module component: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

Coordinators: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102808 - Digital Service Systems in Industry
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	4

Courses					
WT 25/26	2550490	Modellieren und OR-Software: Fortgeschrittene Themen	3 SWS	Practical course / 🖧	Pomes, Linner, Nickel
Exams					
WT 25/26	7900071	Modeling and OR-Software: Advanced Topics			Nickel
ST 2026	7900188	Modeling and OR-Software: Advanced Topics			Nickel

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is a written examination. The examination is held in every semester. The prerequisite can only be obtained in semesters in which the course exercises are offered.

Prerequisites
Prerequisite for admission to the exam is the successful participation in the exercises. This includes the processing and presentation of exercises.

Recommendations
Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

Successful completion of the course *Modeling and OR-Software: Introduction*.

Additional Information
Due to the limited number of participants, please register in advance. Further information can be found on the website of the course. Registration takes place via the Wiwi-Portal.The course is offered every winter semester. The planned lectures and courses for the next three years are announced online at https://dol.ior.kit.edu/Lehrveranstaltungen.php.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Modellieren und OR-Software: Fortgeschrittene Themen

2550490, WS 25/26, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The advanced course is designated for Master students that already attended the introductory course or gained equivalent experience elsewhere, e.g. during a seminar or bachelor thesis. We will work on advanced topics and methods in OR, among others, cutting planes, column generation and constraint programming. The Software used for the exercises is IBM ILOG CPLEX Optimization Studio. The associated modelling programming language is Python.

Please note that the second exam in the summer semester 26 will only be offered to students in their second try.

T 7.235 Module component: Modeling and Simulation [T-WIWI-112685]

Coordinators: Prof. Dr.-Ing. Sanja Lazarova-Molnar
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2511100	Modeling and Simulation	2 SWS	Lecture	Lazarova-Molnar
ST 2026	2511101	Exercises Modeling and Simulation	1 SWS	Practice	Lazarova-Molnar, Mostafa
Exams					
WT 25/26	79AIFB_MaS_A6	Modeling and Simulation (Registration extended until 16.02.2026)			Lazarova-Molnar
ST 2026	791-AIFB-MaS-HK	Modeling and Simulation (Registration until 20.07.2026)			Lazarova-Molnar

Assessment
Depending on the number of participants in the course, the exam will be offered either as an oral exam (20 min), or as a written exam (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendations
Some experience in programming and knowledge of basic mathematics and statistics.

Additional Information
Instruction is in the form of lectures and exercises. A detailed course schedule will be published before the start of the semester.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Modeling and Simulation** **Lecture (V)**
2511100, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Modeling and Simulation is the most widely used operations research / systems engineering technique for designing new systems and optimizing the performance of existing systems. In one way or another, just about every engineering or scientific field uses simulation as an exploration, modeling, or analysis technique. The course is designed to provide students with basic knowledge of modeling and simulation approaches and to provide them with first experience of using a simulation package. The course will focus on modeling and simulation of real-world discrete event systems. Examples of discrete events are customer arrivals at a queue of a service desk, machine failures in manufacturing systems, telephone calls in a call center, etc. Moreover, continuous and hybrid models will be also discussed. Topics include Discrete-Event Simulation, Input Modeling, Output Analysis, Random Number Generation, Verification and Validation, Stochastic Petri Nets and Markov Chains.

Competence Certificate

Depending on the number of participants in the course, the exam will be offered either as an oral exam (20 min), or as a written exam (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Learning Objectives

Knowledge:

- Demonstrate knowledge about general and specific theories, challenges, algorithms, methods, technologies, and tools related to modelling and simulation
- Demonstrate knowledge of two important classes of simulation:
  - Discrete-event Monte-Carlo simulation,
  - Continuous simulation with ODEs
- Demonstrate knowledge of algorithms necessary to build a simulator

Skills:

- Analyse suitability of an approach/tool for a given modelling problem
- Understand simulation models of various types
- Demonstrate methods and techniques to overcome common challenges in modelling and simulation
- Model simulation input data
- Analyse and model discrete stochastic systems
- Analyse and interpret simulation results

Competences:

- Use different methods to conduct simulation-based analysis of real-world data
- Build and simulate stochastic models
- Use simulation software

Prerequisites

Some experience in programming and knowledge of basic mathematics and statistics

Form of instruction

Lectures and exercises. A detailed course plan will be published before the semester start.

Literature

Discrete-Event System Simulation, 5th Edition

Jerry Banks, John S. Carson, II, Barry L. Nelson and David M. Nicol

T 7.236 Module component: Modeling the Dynamics of Financial Markets [T-WIWI-113414]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-106660 - Modeling the Dynamics of Financial Markets

Type	Credits	Grading	Term offered	Version
Written examination	9 CP	graded	Each summer term	1

Assessment
The examination takes the form of a one-hour written comprehensive examination on the courses "Dynamic Capital Marke Theory", "Essentials for Dynamic Financial Machine Learning" and "Exercises, Python, Resesearch Frontier in Dynamic Capital Markets".

Recommendations
Recommendation: Knowledge in the fields of Advanced Statistics, Deep Learning, Financial Economics, Differential Equations, Optimization.

Workload
270 hours

T 7.237 Module component: Morphodynamics [T-BGU-101859]

Coordinators: Prof. Dr. Mario Jorge Rodrigues Pereira da Franca
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	1

Courses					
ST 2026	6222805	Landscape and River Morphology	2 SWS	Lecture / Practice / 🗣	Rodrigues Pereira da Franca, Vanzo

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
See German version.

Prerequisites
None

Workload
90 hours

T 7.238 Module component: Multicriteria Optimization [T-WIWI-111587]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	see Annotations	1

Assessment
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.
The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Additional Information
The course is offered every second winter semester (starting WiSe 22/23). The curriculum of the next three years is available online (www.ior.kit.edu).

Contents:

Multicriteria optimization deals with optimization problems with multiple objective functions. In practice, the minimization or maximization of several objectives often conflict with each other, such as weight and stability of mechanical components, return and risk of stock portfolios, or cost and duration of transports. Various scalarization approaches allow one to formulate single-objective problems that can be solved using nonlinear or global optimization techniques, and whose optimal points have a reasonable interpretation for the underlying multicriteria problem.

However, some seemingly obvious scalarization approaches suffer from various drawbacks, so that regardless of scalarization approaches, it is necessary to clarify what is meant by the solution of a multicriteria optimization problem in the first place. For such Pareto-optimal points, optimality conditions and solution procedures based on them can be formulated. From the usually non-unique Pareto set, decision makers finally choose an alternative based on their subjective preferences.

The lecture gives a mathematically sound introduction to multicriteria optimization and is structured as follows:

- Introductory examples and terminology
- Solution concepts
- Methods for the determination of the Pareto set
- Selection of Pareto-optimal points under subjective preferences

Workload
135 hours

T 7.239 Module component: Multivariate Statistical Methods [T-WIWI-103124]

Coordinators: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-101639 - Econometrics and Statistics II
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Courses					
ST 2026	2550554	Analysis of Multivariate Data	2 SWS	Lecture / 🗣	Grothe
ST 2026	2550555	Übung zu Multivariate Verfahren	2 SWS	Practice / 🗣	Vetter
Exams					
ST 2026	7900351	Multivariate Statistical Methods			Grothe

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Witten examination lasting 60 minutes.

The examination is offered during the examination period of the lecture semester. Only repeaters (and not first-time writers) are admitted to the repeat examination in the examination period of the following semester.

Prerequisites
None

Recommendations
Due to the strong quantitative focus and the treatment of advanced statistical methods, in-depth prior knowledge of statistics (comparable to the content of the 'Advanced Statistics' course) is very advantageous for successful completion of the course. Students without such prior knowledge are advised to prepare intensively before the start of the course, as a significantly higher level of familiarization is to be expected.

In addition, prior attendance of the Bachelor course 'Analysis of multivariate data' is recommended. Alternatively, the lecture notes for this course can be made available to students to help them prepare independently.

Additional Information
The course (lecture and exercise) is offered irregularly. Detailed information can be found on the chair's website.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Analysis of Multivariate Data

2550554, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Skript zur Vorlesung

T 7.240 Module component: Nano-Optics [T-PHYS-102282]

Coordinators: PD Dr. Andreas Naber
Organisation: KIT Department of Physics
Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	8 CP	graded	Each winter term	2

Courses					
WT 25/26	4020021	Nano-Optics	3 SWS	Lecture / 🗣	Naber
WT 25/26	4020022	Exercises to Nano-Optics	1 SWS	Practice / 🗣	Naber
Exams					
WT 25/26	7800099	Nano-Optics			Naber

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.241 Module component: Nature-Inspired Optimization Methods [T-WIWI-102679]

Coordinators: Prof. Dr. Pradyumn Kumar Shukla
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2511106	Nature-Inspired Optimization Methods	2 SWS	Lecture /	Shukla
ST 2026	2511107	Übungen zu Nature-Inspired Optimization Methods	1 SWS	Practice /	Shukla
Exams					
WT 25/26	79AIFB_NOM_B5	Nature-Inspired Optimisation Methods (Registration extended until 16.02.2026)			Shukla
ST 2026	791-AIFB-NOM-HK	Nature-Inspired Optimization Methods (Registration until 20.07.2026)			Shukla

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Success is assessed in the form of a written (60 min) or oral examination.

The examination for this course is offered both in the semester in which the course takes place and in the following semester. In the following semester (winter term), participation in the exam is **exclusively reserved for students who did not pass the first attempt.** This regulation applies from summer semester 2025.

Prerequisites
None

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Nature-Inspired Optimization Methods

2511106, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

Learning objectives:

Students learn:

- Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization
- Different aspects and limitation of the methods
- Applications of such methods
- Multi-objective optimization methods
- Constraint handling methods
- Different aspects in parallelization and computing platforms

Literature

* E. L. Aarts and J. K. Lenstra: 'Local Search in Combinatorial Optimization'. Wiley, 1997 * D. Corne and M. Dorigo and F. Glover: 'New Ideas in Optimization'. McGraw-Hill, 1999 * C. Reeves: 'Modern Heuristic Techniques for Combinatorial Optimization'. McGraw-Hill, 1995 * Z. Michalewicz, D. B. Fogel: How to solve it: Modern Heuristics. Springer, 1999 * E. Bonabeau, M. Dorigo, G. Theraulaz: 'Swarm Intelligence'. Oxford University Press, 1999 * A. E. Eiben, J. E. Smith: 'Introduction to Evolutionary Computation'. * M. Dorigo, T. Stützle: 'Ant Colony Optimization'. Bradford Book, 2004 Springer, 2003

T 7.242 Module component: Non- and Semiparametrics [T-WIWI-103126]

Coordinators: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Courses					
WT 25/26	2521300	Non- and Semiparametrics	2 SWS	Lecture	Schienle
WT 25/26	2521301		2 SWS	Practice	Rüter
Exams					
WT 25/26	7900009	Non- and Semiparametrics			Schienle

Assessment
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendations
Knowledge of the contents covered by the course *"Applied Econometrics"* [2520020]

Additional Information
The course takes place every second winter semester: 2018/19 then 2020/21

Below you will find excerpts from courses related to this module component:

V Non- and Semiparametrics

2521300, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Learning objectives:

The student

- has profound knowledge of non- and semiparametric estimation methods
- is capable of implementing these methods using statistical software and using them to assess empirical problems

Content:

Kernel density estimation, local constant and local linear regression, bandwidth choice, series and sieve estimators, additive models, semiparametric models

Requirements:

It is recommended to attend the course *Applied Econometrics* prior to this course.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Literature
Li, Racine: Nonparametric Econometrics: Theory and Practice. Princeton University Press, 2007.

T 7.243 Module component: Nonlinear Control Systems [T-ETIT-100980]

Coordinators: Dr.-Ing. Mathias Kluwe
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101157 - Control Engineering II

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	2303173	Nichtlineare Regelungssysteme	2 SWS	Lecture / ✕	Kluwe
Exams					
WT 25/26	7303173	Nonlinear Control Systems			Kluwe

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Prerequisites
none

T 7.244 Module component: Nonlinear Optimization I [T-WIWI-102724]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	4

Courses					
WT 25/26	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 25/26	2550112	Exercises Nonlinear Optimization I	1 SWS	Practice / 🗣	Stein, Schwarze, Neussel
Exams					
WT 25/26	7900001_WS2526_HK	Nonlinear Optimization I			Stein
ST 2026	7900202_SS2026_NK	Nonlinear Optimization I			Stein

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam. The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

Additional Information
Part I and II of the lecture are held consecutively in the *same* semester.

Below you will find excerpts from courses related to this module component:

V Nonlinear Optimization I

2550111, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature
O. Stein, Basic Concepts of Nonlinear Optimization, Springer, Berlin, 2024

Additional Literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.245 Module component: Nonlinear Optimization I and II [T-WIWI-103637]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	9 CP	graded	Each winter term	6

Courses					
WT 25/26	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 25/26	2550112	Exercises Nonlinear Optimization I	1 SWS	Practice / 🗣	Stein, Schwarze, Neussel
WT 25/26	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 25/26	7900003_WS2526_HK	Nonlinear Optimization I and II			Stein
ST 2026	7900204_SS2026_NK	Nonlinear Optimization I and II			Stein

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consits of a written exam in English (120 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

Prerequisites
None.

Additional Information
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from courses related to this module component:

V Nonlinear Optimization I

2550111, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature
O. Stein, Basic Concepts of Nonlinear Optimization, Springer, Berlin, 2024

Additional Literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

V

Nonlinear Optimization II

2550113, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature
O. Stein, Basic Concepts of Nonlinear Optimization, Springer, Berlin, 2024

Additional Literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.246 Module component: Nonlinear Optimization II [T-WIWI-102725]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	3

Courses					
WT 25/26	2550112	Exercises Nonlinear Optimization I	1 SWS	Practice / 🗣	Stein, Schwarze, Neussel
WT 25/26	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
WT 25/26	2550114	Exercise to Nonlinear Optimization II	1 SWS	Practice / 🗣	Stein, Schwarze, Neussel
Exams					
WT 25/26	7900002_WS2526_HK	Nonlinear Optimization II			Stein
ST 2026	7900203_SS2026_NK	Nonlinear Optimization II			Stein

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consits of a written exam (60 minutes) in English according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites
None.

Additional Information
Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from courses related to this module component:

V **Nonlinear Optimization II** — **Lecture (V) On-Site**
2550113, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature
O. Stein, Basic Concepts of Nonlinear Optimization, Springer, Berlin, 2024

Additional Literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.247 Module component: Novel Actuators and Sensors [T-MACH-102152]

Coordinators: Prof. Dr. Manfred Kohl
Dr. Martin Sommer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101293 - Microsystem Technology
M-MACH-101294 - Nanotechnology
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each winter term	4

Courses					
WT 25/26	2141865	Novel actuators and sensors	2 SWS	Lecture / 🗣	Kohl, Sommer
Exams					
WT 25/26	76-T-MACH-102152	Novel Actuators and Sensors			Kohl, Sommer
ST 2026	76T-MACH-102152_2	Novel Actuators and Sensors			Kohl

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 minutes

Prerequisites
T-MACH-114036 must not be started

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Novel actuators and sensors

2141865, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
- Vorlesungsskript "Neue Aktoren" und Folienskript "Sensoren"
- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007
- "Sensors Update", Edited by H.Baltes, W. Göpel, J. Hesse, VCH, 1996, ISBN: 3-527-29432-5
- "Multivariate Datenanalyse – Methodik und Anwendungen in der Chemie", R. Henrion, G. Henrion, Springer 1994, ISBN 3-540-58188-X

T 7.248 Module component: Online Concepts for Karlsruhe City Retailers [T-WIWI-111848]

Coordinators: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105312 - Marketing and Sales Management
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each summer term	2

Courses					
ST 2026	2571184	Online concepts for Karlsruhe city retailers	2 SWS	Others / 🗣	Kupfer
Exams					
ST 2026	7900221	Online Concepts for Karlsruhe City Retailers			Kupfer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment:

- presentations in teams (in each case to the extent of approx. 15 minutes per team with subsequent discussio)
- delivery of a written elaboration per team.

Additional Information
Please note that an application is required to participate in this workshop. The application phase usually takes place at the beginning of the lecture period in the summer semester. More information on the application process is usually available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the lecture period in the summer semester.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Online concepts for Karlsruhe city retailers** — **Others (sonst.) On-Site**
2571184, SS 2026, 2 SWS, Language: German, Open in study portal

Content
Content
As part of a practical project in cooperation with the city marketing department of KME Karlsruhe Marketing und Event GmbH, students will have the opportunity to directly interact with retailers in Karlsruhe. Challenges of the digitalization of brick-and-mortar retailing will be analyzed and solutions will be developed and implemented.

In a theoretical part at the beginning of the event, students will gain an insight into the theoretical foundations of specific online marketing instruments. In cooperation with Karlsruhe City Marketing, students are taught application-oriented skills in online marketing tools, such as content management systems, social media platforms, search engine optimization or Google Ads campaigns.

In the practical part of the course, student teams cooperate with a real retailer in Karlsruhe's city center and learn how to analyze and optimize online presences and digital solutions based on key performance indicators. Possible use cases range from social media communication and website optimization to the introduction of innovative pricing and payment methods. In this way, students are given the tools for developing, maintaining and optimizing individual websites and digital solutions in stationary retailing.

Learning objectives result accordingly as follows:
- Learning of theoretical basics of central, application-oriented tools of online marketing
- Application and practical deep-dive of the acquired knowledge in a real case
- Concise and structured presentation of results

Total time required for 3 credit points: approx. 90.0 hours

Attendance time: 12 hours

Preparation and wrap-up of the course: 58 hours

Exam and exam preparation: 20 hours

Organizational issues
Kick off Montag 11.5.26 Gebäude 01.87 Seminarraum 025

T 7.249 Module component: Operation Methods for Earthmoving [T-BGU-101801]

Coordinators: Dr.-Ing. Heinrich Schlick
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	1,5 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6241905	Earthwork	1 SWS	Lecture / 🗣	Haghsheno, Waleczko
Exams					
WT 25/26	8240101801	Operation Methods for Earthmoving			Schneider

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
45 hours

T 7.250 Module component: Operation Methods for Foundation and Marine Construction [T-BGU-101832]

Coordinators: Dr.-Ing. Harald Schneider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	1,5 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6241904	Underground Construction	1 SWS	Lecture / 🗣	Haghsheno, Schneider
Exams					
WT 25/26	8240101832	Operation Methods for Foundation and Marine Construction			Schneider

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
45 hours

T 7.251 Module component: Operations Research in Health Care Management [T-WIWI-102884]

Coordinators: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each term	4

Courses					
WT 25/26	2550495	Operations Research in Health Care Management	2 SWS	Lecture / 🗣	Graß
WT 25/26	2550496	Übungen zu OR im Health Care Management	1 SWS	Practice	Graß
ST 2026	2550495	Operations Research in Health Care Management	2 SWS	Lecture / 🗣	Graß
ST 2026	2550496	Übungen zu OR im Health Care Management	1 SWS	Practice / 💻	Graß
Exams					
WT 25/26	7900010	Operations Research in Health Care Management			Graß
ST 2026	7900229	Operations Research in Health Care Management			Graß

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in English in the form of a 60-minute written examination (in accordance with §4(2), 1 SPO).

The examination is offered every semester.

Prerequisites
None

Recommendations
Basic knowledge as co nveyed in the module "Introduction to Operations Research" is assumed.

Additional Information
Lectures and examinations are held in English.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Operations Research in Health Care Management** — **Lecture (V) On-Site**
2550495, WS 25/26, 2 SWS, Language: English, Open in study portal

Literature
Elective literature:

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
- Hall: Patient flow: reducing delay in healthcare delivery, Springer, 2006

V **Operations Research in Health Care Management** — **Lecture (V) On-Site**
2550495, SS 2026, 2 SWS, Language: English, Open in study portal

Literature
Weiterführende Literatur:

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
- Hall: Patient flow: reducing delay in healthcare delivery, Springer, 2006

T 7.252 Module component: Operations Research in Supply Chain Management [T-WIWI-102715]

Coordinators: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	2

Exams			
WT 25/26	7900028	Operations Research in Supply Chain Management	Nickel

Assessment
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendations
Basic knowledge as conveyed in the module Introduction to Operations Research and in the lectures Facility Location and Strategic SCM,Tactical and operational SCMis assumed.

Additional Information
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 7.253 Module component: Optical Transmitters and Receivers [T-ETIT-100639]

Coordinators: Prof.Dr.Dr.h.c. Wolfgang Freude
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading	Term offered	Version
Oral examination	6 CP	graded	Each winter term	2

Courses					
WT 25/26	2309460	Optical Transmitters and Receivers	2 SWS	Lecture / 🗣	Freude
WT 25/26	2309461	Tutorial for 2309460 Optical Transmitters and Receivers	2 SWS	Practice / 🗣	Freude, N.N.
Exams					
WT 25/26	7309460	Optical Transmitters and Receivers			Freude
ST 2026	7309460	Optical Transmitters and Receivers			Freude

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Access controll takes placein form of an overall oral examination (approx. 20 minutes). The individual dates for the oral examination are offered regularly.

Prerequisites
none

Recommendations
Knowledge of the physics of the pn-transition.

T 7.254 Module component: Optimization under Uncertainty [T-WIWI-106545]

Coordinators: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	3

Courses					
WT 25/26	2550464	Optimization Under Uncertainty	2 SWS	Lecture /	Rebennack, Kandora
WT 25/26	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	1 SWS	Practice /	Rebennack
WT 25/26	2550466		2 SWS	Others	Rebennack
Exams					
WT 25/26	7900240	Optimization under Uncertainty			Rebennack
ST 2026	7900309	Optimization under Uncertainty			Rebennack

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Assessment
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites
None.

Workload
135 hours

T 7.255 Module component: Optoelectronic Components [T-ETIT-101907]

Coordinators: TT-Prof. Dr. Tobias Huber-Loyola
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Courses					
ST 2026	2309486	Optoelectronic Components	2 SWS	Lecture /	Huber-Loyola
ST 2026	2309487	Optoelectronic Components (Tutorial)	1 SWS	Practice /	Huber-Loyola
Exams					
WT 25/26	7300023	Optoelectronic Components			Randel
WT 25/26	7309486	Optoelectronic Components			Randel
ST 2026	7309486	Optoelectronic Components			Randel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Type of Examination: oral exam

Duration of Examination: approx. 30 minutes

Modality of Exam: Oral examination, usually one examination day per month during the Summer and Winter terms. An extra questions-and-answers session will be held if students wish so.

Prerequisites
none

Recommendations
Minimal background required: Calculus, differential equations, Fourier transforms and p-n junction physics.

T 7.256 Module component: Overview of Manufacturing Technologies für Industrial Engineers [T-MACH-114686]

Coordinators: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each winter term	1 semesters	1

Courses					
WT 25/26	2149674	Overview of ManufacturingTechnologies for Industrial Engineers	1 SWS	Lecture / 🗣	Schulze
Exams					
WT 25/26	76-T-MACH-114686	Overview of Manufacturing Technologies für Industrial Engineers			Schulze

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Control of success is evaluated on the basis of regular attendance.
Regular attendance is achieved when the student has actively participated in at least 80 % of the course hours that have taken place.
If attendance is less than 80 %, the examiner may decide on a case-by-case basis what additional tasks must be completed in order to still achieve the learning objectives of the course. In the case of absence for an important reason (e.g., illness with a doctor's note), regular attendance is usually recognized.

Additional Information
The course is offered in German.

Workload
30 hours

Below you will find excerpts from courses related to this module component:

V Overview of ManufacturingTechnologies for Industrial Engineers

2149674, WS 25/26, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture provides an overview of the various manufacturing processes and the systematics of their classification according to DIN 8580. The focus is on processes that are not covered in the other courses of the module.

The aim of the lecture is to place manufacturing technology within the context of production engineering and to provide an overview of manufacturing processes. To this end, the lecture conveys fundamental knowledge of manufacturing technology and covers the main types of manufacturing processes.

The specific topics include:

- Primary shaping (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming)
- Cutting (machining with defined and undefined cutting edges, separating, ablating)
- Joining
- Coating
- Chaning material properties

Learning Outcomes:

The students ...

- are able to classify the manufacturing processes according to their fundamental mode of operation based on the six main groups defined in DIN 8580.
- are capable of naming the essential manufacturing processes of the six main groups (DIN 8580) and explaining their functions.
- are able to select suitable manufacturing processes for given components.

Workload:

regular attendance: 6 hours
self-study: 24 hours

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/)
bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.257 Module component: Panel Data [T-WIWI-103127]

Coordinators: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2520320	Panel Data	2 SWS	Lecture	Heller
ST 2026	2520321	Übungen zu Paneldaten	2 SWS	Practice	Heller
Exams					
ST 2026	7900115	Panel Data			Heller

Assessment
The assessment is carried out as an examination of another type in the form of a one-hour exam that includes both a written and an oral part. The exam may be taken as an individual exam or in pairs. The individual components are integrated into a single overall grade that reflects the overall impression of the combined performance

Prerequisites
None

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Panel Data

2520320, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Content:
Fixed-Effects-Models, Random-Effects-Models, Time-Demeaning
Workload:
Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours
Exam preparation: 40 hours
Exam preparation: 40 hours

Literature
Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. Cambridge and London: MIT Press.
Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach* (5th ed.). Mason, Ohio: South-Western Cengage Learning.

T 7.258 Module component: Parametric Optimization [T-WIWI-102855]

Coordinators: Prof. Dr. Oliver Stein
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Assessment
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Additional Information
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 7.259 Module component: Patent Law [T-INFO-101310]

Coordinators: Patric Straßburger
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	3

Courses					
ST 2026	24656	Patent Law	2 SWS	Lecture / 🗣	Straßburger
Exams					
WT 25/26	7500006	Patent Law			Matz
ST 2026	7500109	Patent Law			Sattler

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is carried out as a written examination (§ 4 Abs. 2 No. 1 SPO) lasting 60 minutes.

Prerequisites
None.

Recommendations
None.

T 7.260 Module component: Perceiving, Understanding and Communicating Risk and Uncertainty [T-WIWI-114750]

Coordinators: Dr. rer. nat. Nico Gradwohl
Prof. Dr. Benjamin Scheibehenne

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-105714 - Consumer Research

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4,5 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2500007	Perceiving, Understanding and Communicating Risk and Uncertainty	2 SWS	Block / 🗣	Gradwohl
Exams					
WT 25/26	7900312	Perceiving, Understanding and Communicating Risk and Uncertainty			Scheibehenne

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The course will be assessed via an examination of another type, comprising:

- Presentation of a research topic
- Active participation
- Homework assignments
- Designing and presenting an intervention to improve the understanding or communication of risk and uncertainty (e.g., online tool, a visualization for a specific topic, training program)

The overall impression will be assessed. Further details on the assessment's specific design will be provided during the course.

Prerequisites
None

Recommendations
A strong interest in research on human cognition and consumer behavior, as well as interest to engage with basic mathematical models and probability theory.

Additional Information
How do people perceive the risks of natural disasters, new technologies, or medical treatments like vaccines? And how can we communicate such risks clearly and transparently to support informed decision-making among consumers?

This course explores the science behind risk perception and communication. We will examine different types of risk and uncertainty, how individuals interpret them, and how to communicate them effectively. Topics include experimental methods, key research findings, common misconceptions, and the cognitive processes that shape our understanding of risk.

By the end of the course, students will be able to:

- Define key concepts related to risk and uncertainty.
- Describe experimental paradigms used to study risk perception.
- Critically analyze empirical and theoretical research.
- Apply insights to real-world challenges involving public communication of risk.
- Design strategies for improving how risk-related information is conveyed and understood.

This class will be taught in English. The number of participants is limited. The registration will take place via the Campus portal.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Perceiving, Understanding and Communicating Risk and Uncertainty** — Block (B) On-Site
2500007, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
How do people perceive the risks of natural disasters, new technologies, or medical treatments like vaccines? And how can we communicate such risks clearly and transparently to support informed decision-making among consumers?

This course explores the science behind risk perception and communication. We will examine different types of risk and uncertainty, how individuals interpret them, and how to communicate them effectively. Topics include experimental methods, key research findings, common misconceptions, and the cognitive processes that shape our understanding of risk.

By the end of the course, students will be able to:

- Define key concepts related to risk and uncertainty.
- Describe experimental paradigms used to study risk perception, like decisions from description and decision from experience.
- Critically analyze empirical and theoretical research.
- Apply insights to involving public communication of risk.
- Design strategies for improving how risk-related information is conveyed and understood in real-world challenges

Competence Certificate

· Presentation of a research topic

· Active participation

· Homework assignments

· Designing and presenting an intervention to improve the understanding or communication of risk and uncertainty (e.g., an online tool, a visualization for a specific topic, or training programme)

Organizational issues
This class will be taught in English. The number of participants is limited to 12 participants.

The registration will take place via the WiWi portal. If too many students register, students in higher semesters are selected first. Further selection will take place on a first-come, first served basis.

Literature
Dhami, M. K., & Mandel, D. R. (2022). Communicating uncertainty using words and numbers. Trends in Cognitive Sciences, 26(6), 514-526. 10.1016/j.tics.2022.03.002

Slovic, P. (1987). Perception of risk. *Science*, *236*(4799), 280–285. https://doi.org/10.1126/science.3563507

Tannenbaum, D., Fox, C. R., & Ülkümen, G. (2017). Judgment extremity and accuracy under epistemic vs. aleatory uncertainty. *Management Science*, *63*(2), 497-518. https://doi.org/10.1287/mnsc.2015.2344

Van Der Bles, A. M., van der Linden, S., Freeman, A. L., & Spiegelhalter, D. J. (2020). The effects of communicating uncertainty on public trust in facts and numbers. *Proceedings of the National Academy of Sciences*, *117*(14), 7672-7683. 10.1073/pnas.1913678117

T 7.261 Module component: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Once	1

T 7.262 Module component: PH APL-ING-TL02 [T-WIWI-106292]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Once	1

T 7.263 Module component: PH APL-ING-TL03 [T-WIWI-106293]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Once	1

T 7.264 Module component: PH APL-ING-TL04 ub [T-WIWI-106294]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading	Term offered	Version
Coursework	0 CP	pass/fail	Once	1

T 7.265 Module component: PH APL-ING-TL05 ub [T-WIWI-106295]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading	Term offered	Version
Coursework	0 CP	pass/fail	Once	1

T 7.266 Module component: PH APL-ING-TL06 ub [T-WIWI-106296]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading	Term offered	Version
Coursework	0 CP	pass/fail	Once	1

T 7.267 Module component: PH APL-ING-TL07 [T-WIWI-108384]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Once	1

T 7.268 Module component: Physics for Engineers [T-MACH-100530]

Coordinators: apl. Prof. Dr. Alexander Nesterov-Müller
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each summer term	1

Courses					
ST 2026	2142890	Physics for Engineers	4 SWS	Lecture / Practice / 🗣	Nesterov-Müller
Exams					
WT 25/26	76-T-MACH-100530	Physics for Engineers			Gumbsch, Dienwiebel, Nesterov-Müller, Weygand

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam 90 min

Prerequisites
none

Additional Information
The course is offered in German.

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V **Physics for Engineers** — **Lecture / Practice (VÜ) On-Site**
2142890, SS 2026, 4 SWS, Language: German, Open in study portal

Content
1) Foundations of solid state physics

- Wave particle dualism
- Tunnelling
- Schrödinger equation
- H-atom

2) Electrical conductivity of solids

- solid state: periodic potentials
- Pauli Principle
- band structure
- metals, semiconductors and isolators
- p-n junction / diode

3) Optics

- quantum mechanical principles of the laser
- linear optics
- non-linear optics

Exercises are used for complementing and deepening the contents of the lecture as well as for answering more extensive questions raised by the students and for testing progress in learning of the topics.

The student

- has the basic understanding of the physical foundations to explain the relationship between the quantum mechanical principles and the optical as well as electrical properties of materials
- can describe the fundamental experiments, which allow the illustration of these principles

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises)
self-study: 105 hours

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Literature

- Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
- Haken und Wolf: Atom- und Quantenphysik. Einführung in die experimentellen und theoretischen Grundlagen, 7. Aufl., Springer, 2000
- Harris, Moderne Physik, Pearson Verlag, 2013

T 7.269 Module component: Pioneering Leadership in German SMEs [T-WIWI-114184]

Coordinators: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Assessment
Non exam assessment consisting of a presentation of the results and a seminar paper (written in the group).
The grade is composed of 70% of the grade for the written work and 30% of the grade for the presentation.

Prerequisites
None

Recommendations
Prior attendance of the course Innovation Management is recommended.

Workload
90 hours

T 7.270 Module component: Platform & Market Engineering: Commerce, Media, and Digital Democracy [T-WIWI-112823]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-101411 - Information Engineering
M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-102754 - Service Economics and Management

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2540460	Platform & Market Engineering: Commerce, Media, and Digital Democracy	2 SWS	Lecture / 🗣	Weinhardt, Fegert
ST 2026	2540461	Übungen zu Platform & Market Engineering: Commerce, Media, and Digital Democracy	1 SWS	Practice / 🗣	Fegert, Stano, Schick
Exams					
WT 25/26	7910804	Platform & Market Engineering: Commerce, Media, and Digital Democracy			Weinhardt

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by max. one grade level (0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from courses related to this module component:

V Platform & Market Engineering: Commerce, Media, and Digital Democracy

2540460, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This lecture introduces an *innovative learning format* centered around *dynamic*, *AI-assisted self-study*, complemented by *in-person discussion sessions* to deepen content understanding. Instead of traditional lecture-based teaching (Frontalunterricht), we are piloting a type of flipped-classroom approach. The course is designed to be *co-developed by students and lecturers*—for example, through the creation of podcasts using AI tools like NotebookLM in small groups. This not only reinforces your grasp of the material but also builds your AI literacy.

The course will be graded with 80 points total. 60 of them can be earned in the exam at the end of the semester. The remaining 20 points can be earned in the exercise, where a podcast of a part of the lecture content has to be generated. For outstanding podcast submissions, you can receive up to *10 additional bonus* points.

Digital platforms and markets play an increasingly vital role in modern economies and societies. Understanding how to engineer these systems for efficiency, fairness, and societal benefit is crucial for shaping the digital future. By combining economic theory, engineering principles, and hands-on applications, this course prepares you to address real-world challenges in eCommerce, digital media, and digital democracy.
This lecture provides an in-depth exploration of the theoretical foundations, practical applications, and engineering principles essential for understanding and designing modern markets and digital platforms.

We aim to:

- Equip students with the ability to analyze, design, and evaluate digital markets and platforms.
- Provide an understanding of market mechanisms, economic principles, and the role of digital infrastructure in shaping economic and social interactions.
- Explore the influence of digital platforms on media, democracy, and citizen participation.
- Explore ethical implications of digital platforms and online market mechanisms.
- Apply generative AI tools to analyze, structure, and communicate topics from the lecture.
- Develop skills in critical evaluation of AI-generated content.

Course Structure:

1. Foundations of Platform & Market Engineering
    1. Market Engineering and Institutional Economics
    2. The "House of Market Engineering"
    3. Key concepts: efficiency, fairness, incentive compatibility, market convergence
2. Applications and Principles of Markets
    1. Market Engineering and Institutional Economics
    2. Economic theories in digital markets and platforms
3. Market Engineering Microstructure and Infrastructure
    1. Game Theory
    2. Mechanism Design
    3. Trust and Enforcement
    4. Auctions (single-item, combinatorial)
    5. IT & Business Infrastructure
    6. Evaluating Market Engineering: Experimental Economics
4. Digital Platforms and the Media
5. Digital Democracy:
    1. Online Polarization and Disinformation
    2. Digital Participation Engineering
    3. Digital Citizen Science Engineering
6. Ethical Implications

Organizational issues
ehemals: "**Market Engineering: Information in Institutions"**

Literature

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.
- Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
- Smith, V. "Theory, Experiments and Economics", The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

T 7.271 Module component: Polymers in MEMS A: Chemistry, Synthesis and Applications [T-MACH-102192]

Coordinators: Dr.-Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2141853	Polymers in MEMS A: Chemistry, Synthesis and Applications	2 SWS	/	Worgull
Exams					
WT 25/26	76-T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications			Rapp, Worgull

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Oral examination

Prerequisites
none

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Polymers in MEMS A: Chemistry, Synthesis and Applications

2141853, WS 25/26, 2 SWS, Language: German, Open in study portal — **Blended (On-Site/Online)**

Organizational issues
Findet als Blockveranstaltung am Semesterende statt.

T 7.272 Module component: Polymers in MEMS B: Physics, Microstructuring and Applications [T-MACH-102191]

Coordinators: Dr.-Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2141854	Polymers in MEMS B: Physics, Microstructuring and Applications	2 SWS	Lecture /	Worgull
Exams					
WT 25/26	76-T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications			Worgull

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Oral examination

Prerequisites
none

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Polymers in MEMS B: Physics, Microstructuring and Applications

2141854, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

T 7.273 Module component: Polymers in MEMS C: Biopolymers and Bioplastics [T-MACH-102200]

Coordinators: Dr.-Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	2142855	Polymers in MEMS C - Biopolymers and Bioplastics	2 SWS	/	Worgull
Exams					
WT 25/26	76-T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics			Worgull, Rapp

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Oral examination

Prerequisites
none

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Polymers in MEMS C - Biopolymers and Bioplastics** **Online**
2142855, SS 2026, 2 SWS, Language: German, Open in study portal

Content
Polymers are ubiquitous in everyday life: from packaging materials all the way to specialty products in medicine and medical engineering. Today it is difficult to find a product which does not (at least in parts) consist of polymeric materials. The question of how these materials can be improved with respect to their disposal and consumption of (natural) resources during manufacturing is often raised. Today polymers must be fully recycled in Germany and many other countries due to the fact that they do not (or only very slowly) decompose in nature. Furthermore significant reductions of crude oil consumption during synthesis are of increasing importance in order to improve the sustainability of this class of materials. With respect to disposal polymers which do not have to be disposed by combustion but rather allow natural decomposition (composting) are of increasing interest. Polymers from renewable sources are also of interest for modern microelectromechanical systems (MEMS) especially if the systems designed are intended as single-use products.

This lecture will introduce the most important classes of these so-called biopolymers and bioplastics. It will also discuss and highlight polymers which are created from naturally created analogues (e.g. via fermentation) to petrochemical polymer precursors and describe their technical processing. Numerous examples from MEMS as well as everyday life will be given.

Some of the topics covered are:

- What are biopolyurethanes and how can you produce them from castor oil?
- What are "natural glues" and how are they different from chemical glues?
- How do you make tires from natural rubbers?
- What are the two most important polymers for life on earth?
- How can you make polymers from potatoes?
- Can wood be formed by injection molding?
- How do you make buttons from milk?
- Can you play music on biopolymers?
- Where and how do you use polymers for tissue engineering?
- How can you built LEGO with DNA?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

Organizational issues
Für weitere Rückfragen, wenden Sie sich bitte an PD Dr.-Ing- Matthias Worgull (matthias.worgull@kit.edu). Eine Voranmeldung ist nicht notwendig.

Literature
Zusätzliche vorlesungsbegleitende Literatur ist nicht notwendig.

T 7.274 Module component: Portfolio and Asset Liability Management [T-WIWI-103128]

Coordinators: Dr. Mher Safarian
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2520357	Portfolio and Asset Liability Management	2 SWS	Lecture	Safarian
ST 2026	2520358	Übungen zu Portfolio and Asset Liability Management	2 SWS	Practice	Safarian
Exams					
ST 2026	7900366	Portfolio and Asset Liability Management			Safarian

Assessment
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.).

Prerequisites
None

Below you will find excerpts from courses related to this module component:

V Portfolio and Asset Liability Management

2520357, SS 2026, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
Learning objectives:

Knowledge of various portfolio management techniques in the financial industry.

Content:

Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Exam preparation: 40 hours

Organizational issues
Blockveranstaltung, Termine werden über Ilias bekanntgegeben

Literature
To be announced in the lecture

T 7.275 Module component: Practical Course in Water Technology [T-CIWVT-106840]

Coordinators: Dr. Andrea Hille-Reichel
Prof. Dr. Harald Horn

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101121 - Water Chemistry and Water Technology I

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	4

Courses					
WT 25/26	2233032	Practical Course: Water Quality and Water Assessment	2 SWS	Practical course / 🗣	Horn, Hille-Reichel, und Mitarbeitende
Exams					
WT 25/26	7233032	Practical Course in Water Technology			Horn, Hille-Reichel
ST 2026	7233032	Practical Course in Water Technology			Horn, Hille-Reichel

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The learning control is an examination of another type:
6 Experiments including entrance test, protocol; presentation about a selected experiment (about 15 minutes); final test.

Prerequisites
Participation in two excursions, report.

T 7.276 Module component: Practical Course Polymers in MEMS [T-MACH-105556]

Coordinators: Dr.-Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading	Term offered	Version
Coursework	3 CP	pass/fail	Each summer term	1

Assessment
The practical course will close with an oral examination.There will be only passed and failed results, no grades.

Prerequisites
none

T 7.277 Module component: Practical Seminar Digital Service Systems [T-WIWI-106563]

Coordinators: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	1

Exams			
WT 25/26	7900341	Practical Seminar: Human-Centered Systems	Mädche
ST 2026	7900262	Practical Seminar: Human-Centered Systems	Mädche

Assessment
The assessment is carried out as a single examination of another type that combines three mandatory components:

1. written documentation
2. presentation of the results of the practical components
3. active participation in the discussions

A practical component—e.g. conducting a survey or implementing an application—may also be part of the regular workload and is described in the specific assignment description of the course.

The individual components are integrated into an overall assessment that reflects the overall impression of the combined performance

Prerequisites
None

Recommendations
None

Additional Information
The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

T 7.278 Module component: Practical Seminar: Artificial Intelligence in Service Systems [T-WIWI-112152]

Coordinators: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101506 - Service Analytics

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	1

Assessment
The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Prerequisites
None.

Recommendations
Knowledge in the field of Artificial Intelligence in Service Systems is assumed. Therefore, it is recommended to attend the course Artificial Intelligence in Service Systems [2595650] beforehand.

Workload
135 hours

T 7.279 Module component: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

Coordinators: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	1

Exams			
WT 25/26	7900291	Learning How to Prompt - Developing an Adaptive Chatbot	Weinhardt

Assessment
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendations
At least one module offered by the institute should have been chosen before attending this seminar.

Additional Information
The course is held in english. The course is not offered regularly.

T 7.280 Module component: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

Coordinators: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	3

Courses					
WT 25/26	2500008	Practical seminar: Health Care Management	3 SWS	Others / 🗣	Nickel, Mitarbeiter
Exams					
WT 25/26	7900105	Practical Seminar: Health Care Management (with Case Studies)			Nickel

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this module is an examination of another type and consists of the following components:

- a case study to be worked on,
- a seminar paper and
- a final oral examination.

The overall grade results from the weighted evaluation of the case study, the seminar paper and the presentation. The exact weighting of these individual components for the grade will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
Basic knowledge as conveyed in the module *Introduction toOperations Research* is assumed.

Additional Information
The lecture is offered every term.

The planned lectures and courses for the next three years are announced online.

Workload
135 hours

T 7.281 Module component: Practical Seminar: Human-Centered Systems [T-WIWI-113459]

Coordinators: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	1

Courses					
WT 25/26	2540554	Practical Seminar: Human-Centered Systems	3 SWS	Lecture / 🏵	Mädche
ST 2026	2500073	Practical Seminar: AI-based Mental Healthcare	3 SWS	Lecture / 🏵	Kuhlmeier, Mädche
ST 2026	2540554	Practical Seminar: Human-Centered Systems	3 SWS	Lecture / 🏵	Mädche
Exams					
WT 25/26	7900341	Practical Seminar: Human-Centered Systems			Mädche
ST 2026	7900262	Practical Seminar: Human-Centered Systems			Mädche

Legend: 💻 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is in the form of a different type of examination. The assessment is carried out by a practical component, preparing written documentation and actively participating in the discussions. A total of 60 points can be achieved, of which:

- a maximum of 25 points for the written documentation
- a maximum of 25 points for the practical component
- a maximum of 10 points for active participation in the discussions

At least 30 points must be achieved to pass the performance assessment. Please note that a practical component such as conducting a survey or implementing an application is also part of the regular scope of the course in addition to the written documentation. The respective tasks can be found in the announcement on the institute's website https://h-lab.iism.kit.edu.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-108437 - Practical Seminar: Information Systems and Service Design must not have been started.

Below you will find excerpts from courses related to this module component:

V **Practical Seminar: Human-Centered Systems** — **Lecture (V) Blended (On-Site/Online)**
2540554, WS 25/26, 3 SWS, Language: English, Open in study portal

V **Practical Seminar: AI-based Mental Healthcare** — **Lecture (V) Blended (On-Site/Online)**
2500073, SS 2026, 3 SWS, Language: English, Open in study portal

Content
Mental health disorders affect a significant share of the global population. Meeting the resulting demand for care is a challenge on two fronts: patients face long waiting times and limited access to support, while mental health practitioners work under significant time pressure with processes that are often still manual and fragmented. Two developments in AI offer complementary responses: AI-based process digitalization can make clinical and therapeutic workflows more efficient for practitioners, while conversational AI agents can extend therapeutic support directly to those who need it. This seminar engages students with both developments: working on real, ongoing projects at the h-lab and its clinical partners, students design, build, and evaluate prototypes of AI-based applications for mental health and acquire the domain knowledge needed to do so responsibly.

Three project briefs are available, each rooted in an active h-lab research project. Students may also propose their own project in the mental health and AI space.

1. **AI-assisted ADHD assessment system** in collaboration with LWL-Klinikum Marsberg, centered on the analysis of primary school reports as a source of retrospective diagnostic evidence. Example tasks include building an OCR and LLM pipeline for extracting and analyzing free-text reports, or evaluating the diagnostic utility of LLM-generated assessments against clinician judgments.
2. **AI-enhanced CBT group therapy platform** in collaboration with Rethink Wellbeing. Example tasks include building a faciliator feedback system that monitors group dynamics and recommends facilitator actions, automating participant or facilitator selection workflows, or evaluating the accuracy and clinical acceptability of AI-generated recommendations.
3. **AI-based Conversational Mental Health Agents**, in collaboration with the Chair of Clinical Psychology and Psychotherapy at the University of Greifswald. The h-lab and its partners developed an LLM-based chatbot that delivers a single-session behavioral activation session for young people with depressive symptoms. Example tasks include improving the behavioral activation module, implementing additional therapeutic modules (cognitive restructuring, sleep hygiene, emotion regulation, social skills) as LLM-based multi-agent systems, or evaluating agent outputs for therapeutic fidelity and safety.

The seminar is structured around **three phases**:

1. I**ntroductory session:** Introduction to designing and evaluating AI-based mental health and the project briefs.
2. **Working phase:** Students design, develop, and evaluate their prototypes (individually or in groups), with ad hoc support from h-lab assistants.
3. **Final presentation**: Groups present their projects, including a demonstration of their working prototype and a discussion of their evaluation approach and preliminary findings. Participants provide feedback to each other's projects. Technical documentation and a brief evaluation report are due at the end of the semester.

Learning Objectives: Upon completion, students will be able to:

- Understand the mental health domain sufficiently to make informed design decisions
- Build functional AI-based application prototypes addressing a concrete need in an active mental health research or practice context
- Design and apply appropriate evaluation strategies for AI-based mental health applications, assessing feasibility, effectiveness, and safety of their prototypes

V

Practical Seminar: Human-Centered Systems

2540554, SS 2026, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this practical seminar, students get an individual assignment and develop a running software prototype. Beside the software prototype, the students also deliver a written documentation.

Please find the current open offerings on our website: https://h-lab.iism.kit.edu/thesis.php

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

T 7.282 Module component: Practical Seminar: Service Innovation [T-WIWI-110887]

Coordinators: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-102806 - Service Innovation, Design & Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	1

Assessment
Success is assessed through the preparation of written documentation, a presentation of the results of the practical components carried out and active participation in the discussions (in accordance with §4(2), 3 SPO).

Please note that a practical component such as conducting a survey or implementing an application is also part of the regular scope of the course in addition to the written documentation. Please refer to the course description for the respective tasks.

The overall grade is made up of the weighted components (e.g. documentation, oral presentation, practical work and active participation). The weighting of these components for the grade will be announced at the beginning of the course.

Recommendations
Knowledge of Service Innovation Methods is assumed. Therefore it is recommended (but not mandatory) to attend the course Service Innovation [2540468] beforehand.

Additional Information
Due to the project work, the number of participants is limited and participation requires knowledge about models, concepts and approaches that are taught in the Service Innovation lecture. Having taken the Service Innovation lecture or demonstrating equivalent knowledge is a prerequisite for participating in this Practical Seminar. Details for registration will be announced on the web pages for this course.

The seminar is not offered regularly.

Workload
135 hours

T 7.283 Module component: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

Coordinators: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics
M-MACH-101293 - Microsystem Technology
M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each term	3

Courses					
WT 25/26	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
ST 2026	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
Exams					
WT 25/26	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology			Last
ST 2026	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology			Last

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination lasting approx. 60 minutes.

Prerequisites
none;
Mutual exclusion to T-MACH-108312 - Laboratory practical course on fundamentals of microsystems technology (ungraded)

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Introduction to Microsystem Technology - Practical Course

2143875, WS 25/26, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Organizational issues
Das Praktikum findet in den Laboren des IMT am CN statt. Treffpunkt: Bau 301, vor dem Eingang.

Das "Praktikum" ist das selbe wie das "Laborpraktikum", nur benotet! Beide mit schriftlicher Klausur.

Wer teilnehmen möchte, muss sich ab 19.1.2026, 8h00 über das Campussystem unter Veranstaltungen (nicht unter Prüfungen!) auf die Warteliste setzen. Die endgültige Entscheidung, ob man teilnehmen kann, erfolgt erst 10.2.2026.

Die Teilnehmer und Teilnehmerinnen machen in Gruppen zu 3-5 Personen vier Versuche, jeder ~4 h Dauer mit Themen des Instituts aus diesen Bereichen (keine Auswahl möglich):

Röntgenoptik
UV-Lithographie am Beispiel des Photoresists AZ 4533
Fluidische Komponenten aus Polymerwerkstoffen am Beispiel eines Mischerbauteils
Rasterkraftmikroskopie
3D-Printing
Lichtstreuung an Chrommasken
Heißprägen von Kunststoff-Mikrostrukturen
Grundlagen der SAW-Biosensorik
Nano3D-Drucker - Materialtransfer dünnster Schichten
Electrospinning technology for 3D additive manufacturing
Nuclear magnetic resonance imaging
Introduction to Two-Photon Lithography

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V

Introduction to Microsystem Technology - Practical Course

2143875, SS 2026, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
In the practical training includes ten experiments:

1. X-ray optics
2. UV-lithography + SEM
3. Micro fluid mixer
4. AFM
5. 3D-printing
6. Scattering at chromium-masks
7. Micro moulding
8. SAW-bio sensorics
9. Nano3D-printer - material transfer in thin layers
10. Electro spinning

Each student takes part in only four experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Organizational issues
Das Praktikum findet 14.-18.9.2026 an vier halben Tagen in den Laboren des IMT am CN statt. Treffpunkt: Bau 301, vor dem Eingang.

Das "Praktikum" ist das selbe wie das "Laborraktikum", nur benotet! Beide mit schriftlicher Klausur in der Woche nach dem Praktikum, voraussichtlich am 24.9.2026.

Wer teilnehmen möchte, muss sich ab 6.7.2026, 8h00 über das Campussystem unter Veranstaltungen (nicht unter Prüfungen!) auf die Warteliste setzen. Die endgültige Entscheidung, ob man teilnehmen kann, erfolgt erst 31.8.2026.

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 7.284 Module component: Predictive Mechanism and Market Design [T-WIWI-102862]

Coordinators: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101505 - Experimental Economics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Courses					
ST 2026	2500014	Predictive Mechanism and Market Design	2 SWS	Lecture /	Reiß
ST 2026	2500037	Übung zu Predictive Mechanism and Market Design	1 SWS	Practice /	Reiß, Peters

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Additional Information
The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.

T 7.285 Module component: Predictive Modeling [T-WIWI-110868]

Coordinators: Prof. Dr. Fabian Krüger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	2

Courses					
ST 2026	2521311	Predictive Modeling	2 SWS	Lecture / 🗣	Krüger, Siefert
ST 2026	2521312	Predictive Modeling (Tutorial)	2 SWS	Practice / 🗣	Siefert, Krüger

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (90 minutes) according to §4(2), 1 of the examination regulation. A bonus can be acquired by successful completion of an assignment (written report + short in-class presentation) during the semester. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4).

Prerequisites
None

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Predictive Modeling

2521311, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Contents

This course presents methods for making and evaluating statistical predictions based on data. We consider various types of predictions (mean, probability, quantile, and full distribution), all of which are practically relevant. In each case, we discuss selected modeling approaches and their implementation using R software. We consider various economic case studies. Furthermore, we present methods for absolute evaluation (assessing whether a given model is compatible with the data) and relative evaluation (comparing the predictive performance of alternative models).

Learning objectives
Students have a good conceptual understanding of statistical prediction methods. They are able to implement these methods using statistical software, and can assess which method is suitable in a given situation.

Prerequisites

Students should know econometrics on the level of the course `Applied Econometrics' [2520020]

Literature

- Elliott, G., und A. Timmermann (Hrsg.): "Handbook of Economic Forecasting", vol. 2A und 2B, 2013.
- Gneiting, T., und M. Katzfuss: "Probabilistic Forecasting", Annual Review of Statistics and Its Application 1, 125-151, 2014.
- Hastie, T., Tibshirani, R., and J. Friedman: "The Elements of Statistical Learning", 2. Ausgabe, Springer, 2009.
- Weitere Literatur wird in der Vorlesung bekanntgegeben.

V Predictive Modeling (Tutorial)

2521312, SS 2026, 2 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

T 7.286 Module component: Price Management [T-WIWI-105946]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101409 - Electronic Markets

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2540529	Price Management	2 SWS	Lecture / 🗣	Glenn
ST 2026	2540530	Exercise Price Management	1 SWS	Practice / 🗣	Glenn
Exams					
WT 25/26	7900170	Price Management (Nachklausur SoSe 2025)			Geyer-Schulz
ST 2026	7900139	Price Management			Geyer-Schulz
ST 2026	7900254	Price Management (Nachklausur SoSe 2026)			Geyer-Schulz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Please note: this exam will no longer be offered after August 2026.

Prerequisites
None

Recommendations
None

Additional Information
Please note: this course, exercises and exam will no longer be offered after August 2026.

Below you will find excerpts from courses related to this module component:

V Price Management

2540529, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- H. Simon and M. Fassnacht, *Preismanagement*, vol. 4. Wiesbaden: Springer Gabler, 2016.
- T. T. Nagle, J. E. Hogan, und J. Zalee, *The Strategy and Tactics of Pricing: A guide to growing more profitably*. New Jersey: Prentice Hall, 2010.

T 7.287 Module component: Pricing [T-WIWI-102883]

Coordinators: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each winter term	3

Courses					
WT 25/26	2572199	Pricing	3 SWS	Block / 🗣	Klarmann, Bill, Schröder
Exams					
WT 25/26	7900343	Pricing			Klarmann

Legend: 📱 Online, 🔗 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment. The examination (and thus the grade) is composed of three parts:

1. The design and execution of your own small experimental study around the topic of behavioral pricing (as group work).
2. The processing and presentation of a case study on pricing (as group work).
3. The execution of a simulated price negotiation based on a systematic preparation (usually in teams of two).

Prerequisites
Since the earlier course (a) "Pricing Excellence" and (b) "Price Negotiations and Sales Presentations" become parts of the Pricing course, Pricing cannot be taken if (a) and/or (b) have already been completed.

Recommendations
Students are highly encouraged to actively participate in class.

Additional Information
A small application is required for participation in this class. The application phase usually takes place at the beginning of the lecture period in the winter semester. More information on the application process will be made available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the winter semester lecture period. This course is limited to 24 participants.

Below you will find excerpts from courses related to this module component:

V **Pricing** — **Block (B) On-Site**
2572199, WS 25/26, 3 SWS, Language: English, Open in study portal

Content
At the Pricing lecture, students learn about current research and best practices in price management. Delivered in workshop format, the lecture has three key elements:

1. "Behavioral Pricing" workshop
   In this part of the course, central concepts and findings from behavioral pricing research (e.g. price information processing, reference prices, price fairness and mental accounting) are presented and discussed on the basis of important behavioral theories (e.g. prospect theory and information economics). After a brief introduction to experimental research, participants will then conduct their own small experimental study in the form of group work on a hypothesis they have developed on pricing behavior, analyze the data, and present it.

2. "Pricing Excellence" workshop
   In a theory section at the beginning of the course, students are taught theoretical principles of pricing. This includes an introduction to (1) pricing of product prices as well as (2) pricing of net customer prices (development of discount systems). Furthermore, theoretical basics of price enforcement and price monitoring are discussed. This will be followed by a practical application of what has been learned by working on a case study in small groups with a concluding presentation.

3. "Price Negotiation" workshop
   After an introduction to key theories and concepts of negotiation, students prepare and then conduct a simulated price negotiation in small groups with guidance.

Learning Objectives:

Students...

- are familiar with central theories explaining behavioral phenomena regarding consumers dealing with prices
- are able to describe and explain central phenomena of behavioral science with regard to price behavior and derive implications from them
- can formulate their own hypotheses on price behavior and design, conduct and evaluate a suitable experimental study for this purpose
- learn theoretical basics of pricing behavior
- learn the theoretical basics of price enforcement and price monitoring
- apply the acquired knowledge in a practical case study
- know important conceptual basics on the subject of price negotiations
- can prepare and competently conduct price negotiations
- present the results of their group work in a concise and structured manner

All events will take place in presence with compulsory attendance at all dates.

Total time required for 4.5 credit points: approx. 135 hours

Attendance time: 30 hours

Self-study: 105 hours

Organizational issues
Dates will be announced.

T 7.288 Module component: Probabilistic Time Series Forecasting Challenge [T-WIWI-111387]

Coordinators: Prof. Dr. Fabian Krüger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	2

Assessment
Alternative exam assessment. Necessary conditions to pass the course:

- Weekly submission of statistical forecasts during the semester (excluding the Christmas break),
- Presentation (ca. 20 minutes) during the semester,
- Submission of a final report (5-10 pages) around the end of the semester.

Grading is based on the presentation (30%) and the final report (70%).

Prerequisites
Good methodological knowledge in statistics and data science.
Good knowledge in applied data analysis, incl. programming skills in R, Python or similar.
Knowledge of time series analysis is helpful, but not required.

Additional Information
The course is limited in participation. Participants will be selected via the WIWI portal.

Workload
135 hours

T 7.289 Module component: Process Design for Machining of Metallic Components [T-MACH-114058]

Coordinators: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2149672	Process Design for Machining of Metallic Components	3 SWS	Lecture / 🗣	Schulze
Exams					
WT 25/26	76-T-MACH-114058	Process Design for Machining of Metallic Components			Schulze

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, duration 60 minutes

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Process Design for Machining of Metallic Components

2149672, WS 25/26, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The objective of the course “Process Development for Machining Metallic Components” is to enable students to describe essential machining processes for metallic parts. Based on mechanical and materials fundamentals, the course covers all machining methods.

Within this course, students learn theoretical and application aspects of the following topics:

- Orthogonal cutting (cutting forces, rake angle, friction, tool wear)
- Turning and drilling (tool geometry, chip formation, setup times, productivity)
- Milling (face, contour, profile milling; high-speed milling)
- Grinding (wheel composition, thermal effects, surface integrity)
- Honing, lapping, polishing (tolerances, microstructure, surface quality)
- Process chains (raw part → rough machining → finish; handover parameters)
- Modeling and simulation (FEM-based modeling; empirical models)
- Chip formation simulation (numerical prediction of chip shape and breakage)
- Large-scale modeling (wear modeling; sensor integration)
- CNC machining and machine dynamics (G-/M-Codes; axis dynamics; chatter avoidance).

The acquired knowledge is supplemented by practical lectures from industry, which offer valuable insights into current applications, challenges and innovations in machining methods.

Learning Outcomes:

The students ...

- can describe the fundamental mechanisms and characteristic features of individual machining processes (orthogonal cutting, turning, drilling, milling, grinding, honing, lapping, polishing).
- are able to classify machining methods by their operating principle (geometry-defined vs. geometry-indeterminate) and categorize them based on technical parameters (cutting force, feed rate, material removal rate).
- can select an appropriate process for given component requirements (material, geometry, tolerance) and justify their choice.
- are capable of identifying interactions between individual steps in a multi-stage process chain and integrating them effectively.
- can evaluate machining processes with respect to technical factors (material behavior, tool wear, surface integrity) and economic considerations (setup time, productivity, cost metrics) and develop an optimized process strategy.
- are able to apply basic modeling and simulation methods (FEM-based models, empirical approaches) to estimate cutting forces, temperatures, and tool life.
- can interpret numerical chip-formation simulations and use them for process optimization and tool design.
- understand the fundamentals of CNC programming (G- and M-codes) and can analyze machine-dynamic effects (axis dynamics, vibration phenomena, chatter) to ensure stable machining.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/)
bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.290 Module component: Process Engineering [T-BGU-101844]

Coordinators: Dr.-Ing. Harald Schneider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6241703	Process Engineering	2 SWS	Lecture / 🗣	Schneider, Waleczko
Exams					
WT 25/26	8240101844	Process Engineering			Schneider

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.291 Module component: Process Engineering: Example Food Processing [T-CIWVT-111536]

Coordinators: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading	Version
Oral examination	6 CP	graded	1

Exams			
WT 25/26	7211112	Process Engineering: Example Food Processing	Gaukel
ST 2026	7211112	Process Engineering: Example Food Processing	Gaukel

T 7.292 Module component: Process Mining [T-WIWI-109799]

Coordinators: Dr.-Ing. Clemens Schreiber
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	2

Courses					
ST 2026	2511204	Process Mining	2 SWS	Lecture / 🗣	Schreiber
ST 2026	2511205	Exercise Process Mining	1 SWS	Practice / 🗣	Rybinski
Exams					
WT 25/26	79AIFB_PM_A5	Process Mining (Registration extended until 16.02.2026)			Oberweis
ST 2026	791-AIFB-PM-HK	Process Mining (Registration until 20.07.2026)			Schreiber

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Additional Information
Former name (up to winter semester 2018/1019) "Workflow Management".

Below you will find excerpts from courses related to this module component:

V **Process Mining** — **Lecture (V) On-Site**
2511204, SS 2026, 2 SWS, Language: German, Open in study portal

Content
The area of process mining covers approaches which aim at deducting new knowledge on the basis of logfiles generated by information systems. Such information systems are e.g., workflow-management-systems which are used for an efficient control of processes in enterprises and organisations. The lecture introduces the foundations of processes and respective modeling and analysis techniques. In the following, the foundations of process mining and the three classical types of approaches - discovery, conformance and enhancement - will be taught. In addition to the theoretical basics, tools, application scenarios in practice and open research questions are covered as well.

Learning objectives:

Students

- understand the concepts and approaches of process mining and know how they are applied,
- create and evaluate business process models,
- analyze static and dynamic properties of workflows,
- apply approaches and tools of process mining.

Recommendations:

Knowledge of course Applied Informatics - Modelling is expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- W. van der Aalst, H. van Kees: Workflow Management: Models, Methods and Systems, Cambridge, The MIT Press, 2002.
- W. van der Aalst: Process Mining: Data Science in Action. Springer, 2016.
- J. Carmona, B. van Dongen, A. Solti, M. Weidlich: Conformance Checking: Relating Processes and Models. Springer, 2018.
- A. Drescher, A. Koschmider, A. Oberweis: Modellierung und Analyse von Geschäftsprozessen: Grundlagen und Übungsaufgaben mit Lösungen. De Gruyter Studium, 2017.
- A. Oberweis: Modellierung und Ausführung von Workflows mit Petri-Netzen. Teubner-Reihe Wirtschaftsinformatik, B.G. Teubner Verlag, 1996.
- R. Peters, M. Nauroth: Process-Mining: Geschäftsprozesse: smart, schnell und einfach, Springer, 2019.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer, 2012.
- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer, 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.293 Module component: Product- and Production-Concepts for Modern Automobiles [T-MACH-110318]

Coordinators: Dr. Stefan Kienzle
Dr. Dieter Steegmüller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture /	Steegmüller, Kienzle
Exams					
WT 25/26	76-T-MACH-110318	Product- and Production-Concepts for modern Automobiles			Steegmüller, Kienzle

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Oral Exam (20 min)

Prerequisites
T-MACH-105166 - Materials and Processes for Body Leightweight Construction in the Automotive Industry must not have been started.

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Product- and Production-Concepts for modern Automobiles

2149670, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The lecture illuminates the practical challenges of modern automotive engineering. As former leaders of the automotive industry, the lecturers refer to current aspects of automotive product development and production.

The aim is to provide students with an overview of technological trends in the automotive industry. In this context, the course also focuses on changes in requirements due to new vehicle concepts, which may be caused by increased demands for individualisation, digitisation and sustainability. The challenges that arise in this context will be examined from both a production technology and product development perspective and will be illustrated with practical examples thanks to the many years of industrial experience of both lecturers.

The topics covered are:

- General conditions for vehicle and body development
- Integration of new drive technologies
- Functional requirements (crash safety etc.), also for electric vehicles
- Development Process at the Interface Product & Production, CAE/Simulation
- Energy storage and supply infrastructure
- Aluminium and lightweight steel construction
- FRP and hybrid parts
- Battery, fuel cell and electric motor production
- Joining technology in modern car bodies
- Modern factories and production processes, Industry 4.0.

Learning Outcomes:

The students …

- are able to name the presented general conditions of vehicle development and are able to discuss their influences on the final product using practical examples.
- are able to name the various lightweight approaches and identify possible areas of application.
- are able to identify the different production processes for manufacturing lightweight structures and explain their functions.
- are able to perform a process selection based on the methods and their characteristics.

Workload:

regular attendance: 25 hours
self-study: 95 hours

Organizational issues
Termine werden über Ilias bekannt gegeben.

Bei der Vorlesung handelt es sich um eine Blockveranstaltung. Eine Anmeldung über Ilias ist erforderlich.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The lecture is a block course. An application in Ilias is mandatory.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.294 Module component: Production and Logistics Management [T-WIWI-102632]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101412 - Industrial Production III

Type	Credits	Grading	Term offered	Version
Written examination	5,5 CP	graded	Each summer term	1

Courses					
ST 2026	2581954	Production and Logistics Management	2 SWS	Lecture / 🗣	Schultmann, Rosenberg
ST 2026	2581955	Production and Logistics Managment	2 SWS	Practice / 🗣	Schultmann
Exams					
WT 25/26	7981954	Production and Logistics Management			Schultmann
ST 2026	7981954	Production and Logistics Management			Schultmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Production and Logistics Management

2581954, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This course covers central tasks and challenges of operative production and logistics management. Students get to know the set-up and mode of planning systems such as production planning and control systems, enterprise resource planning systems and advanced planning systems to cope with the accompanying planning tasks in supply chain management. Methods to solve these tasks from the field of operational research will be explored with respect to manufacturing program planning, material requirement planning, lot size problems and scheduling. Alongside to MRP II (Manufacturing Resources Planning), students will be introduced to integrated supply chain management approaches. Finally, commercially available planning systems will be presented and discussed.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.295 Module component: Production Technology for E-Mobility [T-MACH-110984]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	2

Courses					
ST 2026	2150605	Production Technology for E-Mobility	3 SWS	Lecture / 🗣	Fleischer
Exams					
WT 25/26	76-T-MACH-112969	Production Technology for E-Mobility			Fleischer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written Exam (60 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Production Technology for E-Mobility

2150605, SS 2026, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In the lecture Production Engineering for Electromobility the students should be enabled to design, select and develop production processes for the production of the components of an electric drive train (electric motor, battery cells, fuel cells) by using research-oriented teaching.

Learning Outcomes:

The students are able to:

- describe the structure and function of a fuel cell, an electric traction drive and a batterysystem.
- reproduce the process chains for the production of the components fuel cell, battery and electric traction drive.
- apply methodical tools to solve problems along the process chain.
- derive the challenges in the production of electric drives for electric mobility.
- describe the factors influencing the individual process steps on each other using the process chain of Li-ion battery cells.
- enumerate or describe the necessary process parameters to counteract the influencing factors of the process steps in Li-ion battery cell production.
- apply methodical tools to solve problems along the process chain for the production of Li-ion battery cells.
- derive the challenge of mounting and dismounting battery modules.
- derive the challenges in the production of fuel cells for use in mobility.
- develop solutions to overcome challenges in the production of fuel cells.

Workload:

regular attendance: 42 hours
self-study: 78 hours

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T 7.296 Module component: Project Course Additive Manufacturing: Design Optimization and Production of Metallic Components [T-MACH-113575]

Coordinators: Prof. Dr.-Ing. Frederik Zanger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each summer term	3

Courses					
ST 2026	2150704	Project Course Additive Manufacturing: Design Optimization and Production of Metallic Components	3 SWS	Practical course / 🗣	Zanger, Frey

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Assessment of another type of examination (graded)

The competence certificate is a project work; alternative test achievement according to § 4 Abs. 2 No. 3 of the SPO. Here, the project work, the milestone-based presentation of the results in presentation form (10 min each) and a final oral examination (15 min) are included in the assessment.

Prerequisites
The following module component may not have started:

- T-MACH-114019 - Additive Fertigung metallischer Bauteile: Designoptimierung und Herstellung
- T-MACH-110983 - Projektpraktikum Additive Fertigung: Entwicklung und Fertigung eines additiven Bauteils
- T-MACH-114624 - Projektpraktikum Additive Fertigung: Designoptimierung und Herstellung metallischer Bauteile
- T-MACH-110960 - Projektpraktikum Additive Fertigung: Entwicklung und Fertigung eines additiven Bauteils

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Project Course Additive Manufacturing: Design Optimization and Production of Metallic Components

Practical course (P)
On-Site

2150704, SS 2026, 3 SWS, Language: German, Open in study portal

Content
The course “Project Course Additive Manufacturing: Design Optimization and Production of Metallic Components” combines the fundamentals of powder bed fusion laser beam melting (PBF-LB/M) with a development project in collaboration with an industry-relevant application case.

Students learn the basics of the following topics:

- Influence of various process variables on the component quality of parts manufactured using the PBF-LB/M process
- Preparation and simulation of the PBF-LB/M process
- Manufacturing of additive metal components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- Computer-aided manufacturing (CAM) for machining rework

The topics are demonstrated in practice in various workshops on the individual topics and transferred to the development task in teamwork. Finally, the results of the work are additively manufactured and machined. The results are then presented, reflected upon, and discussed.

Attendance of the course “Additive Fertigung metallischer Bauteile” is recommended.

Learning Outcomes:

Students ...

- can describe the characteristics and areas of application of the additive manufacturing process powder bed fusion of metals (PBF-LB/M).
- can describe and implement the creation of a product along the entire additive process chain (CAD, simulation, construction job preparation, CAM) from the initial idea to production.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- are able to perform topology optimization of a component for manufacturing using additive manufacturing.
- are able to simulate the additive process, compensate for process-related distortion, and determine the ideal alignment on the build platform.
- are able to create the necessary support structures for the additive process and derive a build job file.
- are able to create a CAM model for the machining post-processing of additive components and to machine the component.
- can select suitable powder fractions and process variables for the additive manufacturing of high-quality components based on existing test results.

Workload:

regular attendance: 14 hours
self-study: 106 hours

Organizational issues
Das Praktikum wird erstmals im Sommersemester 2026 angeboten.

Unregelmäßige Termine, siehe Zeitplan auf wbk-Homepage.
Irregular dates, see schedule on the wbk homepage.

Literature
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.297 Module component: Project Lab Cognitive Automobiles and Robots [T-WIWI-109985]

Coordinators: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Examination of another type	5 CP	graded	Each winter term	3

Courses					
WT 25/26	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course /	Zöllner, Schneider
Exams					
WT 25/26	7900107	Advanced Lab Cognitive Automobile and Robots (Master)			Zöllner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V Practical Course Cognitive automobiles and robots (Master)

2512501, WS 25/26, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to courses such as "Machine Learning 1/2".
Scientific topics, mostly in the area of autonomous driving and robotics, will be addressed in joint work with ML/KI methods. The goal of the internship is for participants to design, develop, and evaluate ML Software system.

In addition to the scientific goals, such as the study and application of methods, the aspects of project-specific teamwork in research (from specification to presentation of results) are also worked on in this internship.

The individual projects require the analysis of the set task, selection of appropriate methods, specification and implementation and evaluation of the solution approach. Finally, the selected solution is to be documented and presented in a short lecture.

Learning Objectives:

- Students will be able to practically apply theoretical knowledge from lectures on machine learning to a selected area of current research.
- Students will be proficient in analyzing and solving thematic problems.
- Students will be able to evaluate, document, and present their concepts and results.

Recommendations:

- Theoretical knowledge of machine learning and/or AI.
- Python knowledge
- Initial experience with deep learning frameworks such as PyTorch/Jax/Tensorflow may be beneficial.

Workload:

The workload of 5 credit points consists of practical implementation of the selected solution, as well as time for literature research and planning/specification of the selected solution. In addition, a short report and presentation of the work performed will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

T 7.298 Module component: Project Lab Machine Learning [T-WIWI-109983]

Coordinators: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Examination of another type	5 CP	graded	Each summer term	3

Courses					
ST 2026	2512500	Project Lab Machine Learning	3 SWS	Practical course /	Zöllner, Schneider
Exams					
ST 2026	7900086	Project Lab Machine Learning			Zöllner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

Workload
150 hours

Below you will find excerpts from courses related to this module component:

V Project Lab Machine Learning

2512500, SS 2026, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.

T 7.299 Module component: Project Management [T-WIWI-103134]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2581963	Project Management	2 SWS	Lecture / 🗣	Schultmann
Exams					
WT 25/26	7981963	Project Management			Schultmann
ST 2026	7981963	Project Management			Schultmann

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Project Management

2581963, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management
8. Stakeholder
9. Communication, Negotiation and Leadership
10. Project Controlling
11. Agile Project Management

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.300 Module component: Project Management in Construction and Real Estate Industry I [T-BGU-103432]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	3 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	6241701	Construction Project Management	4 SWS	Lecture / Practice / 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 25/26	8240103432	Project Management in Construction and Real Estate Industry I			Haghsheno

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
report of case study in the first half of the semester, appr. 8 pages;
presentation of results and colloquium in the middle of the semester, appr. 10 min. each

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Construction Project Management

6241701, WS 25/26, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
This course provides a comprehensive and in-depth introduction to construction project management. It takes a closer look at the organisation and delivery of a construction project from the client's perspective. Selected project management content is taught and applied in teamwork within the context of four practice-based case studies. At the end of the semester, the results are presented in a role play (acquisition meeting with a client).

Organizational issues
genaue Termine: siehe zugehöriger ILIAS-Kurs

Literature

- AHRENS, Hannsjörg; BASTIAN, Klemens; MUCHOWSKI, Lucian (Hrsg.) (2021): *Handbuch Projektsteuerung - Baumanagement: Ein praxisorientierter Leitfaden mit zahlreichen Hilfsmitteln und Arbeitsunterlagen*, 6. Auflage, Fraunhofer IRB Verlag, Stuttgart
- FEWINGS, Peter; HENJEWELE, Christian (2019): *Construction Project Management – An Integrated Approach*, 3. Auflage, Routledge, New York (USA)
- GPM Deutsche Gesellschaft für Projektmanagement e. V. (Hrsg.) (2017): *Individual Competence Baseline für Projektmanagement (Version 4.0)*, 1. Auflage, GPM Deutsche Gesellschaft für Projektmanagement e. V., Nürnberg
- HAGHSHENO, Shervin; JOHN, Paul Christian (2024): *Bauherrnseitige Projektmanagement-Dienstleistungen in Deutschland*, Forschungsbericht, DVP – Deutscher Verband für Projektmanagement in der Bau- und Immobilienwirtschaft e. V.
- HUEMANN, Martina; TURNER, J. Rodney (Hrsg.) (2024): *The Handbook of Project Management*, 6. Auflage, Routledge, New York (USA)
- KOCHENDÖRFER, Bernd; LIEBCHEN, Jens H.; VIERING, Markus G. (2021): *Bau-Projekt-Management: Grundlagen und Vorgehensweisen*, 5. Auflage, Springer Vieweg, Wiesbaden
- SCHULZ, Markus (2020): *Projektmanagement: Zielgerichtet. Effizient. Klar.*, 2. Auflage, UVK Verlag, Tübingen

T 7.301 Module component: Project Management in Construction and Real Estate Industry II [T-BGU-103433]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	3 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	6241701	Construction Project Management	4 SWS	Lecture / Practice / 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 25/26	8240103433	Project Management in Construction and Real Estate Industry II			Haghsheno

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
report of case study in the seond half of the semester, appr. 8 pages;
presentation of results and colloquium in the end of the semester, appr. 10 min. each

Prerequisites
Project Management in Construction and Real Estate Industry I (T-BGU-103432) has to be passed.

Recommendations
none

Additional Information
none

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Construction Project Management

6241701, WS 25/26, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
This course provides a comprehensive and in-depth introduction to construction project management. It takes a closer look at the organisation and delivery of a construction project from the client's perspective. Selected project management content is taught and applied in teamwork within the context of four practice-based case studies. At the end of the semester, the results are presented in a role play (acquisition meeting with a client).

Organizational issues
genaue Termine: siehe zugehöriger ILIAS-Kurs

Literature

- AHRENS, Hannsjörg; BASTIAN, Klemens; MUCHOWSKI, Lucian (Hrsg.) (2021): *Handbuch Projektsteuerung - Baumanagement: Ein praxisorientierter Leitfaden mit zahlreichen Hilfsmitteln und Arbeitsunterlagen*, 6. Auflage, Fraunhofer IRB Verlag, Stuttgart
- FEWINGS, Peter; HENJEWELE, Christian (2019): *Construction Project Management – An Integrated Approach*, 3. Auflage, Routledge, New York (USA)
- GPM Deutsche Gesellschaft für Projektmanagement e. V. (Hrsg.) (2017): *Individual Competence Baseline für Projektmanagement (Version 4.0)*, 1. Auflage, GPM Deutsche Gesellschaft für Projektmanagement e. V., Nürnberg
- HAGHSHENO, Shervin; JOHN, Paul Christian (2024): *Bauherrnseitige Projektmanagement-Dienstleistungen in Deutschland*, Forschungsbericht, DVP – Deutscher Verband für Projektmanagement in der Bau- und Immobilienwirtschaft e. V.
- HUEMANN, Martina; TURNER, J. Rodney (Hrsg.) (2024): *The Handbook of Project Management*, 6. Auflage, Routledge, New York (USA)
- KOCHENDÖRFER, Bernd; LIEBCHEN, Jens H.; VIERING, Markus G. (2021): *Bau-Projekt-Management: Grundlagen und Vorgehensweisen*, 5. Auflage, Springer Vieweg, Wiesbaden
- SCHULZ, Markus (2020): *Projektmanagement: Zielgerichtet. Effizient. Klar.*, 2. Auflage, UVK Verlag, Tübingen

T 7.302 Module component: Project Paper Lean Construction [T-BGU-101007]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	1,5 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	6241901	Lean Construction	4 SWS	Lecture / Practice / 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 25/26	8246101007	Project paper Lean Construction			Haghsheno

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
project:

report, appr. 10 pages, and
presentation, appr. 10 min.

Prerequisites
none

Recommendations
none

Additional Information
The number of participants is limited to 50. Registration modalities will be published in time on the institute's homepage or in the corresponding ILIAS course. Students of Profile 2 'Project Management and Lean Construction' in the degree program 'Technology and Management in Construction Management' always receive a confirmation of participation (basic module). Any necessary selection for the remaining places will be made with priority given to students from Civil Engineering (study focus module), Technology and Management in Construction Management (specialization module) and Industrial Engineering (elective module in Engineering Sciences), taking into account the degree program and the student's progress.

Workload
40 hours

Below you will find excerpts from courses related to this module component:

V Lean Construction

6241901, WS 25/26, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
At the beginning of this module, the theoretical foundations of Lean Philosophy and Lean Construction are presented and deepened through learning simulations and exercises. Subsequently, industry and specialist lectures examine methods such as takt planning and takt control, the Last Planner System™, value stream analysis, and cooperative contract forms in both theory and practice. Furthermore, general project management aspects in construction projects such as construction site logistics, cost and quality management are addressed from a Lean perspective.

As part of the project work, students work in small groups on selected problem areas, present the results, and prepare a written report. This written report, together with the group presentation, is evaluated as a partial module assessment.

Organizational issues
Die Anmeldung zum Kurs findet über das in CAS hinterlegte Anmeldeverfahren statt.

Die Teilnehmerzahl ist auf 50 beschränkt.

Erste Vorlesung: 27.10.2025. Weitere Termine: siehe zugehöriger ILIAS-Kurs

Literature

Gehbauer, F. (2013) *Lean Management Im Bauwesen*. Skript des Instituts für Technologie und Management im Baubetrieb, Karlsruher Institut für Technologie (KIT).
Liker, J. & Meier, D. (2007) *Praxisbuch, der Toyota Weg: für jedes Unternehmen*. Finanzbuch Verlag.
Rother, M., Shook, J., & Wiegand, B. (2006). *Sehen lernen: mit Wertstromdesign die Wertschöpfung erhöhen und Verschwendung beseitigen*. Lean Management Institut.

T 7.303 Module component: Project Studies [T-BGU-101847]

Coordinators: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	6243801	Project Studies	2 SWS	Lecture / Practice / 🗣	Gentes
Exams					
WT 25/26	8240101847	Project Studies			Gentes
ST 2026	8240101847	Project Studies			Gentes

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.304 Module component: Public International Law [T-INFO-113381]

Coordinators: TT-Prof. Dr. Frederike Zufall
Organisation: KIT Department of Informatics
Part of: M-INFO-106754 - Public Economic and Technology Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	2

Courses					
ST 2026	2400172	Public International Law with an Economic Law Focus	2 SWS	Lecture / 🗣	Kasper-Schöniger
Exams					
WT 25/26	7500066	Public International Law			Zufall
ST 2026	7500182	Public International Law with an Economic Law Focus			Zufall

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is carried out as a written examination (§ 4 Abs. 2 No. 1 SPO) lasting 60 minutes.

Depending on the number of participants, it will be announced six weeks before the examination (§ 6 (3) SPO) whether the performance assessment is carried out
- as an oral examination (duration approx. 20 mins.) (§ 4 Abs. 2 Nr. 2 SPO) or
- as a written examination (lasting 60 mins.) (§ 4 Abs. 2 No. 1 SPO).

Prerequisites
None.

Recommendations
- General knowledge of (public) law (eg, through participating in public law or EU law modules) is helpful but not necessary.
- Interest in international affairs and politics is welcomed.

Additional Information
Competency Goals:
- Participating students will be able to navigate the plethora of multilateral treaties to detect relevant international law for specific cases.
- They can develop solutions for legal problems based on case law of international courts and tribunals.
- Students will be able to read and comprehend international treaties and case law.
- They will have a fundamental understand of the interplay between various subfields of public international law.
- Students can identify and explain current issues in public international law.

Content:
The lecture is designed to provide participating students with a general understanding of the foundations, subjects, and sources of public international law, its interplay with national legal regimes, and more detailed knowledge of particular subfields of public international law.

Since the lecture targets students of information systems, particular focus will be given to economic topics in international law, such as investment and trade law aspects. Due to the general importance of climate change for todays (economic) law, international climate change law and environmental law will form further focus areas.

In addition, a concise overview on human rights law, the law on State responsibility, and the peaceful settlement of disputes will be provided.

Throughout the lecture, important case law will be referenced and students are expected to read relevant cases in part to facilitate a discussion of such cases and their relevance for a subject field. Although the United Nations, including its principal judicial organ, the International Court of Justice, is one of the, if not the, key international organization in public international law, further international organizations (eg, Council of Europe, World Trade Organization) and their respective law(s) will also be touched.

Students are advised to have a statute book at hand that includes the most important international treaties and conventions (eg, Evans, Blackstone's International Law Documents, currently 15th ed 2021).

Conducting the lecture in English intends to facilitate students to link their ideas and arguments to current debates in international law.

Below you will find excerpts from courses related to this module component:

V

Public International Law with an Economic Law Focus
2400172, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture is designed to provide participating students with a general understanding of the foundations, subjects, and sources of public international law with an economic law focus, its interplay with national legal regimes, and more detailed knowledge of particular subfields of public international law.

Since the lecture targets students of information systems, particular focus will be given to economic topics in international law, such as investment and trade law aspects. Due to the general importance of climate change for todays (economic) law, international climate change law and environmental law will form further focus areas.

In addition, a concise overview on human rights law, the law on State responsibility, and the peaceful settlement of disputes will be provided.

Throughout the lecture, important case law will be referenced and students are expected to read relevant cases in part to facilitate a discussion of such cases and their relevance for a subject field. Although the United Nations, including its principal judicial organ, the International Court of Justice, is one of the, if not the, key international organization in public international law, further international organizations (eg, Council of Europe, World Trade Organization) and their respective law(s) will also be touched.

Students are advised to have a statute book at hand that includes the most important international treaties and conventions (eg, Evans, Blackstone's International Law Documents, currently 15th ed 2021).

Conducting the lecture in English intends to facilitate students to link their ideas and arguments to current debates in international law.

Organizational issues
Lecture Dates:

- Friday, 26th June 2026, 9 - 17 h
- Saturday, 27th June 2026, 9-17 h
- Saturday, 25th July 2026, 9-17 h

The room will be announced in good time in the Campus System (as per 5th January 2026).

Lageplan:

https://www.kit.edu/campusplan/

T 7.305 Module component: Public Management [T-WIWI-102740]

Coordinators: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101504 - Collective Decision Making
M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2561127	Public Management	3 SWS	Lecture / Practice /	Wigger
Exams					
WT 25/26	790puma	Public Management			Wigger
ST 2026	790puma	Public Management			Wigger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Success is assessed in the form of a written examination (90 minutes). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Recommendations
Basic knowledge of Public Finance is required.

Below you will find excerpts from courses related to this module component:

V Public Management

2561127, WS 25/26, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Literature
Weiterführende Literatur:

- Damkowski, W. und C. Precht (1995): Public Management; Kohlhammer
- Richter, R. und E.G. Furubotn (2003): Neue Institutionenökonomik; 3. Auflage, Mohr
- Schedler, K. und I. Proeller (2003): New Public Management; 2. Auflage; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2. Auflage; Springer

T 7.306 Module component: Public Revenues [T-WIWI-102739]

Coordinators: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2560120	Public Revenues	2 SWS	Lecture / 🗣	Wigger
ST 2026	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice / 🗣	Wigger, Schmelzer
Exams					
WT 25/26	790oeff	Public Revenues			Wigger
ST 2026	790oeff	Public Revenues			Wigger

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of a written examination (60 minutes). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Recommendations
Basic knowledge of Public Finance is required.

Below you will find excerpts from courses related to this module component:

V Public Revenues

2560120, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

Learning goals:

See German version.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Literatur:

- Homburg, S.(2000): *Allgemeine Steuerlehre*, Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4. Aufl., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* und *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2. Aufl., Springer

T 7.307 Module component: Python for Computational Risk and Asset Management [T-WIWI-110213]

Coordinators: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105032 - Data Science for Finance

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each winter term	3

Assessment
The examination takes the form of an alternative exam assessment.
The alternative exam assessment consists of a Python-based "Takehome Exam". At the end of the third week of January, the student is given a "Takehome Exam" which he processes and sends back independently within 4 hours using Python. Precise instructions will be announced at the beginning of the course. The alternative exam assessment can be repeated a maximum of once. A timely repeat option takes place at the end of the third week in March of the same year. More detailed instructions will be given at the beginning of the course.

Prerequisites
None.

Recommendations
Good knowledge of statistics and basic programming skills

Workload
135 hours

T 7.308 Module component: Quality Management [T-MACH-102107]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each winter term	4

Courses					
WT 25/26	2149667	Quality Management	2 SWS	Lecture /	Lanza, Benfer
Exams					
WT 25/26	76-T-MACH-102107	Quality Management			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Written Exam (60 min)

Prerequisites
It is not possible to combine this module component with module component Quality Management [T-MACH-112586].

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Quality Management** — **Lecture (V)**
2149667, WS 25/26, 2 SWS, Language: German, Open in study portal — **Blended (On-Site/Online)**

Content
Based on the quality philosophies Total Quality Management (TQM) and Six Sigma, the lecture deals with the requirements of modern quality management. Within this context, the process concept of a modern enterprise and the process-specific fields of application of quality assurance methods are presented. The lecture covers the current state of the art in preventive and non-preventive quality management methods in addition to manufacturing metrology, statistical methods and service related quality management. The content is completed with the presentation of certification possibilities and legal quality aspects.

Main topics of the lecture:

- The term "Quality"
- Total Quality Management (TQM) and Six Sigma
- Universal methods and tools
- QM during early product stages – product denition
- QM during product development and in procurement
- QM in production – manufacturing metrology
- QM in production – statistical methods
- QM in service
- Quality management systems
- Legal aspects of QM

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Vorlesungstermine montags 09:45 Uhr
Übung erfolgt während der Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt:

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.309 Module component: Quantitative Methods in Energy Economics [T-WIWI-107446]

Coordinators: Patrick Plötz
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading	Term offered	Version
Oral examination	3,5 CP	graded	Each winter term	3

Courses					
WT 25/26	2581007	Quantitative Methods in Energy Economics	2 SWS	Lecture / 🗣	Plötz
WT 25/26	2581008	Übungen zu Quantitative Methods in Energy Economics	1 SWS	Practice / 🗣	Plötz, Britto
Exams					
WT 25/26	7981007	Quantitative Methods in Energy Economics			Fichtner
ST 2026	7981007	Quantitative Methods in Energy Economics			Fichtner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral (app. 30 minutes) exam (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Quantitative Methods in Energy Economics

2581007, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

Learning Goals:

The student

- knows and understands selected quantitative methods of energy economics
- is able to use selected quantitative methods of energy economics
- understands they range of usage, limits and is autonomously able to adress new problems by them.

Literature
Wird in der Vorlesung bekannt gegeben.

T 7.310 Module component: Quantum Functional Devices and Semiconductor Technology [T-ETIT-100740]

Coordinators: Prof. Dr.-Ing. Christian Koos
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101294 - Nanotechnology
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each summer term	1

Prerequisites
none

T 7.311 Module component: Rail System Technology [T-MACH-106424]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-107717 - Rail System Technology and Rail Vehicle Technology

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each term	5

Courses					
WT 25/26	2115919	Rail System Technology	2 SWS	Lecture / 🗣	Cichon
ST 2026	2115919	Rail System Technology	2 SWS	Lecture / 🗣	Cichon
Exams					
WT 25/26	76-T-MACH-106424	Rail System Technology			Cichon
ST 2026	76-T-MACH-106424	Rail System Technology			Cichon

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
writen examination in German language
Duration: 60 minutes
No tools or reference materials may be used during the exam except calculator and dictionary

Prerequisites
none

Additional Information
The course is offered in German.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Rail System Technology** — Lecture (V) On-Site
2115919, WS 25/26, 2 SWS, Language: German, Open in study portal

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V **Rail System Technology** — Lecture (V) On-Site
2115919, SS 2026, 2 SWS, Language: German, Open in study portal

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Organizational issues
schriftliche Prüfung, der Termin steht noch nicht fest

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

T 7.312 Module component: Rail Vehicle Technology [T-MACH-105353]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-107717 - Rail System Technology and Rail Vehicle Technology

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each term	5

Courses					
WT 25/26	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🗣	Cichon
ST 2026	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🗣	Cichon
Exams					
WT 25/26	76-T-MACH-105353	Rail Vehicle Technology			Cichon
ST 2026	76-T-MACH-105353	Rail Vehicle Technology			Cichon

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
writen examination in German language
Duration: approx 60 minutes
No tools or reference materials may be used during the exam except calculator and dictionary

Prerequisites
none

Additional Information
The course is offered in German.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Rail Vehicle Technology

2115996, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V Rail Vehicle Technology

2115996, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Organizational issues
schriftliche Prüfung, der Termin steht noch nicht fest

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

T 7.313 Module component: Rapid Industrialization of Immature Products using the Example of Electric Mobility [T-MACH-113031]

Coordinators: Dr. Jörg Bauer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2149621	Rapid Industrialization of Immature Products using the Example of Electric Mobility	2 SWS	Lecture / 🗣	Bauer
Exams					
WT 25/26	76-T-MACH-113031	Rapid Industrialization of Immature Products using the Example of Electric Mobility			Bauer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written Exam (60 min)

Prerequisites
none

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Rapid Industrialization of Immature Products using the Example of Electric Mobility** — **Lecture (V) On-Site**
2149621, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
The lecture "Rapid Industrialization of Immature Products using the Example of Electric Mobility" deals with production engineering methods for the robust and cost-effective production of technologically novel, so-called "immature" products. In this context, approaches for solving the central challenges resulting from the tension triangle of product development, industrialization and production are identified and discussed.

Based on the motivation for rapid market entry, the current approach involving stakeholders and other participants is explained. On this basis, key enablers for rapid and targeted industrialization are derived and discussed. For example, robust industrial processes based on flexible equipment are an essential core element for cost-effective production. Against this background, industry-relevant concepts for the automation and flexibilization of production processes are presented in the lecture in order to be able to deal efficiently and effectively with product-specific changes on the production side. Therefore, the main goal of an industrialization process is to develop production technologies and processes that enable robust, resource-efficient and cost-effective manufacturing of established and innovative products.

The lecture is structured as follows:

1. Motivation for rapid industrialization (complex market requirements, shortened development and product cycles, decreasing quantities per variant, ...).
2. Industrialization methods (simultaneous engineering, releases, frozen zones, high volumes, ...)
3. Key enablers to accelerate industrialization (simulation and digitalization, flexible and digital production equipment
4. Supply chains and suppliers
5. Testing and deployment
6. Ramp-up

Learning Outcomes:

- The students are familiar with the essential elements of simultaneous engineering and industrialization (motivation, processes, fields of action, challenges).
- The Students know the key enablers for the rapid industrialization of immature products (digitization, flexible production equipment, rapid manufacturing processes for primary production).
- The Students are familiar with the basic principles, methods and procedures of the main enablers. The understanding is deepened through theory, case and practical examples.
- The toolbox of key enablers described in the lecture allows students to select and independently apply the enablers in the context of future challenges.
- The Students are able to disseminate and to apply the knowledge acquired during the lecture in their future working lives.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Blockvorlesung vom 03.11.2025 bis 07.11.2025, täglich von 14:00 bis 19:00 Uhr in der Karlsruher Forschungsfabrik 70.41. Die theoretischen Inhalte der Vorlesung werden durch praktische Aufbauten in der Karlsruher Forschungsfabrik veranschaulicht. Vorlesungsunterlagen und weitere Informationen werden über ILIAS (https://ilias.studium.kit.edu/) zur Verfügung gestellt.

Block course from 03.11.2025 to 07.11.2025, daily from 14:00 to 19:00 in the Karlsruhe Research Factory 70.41. The theoretical contents of the lecture will be illustrated by practical setups in the Karlsruhe Research Factory. Lecture notes and further information will be made available via ILIAS (https://ilias.studium.kit.edu/).

Literature
Foliensatz zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.314 Module component: Recommender Systems [T-WIWI-102847]

Coordinators: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2540506	Recommender Systems	2 SWS	Lecture / 🗣	Geyer-Schulz
WT 25/26	2540507	Exercise Recommender Systems	1 SWS	Practice / 🗣	Geyer-Schulz, Nazemi
Exams					
WT 25/26	7900310	Recommender Systems (WS 2025/2026)			Geyer-Schulz
ST 2026	7900138	Recommender Systems			Geyer-Schulz

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Attention: Exams will not be offered after August 2026.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Recommender Systems

2540506, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

Learning objectives:

The student

- is proficient in different statistical, data-mining, and game theory methods of computing implicit and explicit recommendations
- evaluates recommender systems and compares these with related services

Workload:

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Exam:

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: 0

Organizational issues
Geb. 10.11, Raum 223

Literature

Rakesh Agrawal, Tomasz Imielinski, and Arun Swami. Mining association rules between sets of items in large databases. In Sushil Jajodia Peter Buneman, editor, Proceedings of the ACM SIGMOD International Conference on Management of Data, volume 22, Washington, D.C., USA, Jun 1993. ACM, ACM Press.

Rakesh Agrawal and Ramakrishnan Srikant. Fast algorithms for mining association rules. In Proceedings of the 20th Very Large Databases Conference, Santiago, Chile, pages 487 – 499, Sep 1994.

Asim Ansari, Skander Essegaier, and Rajeev Kohli. Internet recommendation systems. Journal of Marketing Research, 37:363 – 375, Aug 2000.

Christopher Avery, Paul Resnick, and Richard Zweckhauser. The market for evaluations. American Economic Review, 89(3):564 – 584, 1999.

Ibrahim Cingil, Asuman Dogac, and Ayca Azgin. A Broader Approach to Personalization. Communications of the ACM, 43(8):136 – 141, Aug 2000.

Richard O. Duda, Peter E. Hart, and David G. Stork. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.

Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. A customer purchase incidence model applied to recommender services. In R. Kohavi et al., editor, Proceedings of the WebKDD 2001 – Mining log data across all customer touchpoints, volume 2356 of Lecture Notes in Artificial Intelligence LNAI, pages 25–47, Berlin, 2002. ACM, Springer-Verlag.

Jon M. Kleinberg. Authoritative sources in a hyperlinked environment. JACM, 46(5):604–632, sep 1999.

Joseph Konstan, Bradley Miller, David Maltz, Jonathan Herlocker, Lee Gordon, and John Riedl. Grouplens: Applying Collaborative Filtering to Usernet News. Communications of the ACM, 40(3):77 – 87, Mar 1997.

Paul Resnick, Neophytos Iacovou, Peter Bergstrom, and John Riedl. Grouplens: An open architecture for collaborative filtering of netnews. In Proceedings of the conference on Computer supported cooperative work, pages 175 – 186. ACM Press, 1994.

Weiterführende Literatur:

Antoinette Alexander. The return of hardware: A necessary evil? Accounting Technology, 15(8):46 – 49, Sep 1999.

Christopher Avery and Richard Zeckhauser. Recommender systems for evaluating computer messages. Communications of the ACM, 40(3):88 – 89, Mar 1997.

Steven Bellman, Gerald Lohse, and Eric Johnson. Predictors of Online Buying Behavior. Communications of the ACM, 42(12):32 – 38, Dec 1999.

Thomas J. Blischok. Every transaction tells a story. Chain Store Age Executive with Shopping Center Age, 71(3):50–56, Mar 1995.

Hans Hermann Bock. Automatische Klassifikation. Vandenhoeck und Ruprecht, Göttingen, 1974.

Andrew S.C. Ehrenberg. Repeat-Buying: Facts, Theory and Applications. Charles Griffin & Company Ltd, London, 2 edition, 1988.

Wolfgang Gaul, Andreas Geyer-Schulz, Michael Hahsler, and Lars Schmidt-Thieme. eMarketing mittels Recommendersystemen. Marketing ZFP, 24:47 – 55, 2002.

Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. myvu: a next generation recommender system based on observed consumer behavior and interactive evolutionary algorithms. In W. Gaul, O. Opitz, and M. Schader, editors, Data Analysis – Scientific Modeling and Practical Applications, volume 18 of Studies in Classification, Data Analysis and Knowledge Organization, pages 447 – 457, Heidelberg, Germany, 2000. Springer.

Andreas Geyer-Schulz, Michael Hahsler, and Maximillian Jahn. Educational and scientific recommender systems: Designing the information channels of the virtual university. International Journal of Engineering Education, 17(2):153 – 163, 2001.

Mark-Edward Grey. Recommendersysteme auf Basis linearer Regression, 2004.

John A. Hartigan. Clustering Algorithms. John Wiley and Sons, New York, 1975.

Kevin Kelly. New Rules for the New Economy: 10 Radical Strategies for a Connected World. Viking, 1998.

Taek-Hun Kim, Young-Suk Ryu, Seok-In Park, and Sung-Bong Yang. An improved recommendation algorithm in collaborative filtering. In K. Bauknecht, A. Min Tjoa, and G. Quirchmayr, editors, E-Commerce and Web Technologies, Third International Conference, Aix-en-Provence, France, volume 2455 of Lecture Notes in Computer Science, pages 254–261, Berlin, Sep 2002. Springer-Verlag.

Ron Kohavi, Brij Masand, Myra Spiliopoulou, and Jaideep Srivastava. Web mining. Data Mining and Knowledge Discovery, 6:5 – 8, 2002.

G. S. Maddala. Introduction to Econometrics. John Wiley, Chichester, 3 edition, 2001.

Andreas Mild and Martin Natter. Collaborative filtering or regression models for Internet recommendation systems? Journal of Targeting, Measurement and Analysis for Marketing, 10(4):304 – 313, Jan 2002.

Andreas Mild and Thomas Reutterer. An improved collaborative filtering approach for predicting cross-category purchases based on binary market basket data. Journal of Retailing & Consumer Services, 10(3):123–133, may 2003.

Paul Resnick and Hal R. Varian. Recommender Systems. Communications of the ACM, 40(3):56 – 58, Mar 1997.

Badrul M. Sarwar, Joseph A. Konstan, Al Borchers, Jon Herlocker, Brad Miller, and John Riedl. Using filtering agents to improve prediction quality in the grouplens research collaborative filtering system. In Proceedings of ACM Conference on Computer-Supported Cooperative Work, Social Filtering, Social Influences, pages 345 – 354, New York, 1998. ACM Press.

J. Ben Schafer, Joseph Konstan, and Jon Riedl. Recommender Systems in E-commerce. In Proceedings of the 1st ACM conference on Electronic commerce, pages 158 – 166, Denver, Colorado, USA, Nov 1999. ACM.

Upendra Shardanand and Patti Maes. Social information filtering: Algorithms for automating "word of mouth". In Proceedings of ACM SIGCHI, volume 1 of Papers: Using the Information of Others, pages 210 – 217. ACM, 1995.

T 7.315 Module component: Regulation Theory and Practice [T-WIWI-102712]

Coordinators: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading	Term offered	Version
Oral examination	4,5 CP	graded	see Annotations	2

Assessment
The lecture is not offered for an indefinite period of time.
Result of success is made by a 20-30 minutes oral examination. Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None

Recommendations
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.

Particularly helpful but not necessary: Industrial Economics and Principal-Agent- or Contract theories. Prior attendance of the lecture*Competition in Networks* [26240] is helpful in any case but not considered a formal precondition.

Additional Information
The lecture is not offered for an indefinite period of time.

T 7.316 Module component: Responsible Artificial Intelligence [T-WIWI-111385]

Coordinators: Dr. Rainer Hoffmann
Prof. Dr. Jella Pfeiffer

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2545164	Responsible Artificial Intelligence	3 SWS	Lecture / Practice / 🗣	Hoffmann, Gutschow, Bennardo
Exams					
WT 25/26	7900031	Responsible Artificial Intelligence			Pfeiffer
ST 2026	7900038	Responsible Artificial Intelligence (Nachklausur)			Pfeiffer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
Prior to the start of the lecture, introductory materials will be provided for self-study. The lecture has a limitation of participants. Therefore, prior registration via the Wiwi-Portal is mandatory.

Additional Information
Can a technology really be trustworthy or even responsible? Since the success of LLMs at the latest, this question has been increasingly asked in society. With the increasing use of artificial intelligence, terms such as "Trustworthy AI", "Responsible AI" or "Ethical AI" are therefore gaining in importance. But what exactly is behind them? Technology is only ever used by people for specific purposes. So if we want to "trust" an AI solution, we need to understand how the people and organizations involved develop AI responsibly. According to the European Commission's HLEG AI, trustworthy AI must be lawful, ethical and robust.

This lecture sheds light on all these areas and thus provides an answer to the question of what a responsible and thus sustainable approach to AI can look like. After an introduction to AI and data, various approaches will be discussed with which actions and technology applications can be morally evaluated. The aim of this ethical reflection is to find out what we should do with AI instead of limiting ourselves to what we can do with AI.

In the context of robustness, vulnerabilities of AI and measures to address them will be discussed. The lecture will cover other topics such as bias, adversarial attacks, transparency, privacy and human-computer interaction. Current developments in regulatory requirements at European level will also be discussed. Guest lectures and continuous insights into business practice complement the foundations laid.

After successfully completing the course, students should be able

- to classify and evaluate the scientific discussion on ethics in artificial intelligence systems,
- understand the concept of trust and responsibility in the context of artificial intelligence and apply the relevant knowledge to change processes in companies,
- shape the social and entrepreneurial discussion on the use of AI themselves and
- know the legal requirements for AI and implement them in the corporate context.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V **Responsible Artificial Intelligence** — **Lecture / Practice (VÜ) On-Site**
2545164, WS 25/26, 3 SWS, Language: German, Open in study portal

Content
Can a technology really be trustworthy or even responsible? Since the success of LLMs at the latest, this question has been increasingly asked in society. With the increasing use of artificial intelligence, terms such as "Trustworthy AI", "Responsible AI" or "Ethical AI" are therefore gaining in importance. But what exactly is behind them? Technology is only ever used by people for specific purposes. So if we want to "trust" an AI solution, we need to understand how the people and organizations involved develop AI responsibly. According to the European Commission's HLEG AI, trustworthy AI must be lawful, ethical and robust.

This lecture sheds light on all these areas and thus provides an answer to the question of what a responsible and thus sustainable approach to AI can look like. After an introduction to AI and **data,** various approaches will be discussed with which actions and technology applications can be morally evaluated. The aim of this ethical reflection is to find out what we should do with AI instead of limiting ourselves to what we can do with AI.

In the context of robustness, vulnerabilities of AI and measures to address them will be discussed. The lecture will cover other topics such as bias, adversarial attacks, transparency, privacy and human-computer interaction. Current developments in regulatory requirements at European level will also be discussed. Guest lectures and continuous insights into business practice complement the foundations laid.

After successfully completing the course, students should be able to:

- classify and evaluate the scientific discussion on ethics in artificial intelligence systems,
- understand the concept of trust and responsibility in the context of artificial intelligence and apply the relevant knowledge to change processes in companies,
- shape the social and entrepreneurial discussion on the use of AI themselves and
- know the legal requirements for AI and implement them in the corporate context.

Organizational issues
Die Vorlesung und die Übung wechseln sich im zweiwöchentlichen Rhythmus ab: In den Vorlesungswochen liegt die Veranstaltung von 15:45 – 19:00 Uhr (2 SWS), in den Übungswochen von 15:45 – 17:15 Uhr (1 SWS).

Die Übung findet planmäßig online statt.

T 7.317 Module component: Risk Management in Industrial Supply Networks [T-WIWI-102826]

Coordinators: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2581992	Risk Management in Industrial Supply Networks	2 SWS	Lecture / 🗣	Schultmann, Rosenberg
Exams					
WT 25/26	7981992	Risk Management in Industrial Supply Networks			Schultmann
ST 2026	7981992	Risk Management in Industrial Supply Networks			Schultmann

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Risk Management in Industrial Supply Networks

2581992, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn methods and tools to manage risks in complex and dynamically evolving supply chain networks. In the first part of the lectures, students are introduced to the key terms and concepts of risk management and decision theory for industrial application. Based on the theoretic prerequisites, students are able to determine and analyze risk diversification, risk pooling and insurance mechanisms in supply chain network management. Lastly the lectures cover the differences and connection between risk management and resilience in industrial networks.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.318 Module component: Safety Engineering [T-MACH-105171]

Coordinators: Hans-Peter Kany
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	2

Courses					
WT 25/26	2117061	Safety Engineering	2 SWS	Lecture / 🗣	Kany
Exams					
WT 25/26	76-T-MACH-105171	Safety Engineering			Furmans

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Safety Engineering

2117061, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Media
Presentations

Learning content
The course provides basic knowledge of safety engineering. In particular the basics of health at the working place, job safety in Germany, national and European safety rules and the basics of safe machine design are covered. The implementation of these aspects will be illustrated by examples of material handling and storage technology. This course focuses on: basics of safety at work, safety regulations, basic safety principles of machine design, protection devices, system security with risk analysis, electronics in safety engineering, safety engineering for storage and material handling technique, electrical dangers and ergonomics. So, mainly, the technical measures of risk reduction in specific technical circumstances are covered.

Learning goals
The students are able to:

- Name and describe relevant safety concepts of safety engineering,
- Discuss basics of health at work and labour protection in Germany,
- Evaluate the basics for the safe methods of design of machinery with the national and European safety regulations and
- Realize these objectives by using examples in the field of storage and material handling systems.

Recommendations
None

Workload
Regular attendance: 21 hours
Self-study: 99 hours

Organizational issues
Termine: siehe ILIAS.

Literature
Defren/Wickert: Sicherheit für den Maschinen- und Anlagenbau, Druckerei und
Verlag: H. von Ameln, Ratingen

T 7.319 Module component: Science Communication in the Innovation Process [T-WIWI-114748]

Coordinators: Dr. Mara Schwind
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Courses					
WT 25/26	2500055	Science communication in the innovation process	2 SWS	Seminar / 🗣	Schwind, Weissenberger-Eibl, Schwind
Exams					
WT 25/26	7900106	Science Communication in the Innovation Process			Schwind

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessments. The grade consists of the following weighted components:

- 25% workshop
- 25% final presentation
- 50% seminar paper

Details will be announced at the beginning of the course.

Prerequisites
None

Recommendations
Prior attendance of the course Innovation Management [2545015] is recommended.

Additional Information
Teaching and learning format: Seminar

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Science communication in the innovation process

2500055, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
This seminar explores the role of science communication in the innovation process. Students will learn the basic definitions, concepts and models of science communication and critically examine them. They also explore the landscape of science communication actors, the distinction between communication for the common good and strategic communication, and the role of science communication in the acceptance of radical innovations. Through the critical analysis and reflection of science communication formats and their modes of action, students gain an understanding of proven and innovative communication strategies, learning how to adapt different formats to specific target groups and innovation phases.

As part of the seminar, students examine current, research-oriented issues independently and on the basis of scientific criteria. They research, analyze, abstract and reflect on relevant information. They draw their own conclusions using their interdisciplinary knowledge and develop current research results further in certain areas. They know how to validate the results obtained and present them logically and systematically in written and oral form, taking into account scientific methods (structuring, specialist terminology, citing sources). In doing so, they are able to argue professionally and defend the results in discussions with experts. In addition, students are familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and successfully apply these guidelines in the preparation of their scientific work.

T 7.320 Module component: Selected Legal Issues of Internet Law [T-INFO-108462]

Coordinators: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each summer term	1

Courses					
ST 2026	24821	Selected legal issues of Internet law	2 SWS	Colloquium / 🗣	Sattler
Exams					
ST 2026	7500099	Selected Legal Issues of Internet Law			Sattler

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is carried out as an examination of another type (§ 4 Abs. 2 No. 3 SPO).

The overall impression is evaluated. The following partial aspects are included in the grading: oral presentation and discussion.

Prerequisites
The course **Internet Law T-INFO-101307** must not have started.

Recommendations
Keine.

Additional Information
Lecture (with written exam) **Internet Law** T-INFO-101307 is offered in the winter semester.

Colloquium (other type of examination) **Selected Legal Issues of Internet Law** T-INFO-108462 offered in the summer semester

T 7.321 Module component: Selected Topics in Statistics and Analytics: Seminal Papers in Theory and Methods [T-WIWI-114746]

Coordinators: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101637 - Analytics and Statistics

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Irregular	1

Courses					
WT 25/26	2500005	Selected Topics in Statistics and Analytics: Seminal Papers in Theory and Methods	3 SWS	Lecture / Practice / 🗣	Grothe
Exams					
WT 25/26	7900044	Selected Topics in Statistics and Analytics: Seminal Papers in Theory and Methods			Grothe

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of an alternative exam assessment. The grade is composed of 30% active participation, 30% preparation of the sessions, and 40% written contributions during the semester (e.g. questions or reflections on the assigned papers).
Details on the structure of the performance assessment will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
We recommend a sound statistical basis, such as that taught in the Advanced Statistics course.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Selected Topics in Statistics and Analytics: Seminal Papers in Theory and Methods

Lecture / Practice (VÜ)
On-Site

2500005, WS 25/26, 3 SWS, Language: German/English, Open in study portal

Content
In this course, 6–8 key scientific papers ("seminal works") from various areas of statistics and data analysis are read, analyzed, discussed, and optionally implemented. The goal is to develop and reflect on both core statistical concepts and scientific reading and writing skills.
The course is intended for advanced students with a solid background in statistics.

T 7.322 Module component: Selected topics of system integration for micro- and nanotechnology [T-MACH-105695]

Coordinators: apl. Prof. Dr. Ulrich Gengenbach
Prof. Dr. Veit Hagenmeyer
Dr. Liane Koker
apl. Prof. Dr. Ingo Sieber

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	2

Assessment
oral exam (Duration: 30min)

Prerequisites
T-MACH-108809 "Micro- and nanosystem integration for medical, fluidic and optical applications" must not be started.

Additional Information
The course is offered in German.

Workload
120 hours

T 7.323 Module component: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

Coordinators: Dr. Timo Mappes
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type	Credits	Grading	Term offered	Version
Oral examination	3 CP	graded	Each term	1

Assessment
Oral examination

Prerequisites
none

T 7.324 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Graded [T-WIWI-111439]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	2 CP	graded	2

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.325 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Graded [T-WIWI-111438]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	1 CP	graded	2

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.326 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Graded [T-WIWI-113354]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	3 CP	graded	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.327 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Graded [T-WIWI-113352]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	1 CP	graded	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.328 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Graded [T-WIWI-113353]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	2 CP	graded	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.329 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Graded [T-WIWI-111440]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	3 CP	graded	2

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.330 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Ungraded [T-WIWI-113356]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.331 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Ungraded [T-WIWI-113357]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Coursework	3 CP	pass/fail	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.332 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Ungraded [T-WIWI-111442]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.333 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Ungraded [T-WIWI-111441]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Coursework	1 CP	pass/fail	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.334 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Ungraded [T-WIWI-111443]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Coursework	3 CP	pass/fail	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.335 Module component: Self-Booking-HOC-SPZ-FORUM-STK-Ungraded [T-WIWI-113355]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Coursework	1 CP	pass/fail	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- Studienkolleg

Additional Information
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.336 Module component: Semantic Web Technologies [T-WIWI-110848]

Coordinators: Dr.-Ing. Tobias Käfer
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2511310	Semantic Web Technologies	2 SWS	Lecture / 🗣	Käfer, Braun, Kubelka
ST 2026	2511311	Exercises to Semantic Web Technologies	1 SWS	Practice / 🗣	Käfer, Braun, Kubelka
Exams					
WT 25/26	79AIFB_SWebT_A2	Semantic Web Technologies (Registration extended until 16.02.2026)			Käfer
ST 2026	791-AIFB-SWebT-HK	Semantic Web Technologies (Registration until 20.07.2026)			Käfer

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendations
It is recommended that students have previously attended computer-science lectures from the Bachelor programmes Information Systems or Industrial Engineering and Management in semesters 1 – 4, or have taken equivalent courses.

Below you will find excerpts from courses related to this module component:

V Semantic Web Technologies

2511310, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals

Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

V **Exercises to Semantic Web Technologies** **Practice (Ü)**
2511311, SS 2026, 1 SWS, Language: English, Open in study portal **On-Site**

Content
The exercises are related to the lecture Semantic Web Technologies.

Multiple exercises are held that capture the topics, held in the lecture Semantic Web Technologies, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

T 7.337 Module component: Seminar Application of Artificial Intelligence in Production [T-MACH-112121]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105968 - Artificial Intelligence in Production
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each summer term	5

Courses					
ST 2026	2150910	Seminar Application of Artificial Intelligence in Production	2 SWS	Seminar / 🗣	Fleischer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative test achievement (graded):

- Presentation of the results (approx. 20 min) followed by a colloquium (approx. 15 min) with weighting 25%
- Written processing of the results with weighting 75%

Prerequisites
none

Recommendations
Previous participation in the lecture 2149921 "Artificial Intelligence in Production" or advanced knowledge of Python.

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Seminar Application of Artificial Intelligence in Production

2150910, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The module AI in Production is designed to teach students the practical, holistic integration of machine learning methods and the application of artificial intelligence in production. The course is based on the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content aspects (methods) within the individual phases. In addition to teaching the practice-relevant aspects for integrating the most important methods of machine learning, the focus here is primarily on the necessary steps for data generation and data preparation, as well as the implementation and safeguarding of the methods in an industrial environment.

The lecture “Seminar on the Application of Artificial Intelligence in Production” aims at the practical integration of current methods of machine learning using realistic industrial use cases. The content of the course is based on the holistic, practical implementation of an AI project in production. In doing so, students solve a problem from a production context using methods of data analysis, processing and machine learning.

Learning Outcomes:

The students

- are able to independently analyze a practical problem in production with regard to the application of machine learning methods.
- will be able to independently apply common deep learning algorithms to practical data sets, validate them, and analyze the results.
- understand the challenges of using deep learning methods in production.
- will know the main action areas and open research questions for the successful implementation of AI in production and for the implementation of autonomous machines.
- are able to evaluate the results of current deep learning methods and, based on these, to develop and practically apply proposed solutions (from the field of machine learning).

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Auftaktveranstaltung am 24.04.2026, 8:00 - 9:30 Uhr im Vorlesungsbereich der Karlsruher Forschungsfabrik (Geb. 70.41).

Alle nachfolgenden Termine werden über Ilias (https://ilias.studium.kit.edu/) bekanntgegeben.

Literature
Materialien zur Lehrveranstaltung werden über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Course materials will be provided onIlias (https://ilias.studium.kit.edu/).

T 7.338 Module component: Seminar Creating a Patent Specification [T-ETIT-100754]

Coordinators: Prof. Dr. Wilhelm Stork
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Coursework	3 CP	pass/fail	Each summer term	1

Courses					
ST 2026	2311633	Seminar Creating a Patent Specification	2 SWS	Seminar / 🗣	Stork

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.339 Module component: Seminar Data-Mining in Production [T-MACH-108737]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	2

Courses					
WT 25/26	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🗣	Lanza
Exams					
WT 25/26	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Additional Information
The course is offered in German.

The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Seminar Data Mining in Production

2151643, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

Learning Outcomes:

The students …

- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues
Die Teilnehmerzahl ist auf zwölf Studierende begrenzt. Termine und Fristen zur Veranstaltung werden unter https://www.wbk.kit.edu/studium-und-lehre.php bekanntgegeben.

The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

T 7.340 Module component: Seminar Development of Automated Production Systems [T-MACH-113999]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101298 - Automated Manufacturing Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2149911	Seminar Development of Automated Production Systems	2 SWS	Seminar / 🗣	Fleischer
Exams					
WT 25/26	76-T-MACH-113999	Seminar Development of Automated Production Systems			Fleischer

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative test achievement (graded):

- Presentation of the results (approx. 20 min) followed by a colloquium (approx. 15 min) with weighting 25%
- Written processing of the results with weighting 75%

Prerequisites
T-MACH-108844 - Automated production systems must not be started

Additional Information
The course is offered in German.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Seminar Development of Automated Production Systems

2149911, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The course "Seminar Development of Automated Production Systems" aims at the practical project planning of automated production systems based on realistic industrial use cases. The content framework of the course results from the holistic, practical project planning task of an automated production plant. Firstly, the basics of production automation are taught as an introduction. The aspects of multi-machine systems and project planning are then examined in depth. An interdisciplinary approach to these sub-areas results in interfaces to Industry 4.0 approaches. The core of the course is the project planning of a use case based on the procedure taught. In doing so, the students should apply the methods taught in a problem-related and results-orientated manner and thus develop an automation solution.

Learning Outcomes:
The students...

- are able to name and describe the automation tasks in production plants and the components required for implementation.
- understand the challenges that can arise when using automation solutions in production.
- are able to independently analyse a practical problem in production with regard to the application of automation.
- are able to assess the results of automation problems and, based on this, develop and apply practical solutions.

Workload:
regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.341 Module component: Seminar in Business Administration A (Master) [T-WIWI-103474]

Coordinators: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	2500045	Digital Democracy - Challenges and Opportunities of the Digital Society	2 SWS	Seminar /	Fegert, Stein, Bezzaoui
WT 25/26	2500049	Seminar in Cognition and Consumer Behavior	2 SWS	Seminar /	Gradwohl
WT 25/26	2500055	Science communication in the innovation process	2 SWS	Seminar /	Schwind, Weissenberger-Eibl, Schwind
WT 25/26	2500125	Human-Centered Systems Seminar: Engineering	2 SWS	Seminar /	Mädche
WT 25/26	2530293		2 SWS	Seminar /	Ruckes, Luedecke, Kohl, Sarac, Fkyerat
WT 25/26	2530586		2 SWS	Seminar /	Uhrig-Homburg, Molnar
WT 25/26	2540472	Master Seminar (Information Systems III) – Future of Commerce / AI and Fairness	2 SWS	Seminar /	Bennardo, Gutschow, Heßler
WT 25/26	2540473	Business Data Analytics	2 SWS	Seminar /	Hariharan, Grote, Schulz, Motz
WT 25/26	2540475	Positive Information Systems	2 SWS	Seminar /	Knierim, del Puppo
WT 25/26	2540478	Smart Grids and Energy Markets	2 SWS	Seminar /	Weinhardt, Semmelmann, Miskiw, Speck
WT 25/26	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar /	Geyer-Schulz, Nazemi
WT 25/26	2540557	Human-Centered Systems Seminar: Research	2 SWS	Seminar /	Mädche
WT 25/26	2545105	Case studies seminar: Innovation management	2 SWS	Seminar /	Weissenberger-Eibl
WT 25/26	2571181	Seminar Digital Marketing (Master)	2 SWS	Seminar /	Kupfer, Schmitt, Cinar
WT 25/26	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 25/26	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 25/26	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar /	Wouters, Dickemann
WT 25/26	2581030	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Sloot
WT 25/26	2581032	Seminar Energy Economics VI	2 SWS	Seminar /	Fichtner, Slednev
WT 25/26	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar /	Schultmann, Rudi
WT 25/26	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar /	Schultmann, Steins
WT 25/26	2581978	Seminar in Production and Operations Management	2 SWS	Seminar /	Schultmann, Rosenberg
WT 25/26	2581979	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Kleinebrahm
WT 25/26	2581980	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Sandmeier

WT 25/26	2581981	Seminar in Energy Economics	2 SWS	Seminar / 🗣	Ardone, Fichtner
ST 2026	2500018	Successful transformation through innovation	2 SWS	Seminar / 🗣	Busch
ST 2026	2500020	Digital Democracy - Challenges and opportunities of the digital society	2 SWS	Seminar / 🧩	Fegert
ST 2026	2500125	Human-Centered Systems Seminar: Engineering	3 SWS	Seminar / 🧩	Mädche
ST 2026	2530580	Seminar in Finance (Master)	2 SWS	Seminar / 🗣	Uhrig-Homburg
ST 2026	2540469	Master Seminar: Intelligent & Responsible Information Systems	2 SWS	Seminar / 🗣	Bennardo, Gutschow, Heßler
ST 2026	2540473	Applied Responsible AI	2 SWS	Seminar	Schulz, Weinhardt
ST 2026	2540475	Positive Information Systems	2 SWS	Seminar	Knierim
ST 2026	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Weinhardt
ST 2026	2540493	Data Science for Industrial Applications	2 SWS	Seminar / 🗣	Spitzer, Holstein, Hendriks
ST 2026	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2026	2540553	Biosignal-Adaptive Systems Seminar	2 SWS	Seminar / 🧩	Mädche, Beigl
ST 2026	2540557	Human-Centered Systems Seminar: Research	3 SWS	Seminar / 🧩	Mädche
ST 2026	2545002	Entrepreneurship Research	2 SWS	Seminar / 🗣	Kuschel, Malik
ST 2026	2571180	Seminar in Marketing and Sales (Master)	2 SWS	Seminar / 🗣	Klarmann, Mitarbeiter
ST 2026	2571182	Seminar “The Future of Marketing” (Master)	2 SWS	Seminar / 🗣	Kupfer
ST 2026	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter, Gorny
ST 2026	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
ST 2026	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar / 🗣	Fichtner, Sloot
ST 2026	2581031	Seminar Energiewirtschaft V	2 SWS	Seminar / 🗣	Plötz
ST 2026	2581032	Seminar Energiewirtschaft VI	2 SWS	Seminar / 🗣	Slednev, Fichtner
ST 2026	2581978	Seminar Produktionswirtschaft und Logistik III	2 SWS	Seminar / 🗣	Schultmann, Rosenberg
ST 2026	2581979	Seminar Energiewirtschaft I	2 SWS	Seminar / 🗣	Fichtner, Kleinebrahm
ST 2026	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar / 🗣	Fichtner, Sandmeier
ST 2026	2581981	Seminar Energiewirtschaft III	2 SWS	Seminar / 🗣	Ardone, Fichtner
Exams					
WT 25/26	00072	Seminar Positive Information Systems			Weinhardt
WT 25/26	00074	Seminar Business Data Analytics			Weinhardt
WT 25/26	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 25/26	7900069	Human-Centered Systems Seminar: Engineering			Mädche
WT 25/26	7900106	Science Communication in the Innovation Process			Schwind
WT 25/26	7900151	Master Seminar in Data Science and Machine Learning			Geyer-Schulz
WT 25/26	7900163	Seminar Human Resource Management (Master)			Nieken
WT 25/26	7900164	Seminar Human Resources and Organizations (Master)			Nieken
WT 25/26	7900184	Seminar in Finance (Master)			Ruckes
WT 25/26	7900203	Seminar "Finance in a nutshell"			Uhrig-Homburg
WT 25/26	7900233	Human-Centered Systems Seminar: Research			Mädche
WT 25/26	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl
WT 25/26	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg
WT 25/26	7900322	Seminar in Cognition and Consumer Behavior (Master)			Scheibehenne

WT 25/26	7900328	Seminar in Energy Economics VI	Fichtner
WT 25/26	7900333	Seminar Digital Marketing (Master)	Kupfer
WT 25/26	7900335	Seminar Energy Economics IV	Fichtner
WT 25/26	79-2579919-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
WT 25/26	7940469	Master Seminar: Information Systems III	Pfeiffer, Heßler
WT 25/26	7981976	Seminar in Production and Operations Management I	Schultmann
WT 25/26	7981977	Seminar in Production and Operations Management II	Schultmann
WT 25/26	7981978	Seminar in Production and Operations Management III	Schultmann
WT 25/26	7981979	Seminar Energy Economics I	Fichtner
WT 25/26	7981980	Seminar Energy Economics II	Fichtner
WT 25/26	7981981	Seminar Energy Economics III	Fichtner
ST 2026	7900052	Entrepreneurship Research	Terzidis
ST 2026	7900101	Seminar Human Resource Management (Master)	Nieken
ST 2026	7900127	Seminar in Finance: Structured Products –Pricing & Risk Management (Master)	Uhrig-Homburg
ST 2026	7900190	Human-Centered Systems Seminar: Engineering	Mädche
ST 2026	7900231	Seminar Human Resources and Organizations (Master)	Nieken
ST 2026	7900233	Seminar in Marketing and Sales (Master)	Klarmann
ST 2026	7900240	Seminar "The Future of Marketing" (Master)	Kupfer
ST 2026	7900261	Human-Centered Systems Seminar: Research	Mädche
ST 2026	7900265	Biosignal-Adaptive Systems Seminar	Mädche
ST 2026	7900326	Seminar Energy Economics VI	Fichtner
ST 2026	792581030	Seminar Energy Economics IV	Fichtner
ST 2026	792581031	Seminar Energy Economics V	Plötz
ST 2026	7940469	Master Seminar: Intelligent & Responsible Information Systems	Pfeiffer
ST 2026	7981978	Seminar in Production and Operations Management III	Schultmann
ST 2026	7981979	Seminar Energy Economics I: A Real-Time Day-Ahead Energy Time Series Forecasting Challenge	Fichtner
ST 2026	7981980	Seminar Energy Economics II: Sustainable Transformation of Energy Infrastructures	Fichtner
ST 2026	7981981	Seminar Energy Economics III	Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Science communication in the innovation process** **Seminar (S) On-Site**
2500055, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
This seminar explores the role of science communication in the innovation process. Students will learn the basic definitions, concepts and models of science communication and critically examine them. They also explore the landscape of science communication actors, the distinction between communication for the common good and strategic communication, and the role of science communication in the acceptance of radical innovations. Through the critical analysis and reflection of science communication formats and their modes of action, students gain an understanding of proven and innovative communication strategies, learning how to adapt different formats to specific target groups and innovation phases.

As part of the seminar, students examine current, research-oriented issues independently and on the basis of scientific criteria. They research, analyze, abstract and reflect on relevant information. They draw their own conclusions using their interdisciplinary knowledge and develop current research results further in certain areas. They know how to validate the results obtained and present them logically and systematically in written and oral form, taking into account scientific methods (structuring, specialist terminology, citing sources). In doing so, they are able to argue professionally and defend the results in discussions with experts. In addition, students are familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and successfully apply these guidelines in the preparation of their scientific work.

V **Seminar (S) On-Site**
2530586, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
Within this seminar eLearning videos are produced to different topics out of the contents of our lectures. The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.Through conduction of the video the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

The success is monitored by the development of an eLearning video and by the writing of a project report (according to §4(2), 3 SPO).

The overall grade is made up of these partial performances.

Recommendations:

Knowledge of the content of the modules *Essentials of Finance* [WW3BWLFBV1] (for bachelor students) and *F1 (Finance)* [WW4BWLFBV1] (for master students) is assumed.

The total workload for this course is approximately 90 hours. For further information see German version.

Organizational issues
Kickoff am 27.10.25 um 16 Uhr, Zwischenpräsentation am 09.12.25, 16 Uhr und Abschlusspräsentation am 27.01.26, 17:30 Uhr am Campus B (Geb. 09.21), Raum 209

V **Master Seminar (Information Systems III) – Future of Commerce / AI and Fairness** **Seminar (S) On-Site**
2540472, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
This seminar is offered by the Information Systems III research group, which has been based at the Institute for Information Systems (WIN) since January 2025 and is led by Prof. Dr. Jella Pfeiffer. Further information about us can be found on our website (WIN - Information Systems III).

V **Business Data Analytics** **Seminar (S) On-Site**
2540473, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Content
wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

V **Master Seminar in Data Science and Machine Learning** — **Seminar (S)** **Blended (On-Site/Online)**
2540510, WS 25/26, 2 SWS, Language: German, Open in study portal

V **Case studies seminar: Innovation management** — **Seminar (S)** **On-Site**
2545105, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
The objective of the seminar is to acquire selected concepts and methods of innovation management and to apply these in a practical way. The focus is on working on specific issues using a case study from business practice. Students work in groups and transfer the content taught, for example from the areas of scenario development, to entrepreneurial challenges in the context of fictitious case studies. The course follows a didactic interplay of theoretical input and direct application of what has been learned. At the end, the groups present their results in a plenary presentation, which is prepared by a short introduction to presentation techniques. The joint discussion promotes the transfer of knowledge to different contexts and strengthens the participants' ability to reflect.

As part of the seminar, students deal independently with current, research-oriented issues and systematically apply scientific criteria. They research relevant information, analyze, abstract and critically evaluate it. They draw conclusions independently from poorly structured data, incorporate interdisciplinary knowledge and contribute selectively to the further development of existing research perspectives. The results are validated and systematically prepared both orally and in writing using scientific standards - particularly with regard to structuring, terminology and correct citation of sources. In doing so, students argue in a technically sound manner and defend their findings in discourse with other participants and lecturers. They are also familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and apply these standards consistently in the preparation of their scientific work.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

V **Seminar Human Resource Management (Master)** — **Seminar (S)** **On-Site**
2573012, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V **Seminar Human Resources and Organizations (Master)** — **Seminar (S)** **On-Site**
2573013, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V **Seminar Management Accounting - Sustainability Topics** **Seminar (S) On-Site**
2579919, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade is made up of the grade of the seminar paper, the presentation and the contributions in the seminar sessions.

Required prior Courses:

- The course requires a basic knowledge of finance and accounting.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 8 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

V

Successful transformation through innovation

2500018, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content

This seminar uses strategic innovation management and concepts such as organizational ambidexterity, boundary spanning and stakeholder approaches to shed light on how companies can increase their innovative capacity through innovation. Students will use a core paper to understand the steps a company takes to become an innovative organization. The aim is to understand how medium-sized companies can develop into innovation-driven organizations in the context of organizational inertia and path dependency with the help of the aforementioned concepts. Part of the seminar will be to analyze the role of different stakeholders and how companies can become part of innovation ecosystems.

Based on the impulses and the core paper, students will apply the concepts they have learned to selected companies and present their results. These are also incorporated into academic seminar papers. As part of this work process, students deal independently with a current, research-oriented question and apply scientific criteria consistently. They research relevant information, analyze and abstract it critically and draw their own conclusions on this basis, reflecting their interdisciplinary knowledge and selectively developing current research findings.

The results obtained are systematically presented in written and oral form in compliance with academic standards - including structured presentation, correct specialist terminology and comprehensible references. In doing so, the students argue in a technically sound manner and are able to defend their positions in scientific discourse with experts. In addition, they are familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and successfully apply these guidelines in the preparation of their scientific work.

Organizational issues

Weblink: https://itm.entechnon.kit.edu/192_1281.phphttps://itm.entechnon.kit.edu/192_1673.php

V

Human-Centered Systems Seminar: Engineering

2500125, SS 2026, 3 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

Formerly known as "Current Topics in Digital Transformation"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the human-centered systems lab (Prof. Mädche). Students will work on a dedicated topic in the context of human-centered systems and apply a pre-defined research method. A broad spectrum of topics is offered every semester, topics may range from creating an experimental design, analyzing collected data, or systematically comparing existing software prototypes in a specific field of interest.

V

Data Science for Industrial Applications

2540493, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Learning Objectives

This seminar will require you to screen, select, and apply information systems theories and methodologies to solve contemporary challenges in the manufacturing and adjacent industries. This will include both critical reviews of the literature state-of-the-art [1-2] as well as the systematic conduct of design science research and machine learning methods [3-4]. You will identify key problems in real-world use cases, derive relevant research questions, and systematically gather, choose, and apply academic knowledge to develop solutions in the form of proof-of-concepts or prototypes.

Course Credits

The seminar can be credited as Seminar Betriebswirtschaftslehre A [T-WIWI-103474], Seminar Betriebswirtschaftslehre B [T-WIWI-103476] or Seminar Wirtschaftsinformatik [T-WIWI-109827] (3 ECTS). Other courses may be credited upon request.

Seminar Description

The Internet of Things (IoT) is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, connectivity/internet access, and the economic application of sensors [5], physical products are providing vast amounts of data, enabling the development of smart services [6]. While such IoT use cases are projected to open a market potential valued at $3.3 billion in 2030 [7], the industry is still far from exploiting its full capabilities. To solve this challenge, cutting-edge academic knowledge in information systems and machine learning is key to generating valuable insights from machine data.

The seminar is held in cooperation with international industry partners, who provide real-world datasets and ongoing access to subject matter experts. Students will work in teams of 2-4 on different topics and datasets. The assignments will be handed out in a joint kick-off event – to be scheduled once participating students have been selected. Attendance at this kick-off event is mandatory and a prerequisite for participation. Students are required to submit a seminar paper of 12-15 pages on an individual basis.

Expertise in Python and Data Science / Machine Learning as well as successful participation in the course “Artificial Intelligence in Service Systems” (T-WIWI-108715) are strongly recommended.

Contact

Daniel Hendricks – daniel.hendriks@kit.edu

Philipp Spitzer - philipp.spitzer@kit.edu

Joshua Holstein – joshua.holstein@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.

[1] Webster, J., Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. MIS Quarterly, 26 (2) xiii-xxiii.

[2] Brocke, J. v. et al. (2009), Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process. *Proceedings of the European Conference on Information Systems*, paper 161.

[3] Wirth, R., Hipp, J. (2000). CRISP-DM: Towards a Standard Process Model for Data Mining. Proceedings of the 4th International Conference on the Practical Applications of Knowledge Discovery and Data Mining, 29-40.

[4] Peffers, K., Tuunanen, T., Rothenberger, M., Chatterjee, S. (2008). A Design Science Research Methodology for Information Systems Research. Journal of Management Information Systems, 24 (3) 45–78.

[5] Martin, D.; Kühl, N.; Satzger, G. (2021). Virtual Sensors. Business & Information Systems Engineering, 63 (3) 315-323.

[6] Hunke, F., Heinz, D. Satzger, G. (2022). Creating customer value from data: foundations and archetypes of analytics-based services. Electronic Markets, 32, 503–521.

[7] Chui, M., Collins, M., Patel, M. (2021). IoT value set to accelerate through 2030: Where and how to capture it. McKinsey & Company. URL: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/iot-value-set-to-accelerate-through-2030-where-and-how-to-capture-it

V **Master Seminar in Data Science and Machine Learning** **Seminar (S)**
2540510, SS 2026, 2 SWS, Language: German/English, Open in study portal

V **Biosignal-Adaptive Systems Seminar** **Seminar (S)**
2540553, SS 2026, 2 SWS, Language: English, Open in study portal **Blended (On-Site/Online)**

Content
Biosignal-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a biosignal-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (h-lab, Prof. Mädche). It is offered as part of the DFG-funded graduate school “KD2School: Designing Adaptive Systems for Economic Decisions“ (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a biosignal-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a biosignal-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the biosignal-adaptive system prototype

Prerequisites

Strong analytical abilities and profound software development skills are required.

Organizational issues
Termine werden bekannt gegeben

Literature
Required literature will be made available in the seminar.

V **Human-Centered Systems Seminar: Research** **Seminar (S)**
2540557, SS 2026, 3 SWS, Language: English, Open in study portal **Blended (On-Site/Online)**

Content
Formerly known as "Information Systems and Service Design Seminar"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group IS I (Prof. Mädche). The research group “Information Systems I” (IS I) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues
Termine werden bekannt gegeben

V Entrepreneurship Research
2545002, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

In this course, the students choose from various relevant and current research topics in entrepreneurship and independently develop a topic that suits them in small teams. Initially, there is an introduction to standard methods such as systematic literature review, design science, qualitative and quantitative data analysis, and more. The seminar topic must be scientifically prepared and presented in 15-20 pages as part of a written elaboration. The seminar results are presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

The foundations of independent scholarly work (literature review, argumentation + discussion, citation of literature sources, application of qualitative, quantitative, and simulation methods) are developed as part of the written elaboration. The competencies acquired in the seminar can be utilized in preparing for a potential master's thesis. Therefore, the seminar is mainly aimed at students who intend to write their thesis at the Chair of Entrepreneurship and Technology Management and wish to gain substantial experience in entrepreneurship research.

Organizational issues
Registration is via the Wiwi-Portal.

Seminar dates will probably be (as announced in Wiwi-Portal):

Wednesday, 29.04.2026, 10.00-16.00
Wednesday, 20.05.2026, 10.00-16.00
Wednesday, 24.06.2026, 09.00-12.00

Literature
Will be announced in the seminar.

V Seminar Human Resource Management (Master)
2573012, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V Seminar Human Resources and Organizations (Master)
2573013, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

T 7.342 Module component: Seminar in Business Administration B (Master) [T-WIWI-103476]

Coordinators: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	2500045	Digital Democracy - Challenges and Opportunities of the Digital Society	2 SWS	Seminar /	Fegert, Stein, Bezzaoui
WT 25/26	2500055	Science communication in the innovation process	2 SWS	Seminar /	Schwind, Weissenberger-Eibl, Schwind
WT 25/26	2500125	Human-Centered Systems Seminar: Engineering	2 SWS	Seminar /	Mädche
WT 25/26	2530293		2 SWS	Seminar /	Ruckes, Luedecke, Kohl, Sarac, Fkyerat
WT 25/26	2530586		2 SWS	Seminar /	Uhrig-Homburg, Molnar
WT 25/26	2540472	Master Seminar (Information Systems III) – Future of Commerce / AI and Fairness	2 SWS	Seminar /	Bennardo, Gutschow, Heßler
WT 25/26	2540473	Business Data Analytics	2 SWS	Seminar /	Hariharan, Grote, Schulz, Motz
WT 25/26	2540475	Positive Information Systems	2 SWS	Seminar /	Knierim, del Puppo
WT 25/26	2540478	Smart Grids and Energy Markets	2 SWS	Seminar /	Weinhardt, Semmelmann, Miskiw, Speck
WT 25/26	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar /	Geyer-Schulz, Nazemi
WT 25/26	2540557	Human-Centered Systems Seminar: Research	2 SWS	Seminar /	Mädche
WT 25/26	2545105	Case studies seminar: Innovation management	2 SWS	Seminar /	Weissenberger-Eibl
WT 25/26	2571181	Seminar Digital Marketing (Master)	2 SWS	Seminar /	Kupfer, Schmitt, Cinar
WT 25/26	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 25/26	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 25/26	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar /	Wouters, Dickemann
WT 25/26	2581030	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Sloot
WT 25/26	2581032	Seminar Energy Economics VI	2 SWS	Seminar /	Fichtner, Slednev
WT 25/26	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar /	Schultmann, Rudi
WT 25/26	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar /	Schultmann, Steins
WT 25/26	2581978	Seminar in Production and Operations Management	2 SWS	Seminar /	Schultmann, Rosenberg
WT 25/26	2581979	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Kleinebrahm
WT 25/26	2581980	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Sandmeier
WT 25/26	2581981	Seminar in Energy Economics	2 SWS	Seminar /	Ardone, Fichtner

ST 2026	2500018	Successful transformation through innovation	2 SWS	Seminar / 🗣	Busch
ST 2026	2500020	Digital Democracy - Challenges and opportunities of the digital society	2 SWS	Seminar / 🧩	Fegert
ST 2026	2500125	Human-Centered Systems Seminar: Engineering	3 SWS	Seminar / 🧩	Mädche
ST 2026	2530580	Seminar in Finance (Master)	2 SWS	Seminar / 🗣	Uhrig-Homburg
ST 2026	2540469	Master Seminar: Intelligent & Responsible Information Systems	2 SWS	Seminar / 🗣	Bennardo, Gutschow, Heßler
ST 2026	2540473	Applied Responsible AI	2 SWS	Seminar	Schulz, Weinhardt
ST 2026	2540475	Positive Information Systems	2 SWS	Seminar	Knierim
ST 2026	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Weinhardt
ST 2026	2540493	Data Science for Industrial Applications	2 SWS	Seminar / 🗣	Spitzer, Holstein, Hendriks
ST 2026	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2026	2540553	Biosignal-Adaptive Systems Seminar	2 SWS	Seminar / 🧩	Mädche, Beigl
ST 2026	2540557	Human-Centered Systems Seminar: Research	3 SWS	Seminar / 🧩	Mädche
ST 2026	2545002	Entrepreneurship Research	2 SWS	Seminar / 🗣	Kuschel, Malik
ST 2026	2571180	Seminar in Marketing and Sales (Master)	2 SWS	Seminar / 🗣	Klarmann, Mitarbeiter
ST 2026	2571182	Seminar “The Future of Marketing” (Master)	2 SWS	Seminar / 🗣	Kupfer
ST 2026	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter, Gorny
ST 2026	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
ST 2026	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar / 🗣	Fichtner, Sloot
ST 2026	2581031	Seminar Energiewirtschaft V	2 SWS	Seminar / 🗣	Plötz
ST 2026	2581032	Seminar Energiewirtschaft VI	2 SWS	Seminar / 🗣	Slednev, Fichtner
ST 2026	2581978	Seminar Produktionswirtschaft und Logistik III	2 SWS	Seminar / 🗣	Schultmann, Rosenberg
ST 2026	2581979	Seminar Energiewirtschaft I	2 SWS	Seminar / 🗣	Fichtner, Kleinebrahm
ST 2026	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar / 🗣	Fichtner, Sandmeier
ST 2026	2581981	Seminar Energiewirtschaft III	2 SWS	Seminar / 🗣	Ardone, Fichtner
Exams					
WT 25/26	00072	Seminar Positive Information Systems			Weinhardt
WT 25/26	00074	Seminar Business Data Analytics			Weinhardt
WT 25/26	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 25/26	7900069	Human-Centered Systems Seminar: Engineering			Mädche
WT 25/26	7900106	Science Communication in the Innovation Process			Schwind
WT 25/26	7900151	Master Seminar in Data Science and Machine Learning			Geyer-Schulz
WT 25/26	7900163	Seminar Human Resource Management (Master)			Nieken
WT 25/26	7900164	Seminar Human Resources and Organizations (Master)			Nieken
WT 25/26	7900184	Seminar in Finance (Master)			Ruckes
WT 25/26	7900203	Seminar "Finance in a nutshell"			Uhrig-Homburg
WT 25/26	7900233	Human-Centered Systems Seminar: Research			Mädche
WT 25/26	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl
WT 25/26	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg
WT 25/26	7900322	Seminar in Cognition and Consumer Behavior (Master)			Scheibehenne
WT 25/26	7900328	Seminar in Energy Economics VI			Fichtner

WT 25/26	7900333	Seminar Digital Marketing (Master)	Kupfer
WT 25/26	7900335	Seminar Energy Economics IV	Fichtner
WT 25/26	79-2579919-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
WT 25/26	7940469	Master Seminar: Information Systems III	Pfeiffer, Heßler
WT 25/26	7981976	Seminar in Production and Operations Management I	Schultmann
WT 25/26	7981977	Seminar in Production and Operations Management II	Schultmann
WT 25/26	7981978	Seminar in Production and Operations Management III	Schultmann
WT 25/26	7981979	Seminar Energy Economics I	Fichtner
WT 25/26	7981980	Seminar Energy Economics II	Fichtner
WT 25/26	7981981	Seminar Energy Economics III	Fichtner
ST 2026	7900052	Entrepreneurship Research	Terzidis
ST 2026	7900101	Seminar Human Resource Management (Master)	Nieken
ST 2026	7900127	Seminar in Finance: Structured Products –Pricing & Risk Management (Master)	Uhrig-Homburg
ST 2026	7900190	Human-Centered Systems Seminar: Engineering	Mädche
ST 2026	7900231	Seminar Human Resources and Organizations (Master)	Nieken
ST 2026	7900233	Seminar in Marketing and Sales (Master)	Klarmann
ST 2026	7900240	Seminar "The Future of Marketing" (Master)	Kupfer
ST 2026	7900261	Human-Centered Systems Seminar: Research	Mädche
ST 2026	7900265	Biosignal-Adaptive Systems Seminar	Mädche
ST 2026	7900326	Seminar Energy Economics VI	Fichtner
ST 2026	792581030	Seminar Energy Economics IV	Fichtner
ST 2026	792581031	Seminar Energy Economics V	Plötz
ST 2026	7940469	Master Seminar: Intelligent & Responsible Information Systems	Pfeiffer
ST 2026	7981978	Seminar in Production and Operations Management III	Schultmann
ST 2026	7981979	Seminar Energy Economics I: A Real-Time Day-Ahead Energy Time Series Forecasting Challenge	Fichtner
ST 2026	7981980	Seminar Energy Economics II: Sustainable Transformation of Energy Infrastructures	Fichtner
ST 2026	7981981	Seminar Energy Economics III	Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V

Science communication in the innovation process

2500055, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
This seminar explores the role of science communication in the innovation process. Students will learn the basic definitions, concepts and models of science communication and critically examine them. They also explore the landscape of science communication actors, the distinction between communication for the common good and strategic communication, and the role of science communication in the acceptance of radical innovations. Through the critical analysis and reflection of science communication formats and their modes of action, students gain an understanding of proven and innovative communication strategies, learning how to adapt different formats to specific target groups and innovation phases.

As part of the seminar, students examine current, research-oriented issues independently and on the basis of scientific criteria. They research, analyze, abstract and reflect on relevant information. They draw their own conclusions using their interdisciplinary knowledge and develop current research results further in certain areas. They know how to validate the results obtained and present them logically and systematically in written and oral form, taking into account scientific methods (structuring, specialist terminology, citing sources). In doing so, they are able to argue professionally and defend the results in discussions with experts. In addition, students are familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and successfully apply these guidelines in the preparation of their scientific work.

V

2530586, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
Within this seminar eLearning videos are produced to different topics out of the contents of our lectures. The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.Through conduction of the video the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

The success is monitored by the development of an eLearning video and by the writing of a project report (according to §4(2), 3 SPO).

The overall grade is made up of these partial performances.

Recommendations:

Knowledge of the content of the modules *Essentials of Finance* [WW3BWLFBV1] (for bachelor students) and *F1 (Finance)* [WW4BWLFBV1] (for master students) is assumed.

The total workload for this course is approximately 90 hours. For further information see German version.

Organizational issues
Kickoff am 27.10.25 um 16 Uhr, Zwischenpräsentation am 09.12.25, 16 Uhr und Abschlusspräsentation am 27.01.26, 17:30 Uhr am Campus B (Geb. 09.21), Raum 209

V

Master Seminar (Information Systems III) – Future of Commerce / AI and Fairness

2540472, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This seminar is offered by the Information Systems III research group, which has been based at the Institute for Information Systems (WIN) since January 2025 and is led by Prof. Dr. Jella Pfeiffer. Further information about us can be found on our website (WIN - Information Systems III).

V

Business Data Analytics

2540473, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

V

Master Seminar in Data Science and Machine Learning

2540510, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

V

Case studies seminar: Innovation management

2545105, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content

The objective of the seminar is to acquire selected concepts and methods of innovation management and to apply these in a practical way. The focus is on working on specific issues using a case study from business practice. Students work in groups and transfer the content taught, for example from the areas of scenario development, to entrepreneurial challenges in the context of fictitious case studies. The course follows a didactic interplay of theoretical input and direct application of what has been learned. At the end, the groups present their results in a plenary presentation, which is prepared by a short introduction to presentation techniques. The joint discussion promotes the transfer of knowledge to different contexts and strengthens the participants' ability to reflect.

As part of the seminar, students deal independently with current, research-oriented issues and systematically apply scientific criteria. They research relevant information, analyze, abstract and critically evaluate it. They draw conclusions independently from poorly structured data, incorporate interdisciplinary knowledge and contribute selectively to the further development of existing research perspectives. The results are validated and systematically prepared both orally and in writing using scientific standards - particularly with regard to structuring, terminology and correct citation of sources. In doing so, students argue in a technically sound manner and defend their findings in discourse with other participants and lecturers. They are also familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and apply these standards consistently in the preparation of their scientific work.

Literature

Werden in der ersten Veranstaltung bekannt gegeben.

V

Seminar Human Resource Management (Master)

2573012, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues

Blockveranstaltung siehe Homepage

V

Seminar Human Resources and Organizations (Master)

2573013, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V **Seminar Management Accounting - Sustainability Topics** **Seminar (S) On-Site**
2579919, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade is made up of the grade of the seminar paper, the presentation and the contributions in the seminar sessions.

Required prior Courses:

- The course requires a basic knowledge of finance and accounting.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 8 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

V

Successful transformation through innovation

2500018, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content

This seminar uses strategic innovation management and concepts such as organizational ambidexterity, boundary spanning and stakeholder approaches to shed light on how companies can increase their innovative capacity through innovation. Students will use a core paper to understand the steps a company takes to become an innovative organization. The aim is to understand how medium-sized companies can develop into innovation-driven organizations in the context of organizational inertia and path dependency with the help of the aforementioned concepts. Part of the seminar will be to analyze the role of different stakeholders and how companies can become part of innovation ecosystems.

Based on the impulses and the core paper, students will apply the concepts they have learned to selected companies and present their results. These are also incorporated into academic seminar papers. As part of this work process, students deal independently with a current, research-oriented question and apply scientific criteria consistently. They research relevant information, analyze and abstract it critically and draw their own conclusions on this basis, reflecting their interdisciplinary knowledge and selectively developing current research findings.

The results obtained are systematically presented in written and oral form in compliance with academic standards - including structured presentation, correct specialist terminology and comprehensible references. In doing so, the students argue in a technically sound manner and are able to defend their positions in scientific discourse with experts. In addition, they are familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and successfully apply these guidelines in the preparation of their scientific work.

Organizational issues

Weblink: https://itm.entechnon.kit.edu/192_1281.phphttps://itm.entechnon.kit.edu/192_1673.php

V

Human-Centered Systems Seminar: Engineering

2500125, SS 2026, 3 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

Formerly known as "Current Topics in Digital Transformation"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the human-centered systems lab (Prof. Mädche). Students will work on a dedicated topic in the context of human-centered systems and apply a pre-defined research method. A broad spectrum of topics is offered every semester, topics may range from creating an experimental design, analyzing collected data, or systematically comparing existing software prototypes in a specific field of interest.

V

Data Science for Industrial Applications

2540493, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Learning Objectives

This seminar will require you to screen, select, and apply information systems theories and methodologies to solve contemporary challenges in the manufacturing and adjacent industries. This will include both critical reviews of the literature state-of-the-art [1-2] as well as the systematic conduct of design science research and machine learning methods [3-4]. You will identify key problems in real-world use cases, derive relevant research questions, and systematically gather, choose, and apply academic knowledge to develop solutions in the form of proof-of-concepts or prototypes.

Course Credits

The seminar can be credited as Seminar Betriebswirtschaftslehre A [T-WIWI-103474], Seminar Betriebswirtschaftslehre B [T-WIWI-103476] or Seminar Wirtschaftsinformatik [T-WIWI-109827] (3 ECTS). Other courses may be credited upon request.

Seminar Description

The Internet of Things (IoT) is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, connectivity/internet access, and the economic application of sensors [5], physical products are providing vast amounts of data, enabling the development of smart services [6]. While such IoT use cases are projected to open a market potential valued at $3.3 billion in 2030 [7], the industry is still far from exploiting its full capabilities. To solve this challenge, cutting-edge academic knowledge in information systems and machine learning is key to generating valuable insights from machine data.

The seminar is held in cooperation with international industry partners, who provide real-world datasets and ongoing access to subject matter experts. Students will work in teams of 2-4 on different topics and datasets. The assignments will be handed out in a joint kick-off event – to be scheduled once participating students have been selected. Attendance at this kick-off event is mandatory and a prerequisite for participation. Students are required to submit a seminar paper of 12-15 pages on an individual basis.

Expertise in Python and Data Science / Machine Learning as well as successful participation in the course “Artificial Intelligence in Service Systems” (T-WIWI-108715) are strongly recommended.

Contact

Daniel Hendricks – daniel.hendriks@kit.edu

Philipp Spitzer - philipp.spitzer@kit.edu

Joshua Holstein – joshua.holstein@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.

[1] Webster, J., Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. MIS Quarterly, 26 (2) xiii-xxiii.

[2] Brocke, J. v. et al. (2009), Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process. *Proceedings of the European Conference on Information Systems*, paper 161.

[3] Wirth, R., Hipp, J. (2000). CRISP-DM: Towards a Standard Process Model for Data Mining. Proceedings of the 4th International Conference on the Practical Applications of Knowledge Discovery and Data Mining, 29-40.

[4] Peffers, K., Tuunanen, T., Rothenberger, M., Chatterjee, S. (2008). A Design Science Research Methodology for Information Systems Research. Journal of Management Information Systems, 24 (3) 45–78.

[5] Martin, D.; Kühl, N.; Satzger, G. (2021). Virtual Sensors. Business & Information Systems Engineering, 63 (3) 315-323.

[6] Hunke, F., Heinz, D. Satzger, G. (2022). Creating customer value from data: foundations and archetypes of analytics-based services. Electronic Markets, 32, 503–521.

[7] Chui, M., Collins, M., Patel, M. (2021). IoT value set to accelerate through 2030: Where and how to capture it. McKinsey & Company. URL: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/iot-value-set-to-accelerate-through-2030-where-and-how-to-capture-it

V **Master Seminar in Data Science and Machine Learning** **Seminar (S)**
2540510, SS 2026, 2 SWS, Language: German/English, Open in study portal

V **Biosignal-Adaptive Systems Seminar** **Seminar (S)**
2540553, SS 2026, 2 SWS, Language: English, Open in study portal **Blended (On-Site/Online)**

Content
Biosignal-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a biosignal-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (h-lab, Prof. Mädche). It is offered as part of the DFG-funded graduate school “KD2School: Designing Adaptive Systems for Economic Decisions“ (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a biosignal-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a biosignal-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the biosignal-adaptive system prototype

Prerequisites

Strong analytical abilities and profound software development skills are required.

Organizational issues
Termine werden bekannt gegeben

Literature
Required literature will be made available in the seminar.

V **Human-Centered Systems Seminar: Research** — **Seminar (S)**
2540557, SS 2026, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
Formerly known as "Information Systems and Service Design Seminar"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group IS I (Prof. Mädche). The research group “Information Systems I” (IS I) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues
Termine werden bekannt gegeben

V Entrepreneurship Research
2545002, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

In this course, the students choose from various relevant and current research topics in entrepreneurship and independently develop a topic that suits them in small teams. Initially, there is an introduction to standard methods such as systematic literature review, design science, qualitative and quantitative data analysis, and more. The seminar topic must be scientifically prepared and presented in 15-20 pages as part of a written elaboration. The seminar results are presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

The foundations of independent scholarly work (literature review, argumentation + discussion, citation of literature sources, application of qualitative, quantitative, and simulation methods) are developed as part of the written elaboration. The competencies acquired in the seminar can be utilized in preparing for a potential master's thesis. Therefore, the seminar is mainly aimed at students who intend to write their thesis at the Chair of Entrepreneurship and Technology Management and wish to gain substantial experience in entrepreneurship research.

Organizational issues
Registration is via the Wiwi-Portal.

Seminar dates will probably be (as announced in Wiwi-Portal):

Wednesday, 29.04.2026, 10.00-16.00
Wednesday, 20.05.2026, 10.00-16.00
Wednesday, 24.06.2026, 09.00-12.00

Literature
Will be announced in the seminar.

V Seminar Human Resource Management (Master)
2573012, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V Seminar Human Resources and Organizations (Master)
2573013, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

T 7.343 Module component: Seminar in Economic Policy [T-WIWI-102789]

Coordinators: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-107011 - Economics of Innovation and Growth

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Exams			
WT 25/26	7900212	Seminar in Economic Policy	Ott
ST 2026	7900051	Seminar in Economic Policy	Ott

Assessment
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted scored examinations (Essay 50%, 40% oral presentation, active participation 10%).

Prerequisites
None

Recommendations
At least one of the lectures "Theory of Endogenous Growth" or "Innovation Theory and Policy" should be attended in advance, if possible.

T 7.344 Module component: Seminar in Economics A (Master) [T-WIWI-103478]

Coordinators: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	25000111	Statistics and Epidemics	2 SWS	Seminar / 🗣	Bracher, Nemcova
WT 25/26	2500024	Wirtschaftstheoretisches Seminar IV (Master)	2 SWS	Seminar / 🧩	Puppe, Kretz, Ammann, Okulicz
WT 25/26	2500052	Seminar on Topics in Digital Economics	2 SWS	Seminar / 🗣	Reiß, Hillenbrand, Potarca
WT 25/26	2500064	Economics of Crime	2 SWS	Seminar / 🗣	Mill
WT 25/26	2520500	Workshop on Economics, Finance and Statistics	2 SWS	Seminar	Puppe, Brumm, Nieken, Ott, Reiß, Ruckes, Schienle, Uhrig-Homburg, Wigger, Krüger
WT 25/26	2520563	Wirtschaftstheoretisches Seminar III (Master)	2 SWS	Seminar / 🗣	Ammann, Kretz
WT 25/26	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner, Pohle
WT 25/26	2560130	Seminar Public Finance	2 SWS	Seminar / 🧩	Wigger, Setio, Schmelzer
WT 25/26	2560142	Seminar in Digital Economics (Master)	2 SWS	Seminar / 🗣	Rosar
WT 25/26	2560143	Seminar Game Theory and Behavioral Economics (Master)	2 SWS	Seminar / 🗣	Rau
WT 25/26	2560282	Seminar in Economic Policy	2 SWS	Seminar / 🗣	Ott, Assistenten
WT 25/26	2560400	Seminar in Macroeconomics I	2 SWS	Seminar / 🧩	Brumm, Pegorari, Kissling, Schang
WT 25/26	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba, Sand
ST 2026	2500012	Making and Evaluating Predictions	2 SWS	Seminar	Schienle, Allen, Zhang
ST 2026	2500035	Efficiency analyses in network sectors	2 SWS	Seminar / 🗣	Mitusch, Latsch
ST 2026	2520536	Seminar in Economic Theory II	2 SWS	Seminar / 🗣	Ammann, Kretz, Okulicz
ST 2026	2520563	Seminar in Economic Theory III	2 SWS	Seminar / 🗣	Ammann, Kretz, Okulicz
ST 2026	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner
ST 2026	2560130	Seminar Public Finance	2 SWS	Block / 🧩	Wigger, Schmelzer
ST 2026	2560282	Seminar in economic policy	2 SWS	Seminar / 🗣	Ott, Assistenten
ST 2026	2560400	Seminar in Macroeconomics I	2 SWS	Seminar / 🧩	Brumm, Frank
ST 2026	2560554	Seminar Lying and Cheating in Economic Decision Situations (Master)	2 SWS	Seminar / 🗣	Rau

Exams			
WT 25/26	7900015	Seminar Economics of Crime (Master)	Mill
WT 25/26	7900115	Seminar: How to Make Democracy Work? Voting Methods in Theory and Practice (Master)	Puppe
WT 25/26	7900117	Seminar in Economics A (Master)	Brumm
WT 25/26	7900139	Selected Aspects of European Transport Planning and Modelling	Mitusch
WT 25/26	7900140	Seminar in Digital Economics (Master)	Puppe
WT 25/26	7900212	Seminar in Economic Policy	Ott
WT 25/26	7900254	Topics in Econometrics	Schienle, Bracher
WT 25/26	7900296	Seminar Game Theory and Behavioral Economics (Master)	Mill
WT 25/26	7900361	Seminar on Topics in Digital Economics	Reiß, Hillenbrand
WT 25/26	79sefi2	Seminar Public Finance A (Master)	Wigger
ST 2026	7900051	Seminar in Economic Policy	Ott
ST 2026	7900131	Lying and Cheating in Economic Decision Situations (Master)	Rau
ST 2026	7900164	Seminar in Economics (Bachelor)	Mitusch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
Note on Prof. Ingrid Ott's seminars: Due to a research semester, no seminars will be offered in the summer semester 2026.

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Statistics and Epidemics** **Seminar (S) On-Site**
25000111, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

Motivation

Infectious disease epidemiology gives rise to a large variety of real-time data streams. During the COVID-19 pandemic, the interpretation and statistical analysis of these data has proven crucial, but also highly challenging. In this seminar, students will get to know central concepts of infectious disease surveillance and modelling from a statistical perspective. Following an overview of various aspects in the form of blocked lectures, students will choose a more specific topic for their seminar thesis.

Learning Goals

Students develop an understanding of central modeling tasks and methods, including

- estimation of reproductive numbers
- compartment models of disease spread
- nowcasting and short-term forecasting of disease spread
- detection of outbreaks
- diagnostic testing

Moreover, they get to know various data types commonly used in the analysis of disease spread.

Logistics

The project seminar is worth 4.5 credit points (Leistungspunkte). There will be three blocked lectures (approx. 135 minutes each) in the beginning of the lecture period. For the various topics covered, subjects for seminar theses will be proposed (and students are allowed to propose their own topics). Towards the end of the semester, students present their progress on the chosen topics to the group. Grades will be based on this presentation (25%) and the final report (75%).

Organizational issues

Prerequisites

Students should have a very good working knowledge of statistics, including proficiency in a programming language for applied data analysis. The lecture VWL3 Introduction to Econometrics is a prerequisite for the project seminar. Most available software in the field is in R, but in principle Python can be used as well. Advanced knowledge of biology, medicine or epidemiology is not required.

Application Procedure

Please submit a transcript of records as well as a short letter of motivation (roughly 200 words) via WIWI-Portal: https://portal.wiwi.kit.edu/ys/8902

Application time frame: September 5th, 2025 to October, 31th, 2025.

V **Economics of Crime** — **Seminar (S) On-Site**

2500064, WS 25/26, 2 SWS, Open in study portal

Content

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Organizational issues

Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 29.10.2025, 11.00 - 12.30 h 01.85, KD2 Lab (1. floor über Außentreppe), Team Room(Raum tbc)

Presentations: 17.01.2026 09.00 - 18.00 h, 01.85, KD2 Lab (1. floor über Außentreppe), Team Room

V **Topics in Econometrics** — **Seminar (S)**

2521310, WS 25/26, 2 SWS, Language: German, Open in study portal

Organizational issues

Wöchentliche Veranstaltung, Donnerstags 13:00-14:30 Uhr in B17 - R320

V **Seminar in Digital Economics (Master)** — **Seminar (S) On-Site**

2560142, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

The seminar addresses issues in the digital economy from a game-theoretic perspective. All information about the seminar will be published on the Wiwi-Portal.

V Seminar Game Theory and Behavioral Economics (Master)

2560143, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see https://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 29.10.2025, 14.00 - 15.30 h, Geb. 01.85, KD2Lab Team room (über Außentreppe)

Presentations: 19.01.2026, 14.00 - 18.00 h, Geb. 01.85, KD2Lab Team room (über Außentreppe)

V Making and Evaluating Predictions

2500012, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Content
A key goal of statistics and data science is to make predictions. Good predictions are important for decision-making, allowing us to balance risks and mitigate the impacts of potentially damaging events. In this seminar, we will study theoretical questions regarding the evaluation of predictions, such as “What does it mean for a prediction to be good?”, before introducing statistical and machine learning methods to generate both point-valued and probabilistic predictions. We will discuss applications to economics, meteorology, and energy forecasting.

Format: The course will start with a short block course at the beginning of the lecture period. Evaluation will be based on a seminar thesis, which students are required to hand in at the end of the lecture period, and a short presentation. The presentations will also take place towards the end of the lecture period.

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V Advanced Topics in Econometrics

2521310, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Organizational issues
wöchentlich, Donnerstags 11:00-12:30, B17, R320

V Seminar Public Finance

2560130, SS 2026, 2 SWS, Language: German, Open in study portal

Block (B)
Blended (On-Site/Online)

Content
See German version.

Organizational issues
Termine werden bekannt gegeben.

Literature
Literatur wird zu Beginn des jeweiligen Seminars vorgestellt.

V Seminar Lying and Cheating in Economic Decision Situations (Master)

2560554, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Objective of the seminar: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 12–15 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (60%). There may be a bonus on the grade for actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Obligatory: Application via WiWi-Portal during the seminar registration period

Seminar Kick-off: 28.04.2026, 14.00 - 14.45 h

Seminar Presentations: 30.06.2026 9.30 - 18.00 h

Hand-in Seminar Papers: 02.08.2026

T 7.345 Module component: Seminar in Economics B (Master) [T-WIWI-103477]

Coordinators: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	25000111	Statistics and Epidemics	2 SWS	Seminar / 🗣	Bracher, Nemcova
WT 25/26	2500024	Wirtschaftstheoretisches Seminar IV (Master)	2 SWS	Seminar / 🧩	Puppe, Kretz, Ammann, Okulicz
WT 25/26	2500052	Seminar on Topics in Digital Economics	2 SWS	Seminar / 🗣	Reiß, Hillenbrand, Potarca
WT 25/26	2500064	Economics of Crime	2 SWS	Seminar / 🗣	Mill
WT 25/26	2520500	Workshop on Economics, Finance and Statistics	2 SWS	Seminar	Puppe, Brumm, Nieken, Ott, Reiß, Ruckes, Schienle, Uhrig-Homburg, Wigger, Krüger
WT 25/26	2520563	Wirtschaftstheoretisches Seminar III (Master)	2 SWS	Seminar / 🗣	Ammann, Kretz
WT 25/26	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner, Pohle
WT 25/26	2560130	Seminar Public Finance	2 SWS	Seminar / 🧩	Wigger, Setio, Schmelzer
WT 25/26	2560142	Seminar in Digital Economics (Master)	2 SWS	Seminar / 🗣	Rosar
WT 25/26	2560143	Seminar Game Theory and Behavioral Economics (Master)	2 SWS	Seminar / 🗣	Rau
WT 25/26	2560282	Seminar in Economic Policy	2 SWS	Seminar / 🗣	Ott, Assistenten
WT 25/26	2560400	Seminar in Macroeconomics I	2 SWS	Seminar / 🧩	Brumm, Pegorari, Kissling, Schang
WT 25/26	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba, Sand
ST 2026	2500012	Making and Evaluating Predictions	2 SWS	Seminar	Schienle, Allen, Zhang
ST 2026	2500035	Efficiency analyses in network sectors	2 SWS	Seminar / 🗣	Mitusch, Latsch
ST 2026	2520536	Seminar in Economic Theory II	2 SWS	Seminar / 🗣	Ammann, Kretz, Okulicz
ST 2026	2520563	Seminar in Economic Theory III	2 SWS	Seminar / 🗣	Ammann, Kretz, Okulicz
ST 2026	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner
ST 2026	2560130	Seminar Public Finance	2 SWS	Block / 🧩	Wigger, Schmelzer
ST 2026	2560259	Organisation and Management of Development Projects	2 SWS	Seminar / 🧩	Sieber
ST 2026	2560282	Seminar in economic policy	2 SWS	Seminar / 🗣	Ott, Assistenten
ST 2026	2560400	Seminar in Macroeconomics I	2 SWS	Seminar / 🧩	Brumm, Frank

ST 2026	2560554	Seminar Lying and Cheating in Economic Decision Situations (Master)	2 SWS	Seminar / 🗣	Rau
Exams					
WT 25/26	7900015	Seminar Economics of Crime (Master)			Mill
WT 25/26	7900115	Seminar: How to Make Democracy Work? Voting Methods in Theory and Practice (Master)			Puppe
WT 25/26	7900118	Seminar in Economics B (Master)			Brumm
WT 25/26	7900139	Selected Aspects of European Transport Planning and Modelling			Mitusch
WT 25/26	7900140	Seminar in Digital Economics (Master)			Puppe
WT 25/26	7900212	Seminar in Economic Policy			Ott
WT 25/26	7900254	Topics in Econometrics			Schienle, Bracher
WT 25/26	7900296	Seminar Game Theory and Behavioral Economics (Master)			Mill
WT 25/26	7900361	Seminar on Topics in Digital Economics			Reiß, Hillenbrand
WT 25/26	79sefi3	Seminar Public Finance B (Master)			Wigger
ST 2026	7900051	Seminar in Economic Policy			Ott
ST 2026	7900131	Lying and Cheating in Economic Decision Situations (Master)			Rau
ST 2026	7900164	Seminar in Economics (Bachelor)			Mitusch

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Statistics and Epidemics** — **Seminar (S) On-Site**
25000111, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

Motivation

Infectious disease epidemiology gives rise to a large variety of real-time data streams. During the COVID-19 pandemic, the interpretation and statistical analysis of these data has proven crucial, but also highly challenging. In this seminar, students will get to know central concepts of infectious disease surveillance and modelling from a statistical perspective. Following an overview of various aspects in the form of blocked lectures, students will choose a more specific topic for their seminar thesis.

Learning Goals

Students develop an understanding of central modeling tasks and methods, including

- estimation of reproductive numbers
- compartment models of disease spread
- nowcasting and short-term forecasting of disease spread
- detection of outbreaks
- diagnostic testing

Moreover, they get to know various data types commonly used in the analysis of disease spread.

Logistics

The project seminar is worth 4.5 credit points (Leistungspunkte). There will be three blocked lectures (approx. 135 minutes each) in the beginning of the lecture period. For the various topics covered, subjects for seminar theses will be proposed (and students are allowed to propose their own topics). Towards the end of the semester, students present their progress on the chosen topics to the group. Grades will be based on this presentation (25%) and the final report (75%).

Organizational issues

Prerequisites

Students should have a very good working knowledge of statistics, including proficiency in a programming language for applied data analysis. The lecture VWL3 Introduction to Econometrics is a prerequisite for the project seminar. Most available software in the field is in R, but in principle Python can be used as well. Advanced knowledge of biology, medicine or epidemiology is not required.

Application Procedure

Please submit a transcript of records as well as a short letter of motivation (roughly 200 words) via WIWI-Portal: https://portal.wiwi.kit.edu/ys/8902

Application time frame: September 5th, 2025 to October, 31th, 2025.

V **Economics of Crime** — **Seminar (S) On-Site**

2500064, WS 25/26, 2 SWS, Open in study portal

Content

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Organizational issues

Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 29.10.2025, 11.00 - 12.30 h 01.85, KD2 Lab (1. floor über Außentreppe), Team Room(Raum tbc)

Presentations: 17.01.2026 09.00 - 18.00 h, 01.85, KD2 Lab (1. floor über Außentreppe), Team Room

V **Topics in Econometrics** — **Seminar (S)**

2521310, WS 25/26, 2 SWS, Language: German, Open in study portal

Organizational issues

Wöchentliche Veranstaltung, Donnerstags 13:00-14:30 Uhr in B17 - R320

V **Seminar in Digital Economics (Master)** — **Seminar (S) On-Site**

2560142, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

The seminar addresses issues in the digital economy from a game-theoretic perspective. All information about the seminar will be published on the Wiwi-Portal.

V Seminar Game Theory and Behavioral Economics (Master)

2560143, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see https://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 29.10.2025, 14.00 - 15.30 h, Geb. 01.85, KD2Lab Team room (über Außentreppe)

Presentations: 19.01.2026, 14.00 - 18.00 h, Geb. 01.85, KD2Lab Team room (über Außentreppe)

V Making and Evaluating Predictions

2500012, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Content
A key goal of statistics and data science is to make predictions. Good predictions are important for decision-making, allowing us to balance risks and mitigate the impacts of potentially damaging events. In this seminar, we will study theoretical questions regarding the evaluation of predictions, such as “What does it mean for a prediction to be good?”, before introducing statistical and machine learning methods to generate both point-valued and probabilistic predictions. We will discuss applications to economics, meteorology, and energy forecasting.

Format: The course will start with a short block course at the beginning of the lecture period. Evaluation will be based on a seminar thesis, which students are required to hand in at the end of the lecture period, and a short presentation. The presentations will also take place towards the end of the lecture period.

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V Advanced Topics in Econometrics

2521310, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Organizational issues
wöchentlich, Donnerstags 11:00-12:30, B17, R320

V Seminar Public Finance

2560130, SS 2026, 2 SWS, Language: German, Open in study portal

Block (B)
Blended (On-Site/Online)

Content
See German version.

Organizational issues
Termine werden bekannt gegeben.

Literature
Literatur wird zu Beginn des jeweiligen Seminars vorgestellt.

V Seminar Lying and Cheating in Economic Decision Situations (Master)

2560554, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Objective of the seminar: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 12–15 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (60%). There may be a bonus on the grade for actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Obligatory: Application via WiWi-Portal during the seminar registration period

Seminar Kick-off: 28.04.2026, 14.00 - 14.45 h

Seminar Presentations: 30.06.2026 9.30 - 18.00 h

Hand-in Seminar Papers: 02.08.2026

T 7.346 Module component: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

Coordinators: Fachvertreter ingenieurwissenschaftlicher Fakultäten
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	3

Assessment
See German version.

Prerequisites
See module description.

Recommendations
None

T 7.347 Module component: Seminar in Informatics A (Master) [T-WIWI-103479]

Coordinators: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	2400125	Security and Privacy Awareness	2 SWS	Seminar /	Seidel-Saul, Volkamer, Boehm, Ballreich, Sikra, Veit
WT 25/26	2512101	Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Master)	2 SWS	Seminar /	Lazarova-Molnar, Khodadadi, Daniel
WT 25/26	2513103	Seminar: Applications of Digital Twins (Master)	2 SWS	Seminar /	Lazarova-Molnar, Lee, Mahmoud
WT 25/26	2513105	Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)	2 SWS	Seminar /	Lazarova-Molnar, Demetgül
WT 25/26	2513107	Seminar: Data-Driven Reliability Modeling of Energy Systems (Master)	2 SWS	Seminar	Lazarova-Molnar, Mostafa
WT 25/26	2513313	Seminar Linked Data and the Semantic Web (Master)	3 SWS	Seminar /	Käfer, Braun, Li, Kubelka
WT 25/26	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/	Hoellig, Käfer, Thoma
WT 25/26	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/	Hoellig, Käfer, Thoma
WT 25/26	2513451	Seminar Cooperative Autonomous Vehicles (Master)	2 SWS	Seminar /	Vinel
WT 25/26	2513458	Seminar Artificial Intelligence for Autonomous Driving (Master)	2 SWS	Seminar /	Zhao, Vinel
WT 25/26	2513460	Seminar Cooperative Robots (Master)	2 SWS	Seminar /	Vinel
WT 25/26	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar /	Zöllner, Schneider
ST 2026	2512101	Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Seminar/ Master)	2 SWS	Seminar /	Lazarova-Molnar, Khodadadi, Lee, Daniel
ST 2026	2513103	Seminar: Applications of Digital Twins (Master)	2 SWS	Seminar /	Lazarova-Molnar, Lee, Mahmoud
ST 2026	2513108	Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)	2 SWS	Seminar /	Demetgül, Lazarova-Molnar
ST 2026	2513109	Seminar: Data-driven Agent-based Modeling and Simulation (Master)	2 SWS	Seminar	Lazarova-Molnar, Lee
ST 2026	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar /	Oberweis, Forell, Fritsch, Rybinski, Schreiber, Ullrich, König

ST 2026	2513221	Seminar Intelligente Fahrzeugsysteme der nächsten Generation: Kognition, Personalisierung und adaptive Mobilität (Master)	2 SWS	Seminar	Ullrich, Schreiber
ST 2026	2513309	Seminar Knowledge Discovery and Data Mining (Master)	2 SWS	Seminar / 🗣	Käfer, Noullet, Kinder, Li
ST 2026	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar / 🗣	Käfer, Thoma, Slobodyanik
ST 2026	2513455	Seminar Machine Learning in Autonomous Driving (Master)	2 SWS	Seminar / 🧩	Zhao, Vinel
ST 2026	2513459	Seminar Vulnerable Road User Technologies (Master)	2 SWS	Seminar / 🧩	Schrapel, Vinel
ST 2026	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar / 🗣	Zöllner, Schneider
ST 2026	2513607	Seminar Knowledge Graphs and Large Language Models (Master)	2 SWS	Seminar / 🧩	Sack, Gesese
Exams					
WT 25/26	7900025	Seminar "Applications of Digital Twins (Master)"			Lazarova-Molnar
WT 25/26	7900048	Seminar New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)			Lazarova-Molnar
WT 25/26	7900069	Human-Centered Systems Seminar: Engineering			Mädche
WT 25/26	7900102	Advanced Lab Knowledge-driven Artificial Intelligence (Master)			Sack
WT 25/26	7900119	Seminar Cognitive Automobiles and Robots			Zöllner
WT 25/26	7900121	Security and Privacy Awareness			Volkamer
WT 25/26	7900209	Seminar "From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Master)"			Lazarova-Molnar
WT 25/26	7900226	Seminar Modeling and Simulation for Energy Systems (Master)			Lazarova-Molnar
WT 25/26	7900233	Human-Centered Systems Seminar: Research			Mädche
WT 25/26	7900245	Seminar Cooperative Autonomous Vehicles (Master)			Vinel
WT 25/26	7900274	Seminar Real-World Challenges in Data Science and Analytics (Master)			Sure-Vetter, Färber
WT 25/26	7900279	Seminar Cooperative Robots (Master)			Vinel
WT 25/26	7900304	Seminar Linked Data and the Semantic Web (Master)			Färber
WT 25/26	7900356	Seminar Real-World Challenges in Data Science and Analytics (Master)			Sure-Vetter, Färber
WT 25/26	79AIFB_AIAD_C4	Seminar Artificial Intelligence for Autonomous Driving (Master)			Vinel
ST 2026	7900062	Seminar Data-driven Agent-based Modeling and Simulation (Master)			Lazarova-Molnar
ST 2026	7900088	Seminar Business Information Systems (Master)			Oberweis
ST 2026	7900147	Cognitive Automobiles and Robots			Zöllner
ST 2026	7900162	Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Master)			Lazarova-Molnar
ST 2026	7900190	Human-Centered Systems Seminar: Engineering			Mädche
ST 2026	7900191	Seminar Vulnerable Road User Technologies (Master)			Vinel
ST 2026	7900198	Seminar Data Science & Real-Time Big Data Analytics (Master)			Käfer
ST 2026	7900199	Seminar Large Language Model-Enhanced Representation Learning for Knowledge Graphs (Master)			Sack
ST 2026	7900202	Seminar Knowledge Discovery and Data Mining (Master)			Käfer
ST 2026	7900203	Seminar Machine Learning in Autonomous Driving (Master)			Vinel
ST 2026	7900206	Seminar New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)			Lazarova-Molnar
ST 2026	7900261	Human-Centered Systems Seminar: Research			Mädche
ST 2026	7900305	Seminar: Applications of Digital Twins (Master)			Lazarova-Molnar

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
Placeholder for seminars offered by the Institute AIFB.

Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Security and Privacy Awareness** — **Seminar (S)** **Blended (On-Site/Online)**
2400125, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Important notes:

- The seminar language is English. This means that English is the standard for the presentation and the seminar paper, and German is only permitted for the paper after consultation with the supervisor, for example, if the topic of the thesis requires it.
- The seminar is only for MASTER students (or Mastervorzug)
- The link to enrol is for every student, regardless of the study background

Topics:

The advertised topics can be found in the wiwi portal.

V **Seminar: Applications of Digital Twins (Master)** — **Seminar (S)** **On-Site**
2513103, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

Seminar Name: Applications of Digital Twins

Size: 10 students (with 10 different topics)

Workload:

- 2 Lectures:
  - Introduction to Digital Twins and topic distribution
  - "How to Give Effective Presentations" lecture
- 10 student presentations (each 45 minutes in total)
- 10 student reports

Responsible Person: Hui Min Lee, Sanja Lazarova-Molnar

Deliverables for Grade:

· 1 Report per student and topic (8 pages, including references, IEEE Template, compulsory usage of Reference Manager – Zotero or EndNote)

· 25 mins presentation per student plus 20 min discussion (focus on the presentation topic + presentation skills) = 45 minutes for each student

Credits: 3 credits = 90 hours

Format/ Structure of the Seminar (Draft):

· 2 Lectures at the beginning of the semester

· Students have 1 week time to provide a priority list of 5 topics, distribution will be decided based on first come – first serve, ensuring that core topics are covered

· Q&As can be asked and answered over mails or ad-hoc appointments

· Students have time to work on the report and presentation during the semester

· Submission of all reports will be required 2 months after the intro lecture for ensuring fairness

· Presentations are done in blocks of 2 students per class, starting mid-June, presentations will be submitted at the day of the scheduled presentation

Approximate Time Consumption for Students (Draft):

· Lectures: 3 hours

· Student Presentations: 7.5 hours

· Topic Subscription: 1 hour

· Presentation Preparation: 15 hours

· Paper Writing and Literature Review: 63.5 hours

Description:

The seminar focuses on applications of Digital Twins and data-driven modeling, with an additional goal of improving scientific research and presentation skills for Master students. The seminar covers the diverse applications and use cases of Digital Twins in different domains such as manufacturing, energy systems, healthcare and many more, offering students an in-depth understanding of the role of Digital Twins in transforming the industries.

The seminar is structured as a literature review seminar. Each student can select a topic out of a predefined set, conduct further research and then write a comprehensive research paper. Students will also deliver presentations, synthesizing insights from both the provided starting reference literature and their own additional research.

By the end of the course, students will not only have a solid understanding of the current applications of Digital Twins and emerging trends but also be well-prepared to present their findings in an academic setting.

Topics:

1. Digital Twins for Manufacturing Systems

References:

· Zhang, Chenyuan, et al. "A reconfigurable modeling approach for digital twin-based manufacturing system." *Procedia Cirp* 83 (2019): 118-125. (96 citations)

· Kritzinger, Werner, et al. "Digital Twin in manufacturing: A categorical literature review and classification." *Ifac-PapersOnline* 51.11 (2018): 1016-1022. (1934 citations)

· Jaensch, Florian, et al. "Digital twins of manufacturing systems as a base for machine learning." *2018 25th International conference on mechatronics and machine vision in practice (M2VIP)*. IEEE, 2018. (73 citations)

2. Digital Twins for Energy Systems

References:

· Steindl, Gernot, et al. "Generic digital twin architecture for industrial energy systems." *Applied Sciences* 10.24 (2020): 8903. (78 citations)

· Granacher, Julia, et al. "Overcoming decision paralysis—A digital twin for decision making in energy system design." *Applied Energy* 306 (2022): 117954. (33 citations) -> focus on interactive digital twins

· Palensky, Peter, et al. "Digital twins and their use in future power systems." *Digital Twin* 1 (2022): 4. (37 citations)

3. Digital Twins in Healthcare

References:

· Alazab, Mamoun, et al. "Digital twins for healthcare 4.0-recent advances, architecture, and open challenges." *IEEE Consumer Electronics Magazine* (2022). (26 citations)

· Croatti, Angelo, et al. "On the integration of agents and digital twins in healthcare." *Journal of Medical Systems* 44 (2020): 1-8. (163 citations)

· Erol, Tolga, Arif Furkan Mendi, and Dilara Doğan. "The digital twin revolution in healthcare." *2020 4th international symposium on multidisciplinary studies and innovative technologies (ISMSIT)*. IEEE, 2020. (106 citations)

4. Digital Twins of City Infrastructures (in Smart Cities)

References:

· Deren, Li, Yu Wenbo, and Shao Zhenfeng. "Smart city based on digital twins." *Computational Urban Science* 1 (2021): 1-11. (110 citations)

· Deng, Tianhu, Keren Zhang, and Zuo-Jun Max Shen. "A systematic review of a digital twin city: A new pattern of urban governance toward smart cities." *Journal of Management Science and Engineering* 6.2 (2021): 125-134. (192 citations)

· Mylonas, Georgios, et al. "Digital twins from smart manufacturing to smart cities: A survey." *Ieee Access* 9 (2021): 143222-143249. (99 citations)

5. Digital Twins in Logistics

References:

· Moshood, Taofeeq D., et al. "Digital twins driven supply chain visibility within logistics: A new paradigm for future logistics." *Applied System Innovation* 4.2 (2021): 29. (71 citations)

· Agalianos, K., et al. "Discrete event simulation and digital twins: review and challenges for logistics." *Procedia Manufacturing* 51 (2020): 1636-1641. (74 citations)

· Korth, Benjamin, Christian Schwede, and Markus Zajac. "Simulation-ready digital twin for realtime management of logistics systems." *2018 IEEE international conference on big data (big data)*. IEEE, 2018. (64 citations)

6. Cognitive Digital Twins

References:

· Al Faruque, Mohammad Abdullah, et al. "Cognitive digital twin for manufacturing systems." *2021 Design, Automation & Test in Europe Conference & Exhibition (DATE)*. IEEE, 2021. (28 citations)

· Zhang, Nan, Rami Bahsoon, and Georgios Theodoropoulos. "Towards engineering cognitive digital twins with self-awareness." *2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE, 2020. (22 citations)

· Zheng, Xiaochen, Jinzhi Lu, and Dimitris Kiritsis. "The emergence of cognitive digital twin: vision, challenges and opportunities." *International Journal of Production Research* 60.24 (2022): 7610-7632. (92 citations)

7. Fusing Data and Human Expert Knowledge in Digital Twins

References:

· Kulkarni, Vinay, Souvik Barat, and Tony Clark. "Towards adaptive enterprises using digital twins." *2019 winter simulation conference (WSC)*. IEEE, 2019. (22 citations)

· Vogel-Heuser, Birgit, et al. "Potential for combining semantics and data analysis in the context of digital twins." *Philosophical Transactions of the Royal Society A* 379.2207 (2021): 20200368. (16 citations)

· Todorovski, Ljupčo, and Sašo Džeroski. "Integrating knowledge-driven and data-driven approaches to modeling." *ecological modelling* 194.1-3 (2006): 3-13. (80 citations)

8. Digital Twins for Multi-agent / Complex Systems

References:

· Pretel, Elena, Alejandro Moya, Elena Navarro, Víctor López-Jaquero, and Pascual González. "Analysing the synergies between Multi-agent Systems and Digital Twins: A systematic literature review." *Information and Software Technology* (2024): 107503. (2 citations)

· Mariani, S., Picone, M., Ricci, A. (2022). About Digital Twins, Agents, and Multiagent Systems: A Cross-Fertilisation Journey. In: Melo, F.S., Fang, F. (eds) *Autonomous Agents and Multiagent Systems. Best and Visionary Papers. AAMAS 2022*. Lecture Notes in Computer Science, vol 13441. (11 citations)

· Marah H, Challenger M. Adaptive hybrid reasoning for agent-based digital twins of distributed multi-robot systems. *SIMULATION*. 2024;100(9):931-957. (0 citations – new articles)

9. Digital Twins for Energy Systems

References:

· Kabir, Md Rafiul, Dipal Halder, and Sandip Ray. "Digital Twins for IoT-driven Energy Systems: A Survey." *IEEE Access* (2024). (0 citations – new articles)

· Brosinsky, Christoph, Rainer Krebs, and Dirk Westermann. "Embedded Digital Twins in future energy management systems: paving the way for automated grid control." *at-Automatisierungstechnik* 68, no. 9 (2020): 750-764.(21 citations)

· Song, Zhao, Christoph M. Hackl, Abhinav Anand, Andre Thommessen, Jonas Petzschmann, Omar Kamel, Robert Braunbehrens, Anton Kaifel, Christian Roos, and Stefan Hauptmann. "Digital twins for the future power system: An overview and a future perspective." *Sustainability* 15, no. 6 (2023): 5259. .(32 citations)

· Mostafa, Omar & Lazarova-Molnar, Sanja. (2024). Enhancing Reliability of Energy Systems with Digital Twins: Challenges and Opportunities. (0 citations – new articles)

10. Digital Twins in Transportation and Automotive

References:

· Schwarz, Chris, and Ziran Wang. "The role of digital twins in connected and automated vehicles." *IEEE Intelligent Transportation Systems Magazine* 14, no. 6 (2022): 41-51. (91 citations)

· Bhatti, Ghanishtha, Harshit Mohan, and R. Raja Singh. "Towards the future of smart electric vehicles: Digital twin technology." *Renewable and Sustainable Energy Reviews* 141 (2021): 110801. (422 citations)

· Almeaibed, Sadeq, Saba Al-Rubaye, Antonios Tsourdos, and Nicolas P. Avdelidis. "Digital twin analysis to promote safety and security in autonomous vehicles." *IEEE Communications Standards Magazine* 5, no. 1 (2021): 40-46. (135 citations)

11. Digital Twins for Environment and Sustainability

References:

· Tzachor, Asaf, Soheil Sabri, Catherine E. Richards, Abbas Rajabifard, and Michele Acuto. "Potential and limitations of digital twins to achieve the sustainable development goals." *Nature Sustainability* 5, no. 10 (2022): 822-829. (110 citations)

· Corrado, Casey R., Suzanne M. DeLong, Emily G. Holt, Edward Y. Hua, and Andreas Tolk. "Combining green metrics and digital twins for sustainability planning and governance of smart buildings and cities." *Sustainability* 14, no. 20 (2022): 12988. (36 citations)

· Kim, Byungmo, Jaewon Oh, and Cheonhong Min. "Development of a simulation model for digital twin of an oscillating water column wave power generator structure with ocean environmental effect." *Sensors* 23, no. 23 (2023): 9472. (3 citations)

12. Digital Twins in Agriculture

References:

· Peladarinos, Nikolaos, Dimitrios Piromalis, Vasileios Cheimaras, Efthymios Tserepas, Radu Adrian Munteanu, and Panagiotis Papageorgas. "Enhancing smart agriculture by implementing digital twins: A comprehensive review." *Sensors* 23, no. 16 (2023): 7128. (60 citations)

· Escribà-Gelonch, Marc, Shu Liang, Pieter van Schalkwyk, Ian Fisk, Nguyen Van Duc Long, and Volker Hessel. "Digital Twins in Agriculture: Orchestration and Applications." *Journal of Agricultural and Food Chemistry* 72, no. 19 (2024): 10737-10752. (12 citations)

· Verdouw, Cor, Bedir Tekinerdogan, Adrie Beulens, and Sjaak Wolfert. "Digital twins in smart farming." *Agricultural Systems* 189 (2021): 103046. (494 citations)

V **Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)** **Seminar (S) On-Site**
2513105, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

Noise, especially in urban areas, is a major environmental issue that impacts quality of life and health, contributing to stress, sleep disturbances, and cardiovascular problems. Traffic noise, primarily from tire-road interactions, has become more prominent as electric vehicles reduce engine noise. Tackling this issue involves both passive methods, like noise barriers, and active solutions such as noise cancellation technologies.

In recent years, artificial intelligence (AI) has emerged as a powerful tool for managing noise. AI-based systems can classify noise sources, create noise maps, and develop control strategies. Advanced AI techniques, including Generative Adversarial Networks (GANs), AutoEncoders, Bi-Long Short-Term Memory (LSTM), and Bi-Gated Recurrent Units (GRUs), Graphical Convolutional Networks (GCN), Physics-informed neural networks, YOLO, Transformer, show great potential for reducing noise. Additionally, many computer vision techniques are used to improve noise conditions. This seminar will explore these AI methods and their role in enhancing conditions safety, minimizing environmental noise, and supporting intelligent transportation systems.

In this seminar, we try to understand Noise through data analysis and other techniques. We discuss current approaches to noise prediction and innovative AI approaches based on data science and machine learning.

Topics:

Introduction to Noise and Tire-Road Noise

Overview on Noise and Tire-Road Noise

Time Series Analysis and Image Analysis

Data Exploration and Visualization

Noise Feature Extraction and Analysis

Machine learning and Deep Learning Approach for Tire-Road Noise

Who are we looking for:

We are looking for students who want to expand their specialist knowledge and practical experience in artificial intelligence, signal processing, computer vision and road-tire noise. Participation provides the opportunity to actively participate in shaping the future of using artificial intelligence, computer vision and signal processing to reduce road-tire and traffic noise.

What we offer:

We provide you with tyre-road noise data. With this data, you can apply many signal processing, computer vision and artificial intelligence algorithms. This is where you can let your creativity run free and implement innovative solutions with our guidance.

Literature

- Stansfeld, S., Clark, C., Smuk, M., Gallacher, J., & Babisch, W. (2021). Road traffic noise, noise sensitivity, noise annoyance, psychological and physical health and mortality. Environmental Health, 20, 1-15.
- Lan, Y., Roberts, H., Kwan, M. P., & Helbich, M. (2020). Transportation noise exposure and anxiety: A systematic review and meta-analysis. Environmental research, 191, 110118.
- WHO. (2018) Environmental Noise Guidelines for the European Region.
- EU. (2019) Regulation (EU) No 540/2014 of the European Parliament and of the Council of 16 April 2014 on the Sound Level of Motor Vehicles and of Replacement Silencing Systems, and Amending Directive 2007/46/EC and Repealing Directive 70/157/EEC.

V **Seminar Linked Data and the Semantic Web (Master)** **Seminar (S)**
2513313, WS 25/26, 3 SWS, Language: German/English, Open in study portal **On-Site**

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V **Seminar Real-World Challenges in Data Science and Analytics (Bachelor)** **On-Site**
2513314, WS 25/26, 3 SWS, Language: German/English, Open in study portal

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V **Seminar Real-World Challenges in Data Science and Analytics (Master)** **On-Site**
2513315, WS 25/26, 3 SWS, Language: German/English, Open in study portal

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V **Seminar Cognitive Automobiles and Robots (Master)** **Seminar (S)**
Blended (On-Site/Online)
2513500, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V

Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Seminar/Master)

Seminar (S)
On-Site

2512101, SS 2026, 2 SWS, Language: English, Open in study portal

Content
This seminar focuses on the data-driven discovery of simulation models in industrial settings, providing a hands-on approach to understanding and optimizing production processes.
Students will start by designing and constructing production lines using Lego Spike and similar modular systems. This activity will include developing comprehensive data-capturing pipelines to collect detailed event-logging raw data from their production lines.
Next, the seminar will explore advanced techniques for transforming this raw data into simulation models, e.g., Petri nets. Participants will learn and apply data-driven model extraction methods, such as process mining to extract workflow processes; statistical methods to fit probability distributions and analyze trends, and machine learning algorithms to model complex behaviors within the production process. Through these techniques, students will extract simulation models that reflect the real-world dynamics of their production lines. The seminar will then guide participants on how to validate the extracted simulation models to ensure their accuracy.
By the end of the seminar, students will be equipped with the skills to build model production lines, collect event logging data from them, transform event log data into actionable simulation models and use these models to drive efficiency and innovation in industrial production settings.

Grading Scheme:

Report - 50%

Presentations - 40%

Implementation - 10%

V

Seminar: Applications of Digital Twins (Master)

Seminar (S)
On-Site

2513103, SS 2026, 2 SWS, Language: English, Open in study portal

Content

Seminar Name: Applications of Digital Twins

Size: 10 students (with 10 different topics)

Workload:

- 2 Lectures:
  - Introduction to Digital Twins and topic distribution
  - "How to Give Effective Presentations" lecture
- 10 student presentations (each 45 minutes in total)
- 10 student reports

Responsible Person: Hui Min Lee, Sanja Lazarova-Molnar

Deliverables for Grade:

· 1 Report per student and topic (8 pages, including references, IEEE Template, compulsory usage of Reference Manager – Zotero or EndNote)

· 25 mins presentation per student plus 20 min discussion (focus on the presentation topic + presentation skills) = 45 minutes for each student

Credits: 3 credits = 90 hours

Format/ Structure of the Seminar (Draft):

· 2 Lectures at the beginning of the semester

· Students have 1 week time to provide a priority list of 5 topics, distribution will be decided based on first come – first serve, ensuring that core topics are covered

· Q&As can be asked and answered over mails or ad-hoc appointments

· Students have time to work on the report and presentation during the semester

· Submission of all reports will be required 2 months after the intro lecture for ensuring fairness

· Presentations are done in blocks of 2 students per class, starting mid-June, presentations will be submitted at the day of the scheduled presentation

Approximate Time Consumption for Students (Draft):

· Lectures: 3 hours

· Student Presentations: 7.5 hours

· Topic Subscription: 1 hour

· Presentation Preparation: 15 hours

· Paper Writing and Literature Review: 63.5 hours

Description:

The seminar focuses on applications of Digital Twins and data-driven modeling, with an additional goal of improving scientific research and presentation skills for Master students. The seminar covers the diverse applications and use cases of Digital Twins in different domains such as manufacturing, energy systems, healthcare and many more, offering students an in-depth understanding of the role of Digital Twins in transforming the industries.

The seminar is structured as a literature review seminar. Each student can select a topic out of a predefined set, conduct further research and then write a comprehensive research paper. Students will also deliver presentations, synthesizing insights from both the provided starting reference literature and their own additional research.

By the end of the course, students will not only have a solid understanding of the current applications of Digital Twins and emerging trends but also be well-prepared to present their findings in an academic setting.

Topics:

1. Digital Twins for Manufacturing Systems

References:

· Zhang, Chenyuan, et al. "A reconfigurable modeling approach for digital twin-based manufacturing system." *Procedia Cirp* 83 (2019): 118-125. (96 citations)

· Kritzinger, Werner, et al. "Digital Twin in manufacturing: A categorical literature review and classification." *Ifac-PapersOnline* 51.11 (2018): 1016-1022. (1934 citations)

· Jaensch, Florian, et al. "Digital twins of manufacturing systems as a base for machine learning." *2018 25th International conference on mechatronics and machine vision in practice (M2VIP)*. IEEE, 2018. (73 citations)

2. Digital Twins for Energy Systems

References:

· Steindl, Gernot, et al. "Generic digital twin architecture for industrial energy systems." *Applied Sciences* 10.24 (2020): 8903. (78 citations)

· Granacher, Julia, et al. "Overcoming decision paralysis—A digital twin for decision making in energy system design." *Applied Energy* 306 (2022): 117954. (33 citations) -> focus on interactive digital twins

· Palensky, Peter, et al. "Digital twins and their use in future power systems." *Digital Twin* 1 (2022): 4. (37 citations)

3. Digital Twins in Healthcare

References:

· Alazab, Mamoun, et al. "Digital twins for healthcare 4.0-recent advances, architecture, and open challenges." *IEEE Consumer Electronics Magazine* (2022). (26 citations)

· Croatti, Angelo, et al. "On the integration of agents and digital twins in healthcare." *Journal of Medical Systems* 44 (2020): 1-8. (163 citations)

· Erol, Tolga, Arif Furkan Mendi, and Dilara Doğan. "The digital twin revolution in healthcare." *2020 4th international symposium on multidisciplinary studies and innovative technologies (ISMSIT)*. IEEE, 2020. (106 citations)

4. Digital Twins of City Infrastructures (in Smart Cities)

References:

· Deren, Li, Yu Wenbo, and Shao Zhenfeng. "Smart city based on digital twins." *Computational Urban Science* 1 (2021): 1-11. (110 citations)

· Deng, Tianhu, Keren Zhang, and Zuo-Jun Max Shen. "A systematic review of a digital twin city: A new pattern of urban governance toward smart cities." *Journal of Management Science and Engineering* 6.2 (2021): 125-134. (192 citations)

· Mylonas, Georgios, et al. "Digital twins from smart manufacturing to smart cities: A survey." *Ieee Access* 9 (2021): 143222-143249. (99 citations)

5. Digital Twins in Logistics

References:

· Moshood, Taofeeq D., et al. "Digital twins driven supply chain visibility within logistics: A new paradigm for future logistics." *Applied System Innovation* 4.2 (2021): 29. (71 citations)

· Agalianos, K., et al. "Discrete event simulation and digital twins: review and challenges for logistics." *Procedia Manufacturing* 51 (2020): 1636-1641. (74 citations)

· Korth, Benjamin, Christian Schwede, and Markus Zajac. "Simulation-ready digital twin for realtime management of logistics systems." *2018 IEEE international conference on big data (big data)*. IEEE, 2018. (64 citations)

6. Cognitive Digital Twins

References:

· Al Faruque, Mohammad Abdullah, et al. "Cognitive digital twin for manufacturing systems." *2021 Design, Automation & Test in Europe Conference & Exhibition (DATE)*. IEEE, 2021. (28 citations)

· Zhang, Nan, Rami Bahsoon, and Georgios Theodoropoulos. "Towards engineering cognitive digital twins with self-awareness." *2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE, 2020. (22 citations)

· Zheng, Xiaochen, Jinzhi Lu, and Dimitris Kiritsis. "The emergence of cognitive digital twin: vision, challenges and opportunities." *International Journal of Production Research* 60.24 (2022): 7610-7632. (92 citations)

7. Fusing Data and Human Expert Knowledge in Digital Twins

References:

· Kulkarni, Vinay, Souvik Barat, and Tony Clark. "Towards adaptive enterprises using digital twins." *2019 winter simulation conference (WSC)*. IEEE, 2019. (22 citations)

· Vogel-Heuser, Birgit, et al. "Potential for combining semantics and data analysis in the context of digital twins." *Philosophical Transactions of the Royal Society A* 379.2207 (2021): 20200368. (16 citations)

· Todorovski, Ljupčo, and Sašo Džeroski. "Integrating knowledge-driven and data-driven approaches to modeling." *ecological modelling* 194.1-3 (2006): 3-13. (80 citations)

8. Digital Twins for Multi-agent / Complex Systems

References:

· Pretel, Elena, Alejandro Moya, Elena Navarro, Víctor López-Jaquero, and Pascual González. "Analysing the synergies between Multi-agent Systems and Digital Twins: A systematic literature review." *Information and Software Technology* (2024): 107503. (2 citations)

· Mariani, S., Picone, M., Ricci, A. (2022). About Digital Twins, Agents, and Multiagent Systems: A Cross-Fertilisation Journey. In: Melo, F.S., Fang, F. (eds) *Autonomous Agents and Multiagent Systems. Best and Visionary Papers. AAMAS 2022*. Lecture Notes in Computer Science, vol 13441. (11 citations)

· Marah H, Challenger M. Adaptive hybrid reasoning for agent-based digital twins of distributed multi-robot systems. *SIMULATION*. 2024;100(9):931-957. (0 citations – new articles)

9. Digital Twins for Energy Systems

References:

· Kabir, Md Rafiul, Dipal Halder, and Sandip Ray. "Digital Twins for IoT-driven Energy Systems: A Survey." *IEEE Access* (2024). (0 citations – new articles)

· Brosinsky, Christoph, Rainer Krebs, and Dirk Westermann. "Embedded Digital Twins in future energy management systems: paving the way for automated grid control." *at-Automatisierungstechnik* 68, no. 9 (2020): 750-764.(21 citations)

· Song, Zhao, Christoph M. Hackl, Abhinav Anand, Andre Thommessen, Jonas Petzschmann, Omar Kamel, Robert Braunbehrens, Anton Kaifel, Christian Roos, and Stefan Hauptmann. "Digital twins for the future power system: An overview and a future perspective." *Sustainability* 15, no. 6 (2023): 5259. .(32 citations)

· Mostafa, Omar & Lazarova-Molnar, Sanja. (2024). Enhancing Reliability of Energy Systems with Digital Twins: Challenges and Opportunities. (0 citations – new articles)

10. Digital Twins in Transportation and Automotive

References:

· Schwarz, Chris, and Ziran Wang. "The role of digital twins in connected and automated vehicles." *IEEE Intelligent Transportation Systems Magazine* 14, no. 6 (2022): 41-51. (91 citations)

· Bhatti, Ghanishtha, Harshit Mohan, and R. Raja Singh. "Towards the future of smart electric vehicles: Digital twin technology." *Renewable and Sustainable Energy Reviews* 141 (2021): 110801. (422 citations)

· Almeaibed, Sadeq, Saba Al-Rubaye, Antonios Tsourdos, and Nicolas P. Avdelidis. "Digital twin analysis to promote safety and security in autonomous vehicles." *IEEE Communications Standards Magazine* 5, no. 1 (2021): 40-46. (135 citations)

11. Digital Twins for Environment and Sustainability

References:

· Tzachor, Asaf, Soheil Sabri, Catherine E. Richards, Abbas Rajabifard, and Michele Acuto. "Potential and limitations of digital twins to achieve the sustainable development goals." *Nature Sustainability* 5, no. 10 (2022): 822-829. (110 citations)

· Corrado, Casey R., Suzanne M. DeLong, Emily G. Holt, Edward Y. Hua, and Andreas Tolk. "Combining green metrics and digital twins for sustainability planning and governance of smart buildings and cities." *Sustainability* 14, no. 20 (2022): 12988. (36 citations)

· Kim, Byungmo, Jaewon Oh, and Cheonhong Min. "Development of a simulation model for digital twin of an oscillating water column wave power generator structure with ocean environmental effect." *Sensors* 23, no. 23 (2023): 9472. (3 citations)

12. Digital Twins in Agriculture

References:

· Peladarinos, Nikolaos, Dimitrios Piromalis, Vasileios Cheimaras, Efthymios Tserepas, Radu Adrian Munteanu, and Panagiotis Papageorgas. "Enhancing smart agriculture by implementing digital twins: A comprehensive review." *Sensors* 23, no. 16 (2023): 7128. (60 citations)

· Escribà-Gelonch, Marc, Shu Liang, Pieter van Schalkwyk, Ian Fisk, Nguyen Van Duc Long, and Volker Hessel. "Digital Twins in Agriculture: Orchestration and Applications." *Journal of Agricultural and Food Chemistry* 72, no. 19 (2024): 10737-10752. (12 citations)

· Verdouw, Cor, Bedir Tekinerdogan, Adrie Beulens, and Sjaak Wolfert. "Digital twins in smart farming." *Agricultural Systems* 189 (2021): 103046. (494 citations)

V **Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)** **Seminar (S) On-Site**
2513108, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Noise, especially in urban areas, is a major environmental issue that impacts quality of life and health, contributing to stress, sleep disturbances, and cardiovascular problems. Traffic noise, primarily from tire-road interactions, has become more prominent as electric vehicles reduce engine noise. Tackling this issue involves both passive methods, like noise barriers, and active solutions such as noise cancellation technologies.

In recent years, artificial intelligence (AI) has emerged as a powerful tool for managing noise. AI-based systems can classify noise sources, create noise maps, and develop control strategies. Advanced AI techniques, including Generative Adversarial Networks (GANs), AutoEncoders, Bi-Long Short-Term Memory (LSTM), and Bi-Gated Recurrent Units (GRUs), Graphical Convolutional Networks (GCN), Physics-informed neural networks, YOLO, Transformer, show great potential for reducing noise. Additionally, many computer vision techniques are used to improve noise conditions. This seminar will explore these AI methods and their role in enhancing conditions safety, minimizing environmental noise, and supporting intelligent transportation systems.

In this seminar, we try to understand Noise through data analysis and other techniques. We discuss current approaches to noise prediction and innovative AI approaches based on data science and machine learning.

Topics:

Introduction to Noise and Tire-Road Noise

Overview on Noise and Tire-Road Noise

Time Series Analysis and Image Analysis

Data Exploration and Visualization

Noise Feature Extraction and Analysis

Machine learning and Deep Learning Approach for Tire-Road Noise

Who are we looking for:

We are looking for students who want to expand their specialist knowledge and practical experience in artificial intelligence, signal processing, computer vision and road-tire noise. Participation provides the opportunity to actively participate in shaping the future of using artificial intelligence, computer vision and signal processing to reduce road-tire and traffic noise.

What we offer:

We provide you with tyre-road noise data. With this data, you can apply many signal processing, computer vision and artificial intelligence algorithms. This is where you can let your creativity run free and implement innovative solutions with our guidance.

Organizational:

- Kickoff meeting **on April 23, 2026**: Introduction to topics, information about data, clarification of organizational questions. In the Kickoff Meeting, Groups come together and each group has a theme.
- Interim presentation **28 May 2026**: Presentation of the current situation and information sharing.
- Final presentation on **July 9, 2026**: Presentation of results and submission of documents

Registration: Please briefly state your motivation for taking this course. Optionally you can attach your Transcript of Records and CV.

Deliverables (per team): 1 Report (min 10 pages, scientific paper format, including references) + Presentations (2) + Implementation Files(codes)

Grading relevant Parts: Written Report, Presentations and Implementation

V

Seminar Knowledge Discovery and Data Mining (Master)

2513309, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science

The exact dates and information for registration will be announced at the event page.

Organizational issues
Die Anmeldung erfolgt über das WiWi-Portal https://portal.wiwi.kit.edu/ .

Literature
Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Seminar Data Science & Real-time Big Data Analytics (Master)

Seminar (S)
On-Site

2513311, SS 2026, 2 SWS, Language: English, Open in study portal

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues
Die Anmeldung erfolgt über das WiWi-Portal https://portal.wiwi.kit.edu/ .

V Cognitive Automobiles and Robots

Seminar (S)
On-Site

2513500, SS 2026, 2 SWS, Language: German/English, Open in study portal

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Seminar Knowledge Graphs and Large Language Models (Master)

Seminar (S)
Blended (On-Site/Online)

2513607, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Large language models (LLMs) such as GPT-4 have shown remarkable capabilities in transforming various natural language processing (NLP) tasks across different domains. However, LLMs often generate incorrect answers, known as hallucinations, posing significant challenges to their usability and reliability. Additionally, LLMs operate as black boxes, making it difficult to understand how they arrive at specific conclusions, leading to transparency and explainability issues. Combining LLMs with KGs creates a powerful synergy that significantly enhances the capabilities of artificial intelligence across various tasks. This integration leverages the strengths of both technologies, with LLMs excelling at understanding and generating human-like text, and KGs providing structured, reliable information about entities and their relationships. Together, they offer a robust approach to problem-solving across diverse domains.

This seminar will focus on the intersection of LLMs and KGs, covering areas of interest including, but not limited to:

- KG completion using LLMs
- Question answering with KGs and LLMs
- Explainability of LLMs with KG integration
- Reasoning with LLMs and KGs
- Enhanced prompt engineering using KGs

Contributions of the students:

Each student will be assigned one paper on the topic, which could be a research paper discussing a novel approach or a resource paper presenting datasets, tools, etc. The student will be responsible for the following tasks:

1. **Report Writing**: Read the assigned paper thoroughly and write a 15-page seminar report explaining the methods and findings in their own words.
2. **Presenting**: Prepare and deliver a seminar presentation to share insights from the paper with other seminar participants.
3. **Conducting Experiments**: If the authors provide code, re-implement it for small-scale experiments using Google Colab or make the implementation available via GitHub.

T 7.348 Module component: Seminar in Informatics B (Master) [T-WIWI-103480]

Coordinators: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	2400125	Security and Privacy Awareness	2 SWS	Seminar /	Seidel-Saul, Volkamer, Boehm, Ballreich, Sikra, Veit
WT 25/26	2512101	Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Master)	2 SWS	Seminar /	Lazarova-Molnar, Khodadadi, Daniel
WT 25/26	2513103	Seminar: Applications of Digital Twins (Master)	2 SWS	Seminar /	Lazarova-Molnar, Lee, Mahmoud
WT 25/26	2513105	Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)	2 SWS	Seminar /	Lazarova-Molnar, Demetgül
WT 25/26	2513107	Seminar: Data-Driven Reliability Modeling of Energy Systems (Master)	2 SWS	Seminar	Lazarova-Molnar, Mostafa
WT 25/26	2513313	Seminar Linked Data and the Semantic Web (Master)	3 SWS	Seminar /	Käfer, Braun, Li, Kubelka
WT 25/26	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/	Hoellig, Käfer, Thoma
WT 25/26	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/	Hoellig, Käfer, Thoma
WT 25/26	2513451	Seminar Cooperative Autonomous Vehicles (Master)	2 SWS	Seminar /	Vinel
WT 25/26	2513458	Seminar Artificial Intelligence for Autonomous Driving (Master)	2 SWS	Seminar /	Zhao, Vinel
WT 25/26	2513460	Seminar Cooperative Robots (Master)	2 SWS	Seminar /	Vinel
WT 25/26	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar /	Zöllner, Schneider
ST 2026	2512101	Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Seminar/ Master)	2 SWS	Seminar /	Lazarova-Molnar, Khodadadi, Lee, Daniel
ST 2026	2513103	Seminar: Applications of Digital Twins (Master)	2 SWS	Seminar /	Lazarova-Molnar, Lee, Mahmoud
ST 2026	2513108	Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)	2 SWS	Seminar /	Demetgül, Lazarova-Molnar
ST 2026	2513109	Seminar: Data-driven Agent-based Modeling and Simulation (Master)	2 SWS	Seminar	Lazarova-Molnar, Lee
ST 2026	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar /	Oberweis, Forell, Fritsch, Rybinski, Schreiber, Ullrich, König

ST 2026	2513221	Seminar Intelligente Fahrzeugsysteme der nächsten Generation: Kognition, Personalisierung und adaptive Mobilität (Master)	2 SWS	Seminar	Ullrich, Schreiber
ST 2026	2513309	Seminar Knowledge Discovery and Data Mining (Master)	2 SWS	Seminar / 🗣	Käfer, Noullet, Kinder, Li
ST 2026	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar / 🗣	Käfer, Thoma, Slobodyanik
ST 2026	2513455	Seminar Machine Learning in Autonomous Driving (Master)	2 SWS	Seminar / 🧩	Zhao, Vinel
ST 2026	2513459	Seminar Vulnerable Road User Technologies (Master)	2 SWS	Seminar / 🧩	Schrapel, Vinel
ST 2026	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar / 🗣	Zöllner, Schneider
ST 2026	2513607	Seminar Knowledge Graphs and Large Language Models (Master)	2 SWS	Seminar / 🧩	Sack, Gesese
Exams					
WT 25/26	7500175	Seminar: Energy Informatics			Hagenmeyer, Bläsius
WT 25/26	7900025	Seminar "Applications of Digital Twins (Master)"			Lazarova-Molnar
WT 25/26	7900048	Seminar New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)			Lazarova-Molnar
WT 25/26	7900102	Advanced Lab Knowledge-driven Artificial Intelligence (Master)			Sack
WT 25/26	7900119	Seminar Cognitive Automobiles and Robots			Zöllner
WT 25/26	7900121	Security and Privacy Awareness			Volkamer
WT 25/26	7900209	Seminar "From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Master)"			Lazarova-Molnar
WT 25/26	7900226	Seminar Modeling and Simulation for Energy Systems (Master)			Lazarova-Molnar
WT 25/26	7900245	Seminar Cooperative Autonomous Vehicles (Master)			Vinel
WT 25/26	7900274	Seminar Real-World Challenges in Data Science and Analytics (Master)			Sure-Vetter, Färber
WT 25/26	7900279	Seminar Cooperative Robots (Master)			Vinel
WT 25/26	7900304	Seminar Linked Data and the Semantic Web (Master)			Färber
WT 25/26	7900356	Seminar Real-World Challenges in Data Science and Analytics (Master)			Sure-Vetter, Färber
WT 25/26	79AIFB_AIAD_C4	Seminar Artificial Intelligence for Autonomous Driving (Master)			Vinel
ST 2026	7900062	Seminar Data-driven Agent-based Modeling and Simulation (Master)			Lazarova-Molnar
ST 2026	7900088	Seminar Business Information Systems (Master)			Oberweis
ST 2026	7900147	Cognitive Automobiles and Robots			Zöllner
ST 2026	7900162	Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Master)			Lazarova-Molnar
ST 2026	7900191	Seminar Vulnerable Road User Technologies (Master)			Vinel
ST 2026	7900198	Seminar Data Science & Real-Time Big Data Analytics (Master)			Käfer
ST 2026	7900199	Seminar Large Language Model-Enhanced Representation Learning for Knowledge Graphs (Master)			Sack
ST 2026	7900202	Seminar Knowledge Discovery and Data Mining (Master)			Käfer
ST 2026	7900203	Seminar Machine Learning in Autonomous Driving (Master)			Vinel
ST 2026	7900206	Seminar New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)			Lazarova-Molnar
ST 2026	7900305	Seminar: Applications of Digital Twins (Master)			Lazarova-Molnar

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
Placeholder for seminars offered by the Institute AIFB.

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Security and Privacy Awareness** — **Seminar (S)** **Blended (On-Site/Online)**
2400125, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Important notes:

- The seminar language is English. This means that English is the standard for the presentation and the seminar paper, and German is only permitted for the paper after consultation with the supervisor, for example, if the topic of the thesis requires it.
- The seminar is only for MASTER students (or Mastervorzug)
- The link to enrol is for every student, regardless of the study background

Topics:

The advertised topics can be found in the wiwi portal.

V **Seminar: Applications of Digital Twins (Master)** — **Seminar (S)** **On-Site**
2513103, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

Seminar Name: Applications of Digital Twins

Size: 10 students (with 10 different topics)

Workload:

- 2 Lectures:
  - Introduction to Digital Twins and topic distribution
  - "How to Give Effective Presentations" lecture
- 10 student presentations (each 45 minutes in total)
- 10 student reports

Responsible Person: Hui Min Lee, Sanja Lazarova-Molnar

Deliverables for Grade:

· 1 Report per student and topic (8 pages, including references, IEEE Template, compulsory usage of Reference Manager – Zotero or EndNote)

· 25 mins presentation per student plus 20 min discussion (focus on the presentation topic + presentation skills) = 45 minutes for each student

Credits: 3 credits = 90 hours

Format/ Structure of the Seminar (Draft):

· 2 Lectures at the beginning of the semester

· Students have 1 week time to provide a priority list of 5 topics, distribution will be decided based on first come – first serve, ensuring that core topics are covered

· Q&As can be asked and answered over mails or ad-hoc appointments

· Students have time to work on the report and presentation during the semester

· Submission of all reports will be required 2 months after the intro lecture for ensuring fairness

· Presentations are done in blocks of 2 students per class, starting mid-June, presentations will be submitted at the day of the scheduled presentation

Approximate Time Consumption for Students (Draft):

· Lectures: 3 hours

· Student Presentations: 7.5 hours

· Topic Subscription: 1 hour

· Presentation Preparation: 15 hours

· Paper Writing and Literature Review: 63.5 hours

Description:

The seminar focuses on applications of Digital Twins and data-driven modeling, with an additional goal of improving scientific research and presentation skills for Master students. The seminar covers the diverse applications and use cases of Digital Twins in different domains such as manufacturing, energy systems, healthcare and many more, offering students an in-depth understanding of the role of Digital Twins in transforming the industries.

The seminar is structured as a literature review seminar. Each student can select a topic out of a predefined set, conduct further research and then write a comprehensive research paper. Students will also deliver presentations, synthesizing insights from both the provided starting reference literature and their own additional research.

By the end of the course, students will not only have a solid understanding of the current applications of Digital Twins and emerging trends but also be well-prepared to present their findings in an academic setting.

Topics:

1. Digital Twins for Manufacturing Systems

References:

· Zhang, Chenyuan, et al. "A reconfigurable modeling approach for digital twin-based manufacturing system." *Procedia Cirp* 83 (2019): 118-125. (96 citations)

· Kritzinger, Werner, et al. "Digital Twin in manufacturing: A categorical literature review and classification." *Ifac-PapersOnline* 51.11 (2018): 1016-1022. (1934 citations)

· Jaensch, Florian, et al. "Digital twins of manufacturing systems as a base for machine learning." *2018 25th International conference on mechatronics and machine vision in practice (M2VIP)*. IEEE, 2018. (73 citations)

2. Digital Twins for Energy Systems

References:

· Steindl, Gernot, et al. "Generic digital twin architecture for industrial energy systems." *Applied Sciences* 10.24 (2020): 8903. (78 citations)

· Granacher, Julia, et al. "Overcoming decision paralysis—A digital twin for decision making in energy system design." *Applied Energy* 306 (2022): 117954. (33 citations) -> focus on interactive digital twins

· Palensky, Peter, et al. "Digital twins and their use in future power systems." *Digital Twin* 1 (2022): 4. (37 citations)

3. Digital Twins in Healthcare

References:

· Alazab, Mamoun, et al. "Digital twins for healthcare 4.0-recent advances, architecture, and open challenges." *IEEE Consumer Electronics Magazine* (2022). (26 citations)

· Croatti, Angelo, et al. "On the integration of agents and digital twins in healthcare." *Journal of Medical Systems* 44 (2020): 1-8. (163 citations)

· Erol, Tolga, Arif Furkan Mendi, and Dilara Doğan. "The digital twin revolution in healthcare." *2020 4th international symposium on multidisciplinary studies and innovative technologies (ISMSIT)*. IEEE, 2020. (106 citations)

4. Digital Twins of City Infrastructures (in Smart Cities)

References:

· Deren, Li, Yu Wenbo, and Shao Zhenfeng. "Smart city based on digital twins." *Computational Urban Science* 1 (2021): 1-11. (110 citations)

· Deng, Tianhu, Keren Zhang, and Zuo-Jun Max Shen. "A systematic review of a digital twin city: A new pattern of urban governance toward smart cities." *Journal of Management Science and Engineering* 6.2 (2021): 125-134. (192 citations)

· Mylonas, Georgios, et al. "Digital twins from smart manufacturing to smart cities: A survey." *Ieee Access* 9 (2021): 143222-143249. (99 citations)

5. Digital Twins in Logistics

References:

· Moshood, Taofeeq D., et al. "Digital twins driven supply chain visibility within logistics: A new paradigm for future logistics." *Applied System Innovation* 4.2 (2021): 29. (71 citations)

· Agalianos, K., et al. "Discrete event simulation and digital twins: review and challenges for logistics." *Procedia Manufacturing* 51 (2020): 1636-1641. (74 citations)

· Korth, Benjamin, Christian Schwede, and Markus Zajac. "Simulation-ready digital twin for realtime management of logistics systems." *2018 IEEE international conference on big data (big data)*. IEEE, 2018. (64 citations)

6. Cognitive Digital Twins

References:

· Al Faruque, Mohammad Abdullah, et al. "Cognitive digital twin for manufacturing systems." *2021 Design, Automation & Test in Europe Conference & Exhibition (DATE)*. IEEE, 2021. (28 citations)

· Zhang, Nan, Rami Bahsoon, and Georgios Theodoropoulos. "Towards engineering cognitive digital twins with self-awareness." *2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE, 2020. (22 citations)

· Zheng, Xiaochen, Jinzhi Lu, and Dimitris Kiritsis. "The emergence of cognitive digital twin: vision, challenges and opportunities." *International Journal of Production Research* 60.24 (2022): 7610-7632. (92 citations)

7. Fusing Data and Human Expert Knowledge in Digital Twins

References:

· Kulkarni, Vinay, Souvik Barat, and Tony Clark. "Towards adaptive enterprises using digital twins." *2019 winter simulation conference (WSC)*. IEEE, 2019. (22 citations)

· Vogel-Heuser, Birgit, et al. "Potential for combining semantics and data analysis in the context of digital twins." *Philosophical Transactions of the Royal Society A* 379.2207 (2021): 20200368. (16 citations)

· Todorovski, Ljupčo, and Sašo Džeroski. "Integrating knowledge-driven and data-driven approaches to modeling." *ecological modelling* 194.1-3 (2006): 3-13. (80 citations)

8. Digital Twins for Multi-agent / Complex Systems

References:

· Pretel, Elena, Alejandro Moya, Elena Navarro, Víctor López-Jaquero, and Pascual González. "Analysing the synergies between Multi-agent Systems and Digital Twins: A systematic literature review." *Information and Software Technology* (2024): 107503. (2 citations)

· Mariani, S., Picone, M., Ricci, A. (2022). About Digital Twins, Agents, and Multiagent Systems: A Cross-Fertilisation Journey. In: Melo, F.S., Fang, F. (eds) *Autonomous Agents and Multiagent Systems. Best and Visionary Papers. AAMAS 2022*. Lecture Notes in Computer Science, vol 13441. (11 citations)

· Marah H, Challenger M. Adaptive hybrid reasoning for agent-based digital twins of distributed multi-robot systems. *SIMULATION*. 2024;100(9):931-957. (0 citations – new articles)

9. Digital Twins for Energy Systems

References:

· Kabir, Md Rafiul, Dipal Halder, and Sandip Ray. "Digital Twins for IoT-driven Energy Systems: A Survey." *IEEE Access* (2024). (0 citations – new articles)

· Brosinsky, Christoph, Rainer Krebs, and Dirk Westermann. "Embedded Digital Twins in future energy management systems: paving the way for automated grid control." *at-Automatisierungstechnik* 68, no. 9 (2020): 750-764.(21 citations)

· Song, Zhao, Christoph M. Hackl, Abhinav Anand, Andre Thommessen, Jonas Petzschmann, Omar Kamel, Robert Braunbehrens, Anton Kaifel, Christian Roos, and Stefan Hauptmann. "Digital twins for the future power system: An overview and a future perspective." *Sustainability* 15, no. 6 (2023): 5259. .(32 citations)

· Mostafa, Omar & Lazarova-Molnar, Sanja. (2024). Enhancing Reliability of Energy Systems with Digital Twins: Challenges and Opportunities. (0 citations – new articles)

10. Digital Twins in Transportation and Automotive

References:

· Schwarz, Chris, and Ziran Wang. "The role of digital twins in connected and automated vehicles." *IEEE Intelligent Transportation Systems Magazine* 14, no. 6 (2022): 41-51. (91 citations)

· Bhatti, Ghanishtha, Harshit Mohan, and R. Raja Singh. "Towards the future of smart electric vehicles: Digital twin technology." *Renewable and Sustainable Energy Reviews* 141 (2021): 110801. (422 citations)

· Almeaibed, Sadeq, Saba Al-Rubaye, Antonios Tsourdos, and Nicolas P. Avdelidis. "Digital twin analysis to promote safety and security in autonomous vehicles." *IEEE Communications Standards Magazine* 5, no. 1 (2021): 40-46. (135 citations)

11. Digital Twins for Environment and Sustainability

References:

· Tzachor, Asaf, Soheil Sabri, Catherine E. Richards, Abbas Rajabifard, and Michele Acuto. "Potential and limitations of digital twins to achieve the sustainable development goals." *Nature Sustainability* 5, no. 10 (2022): 822-829. (110 citations)

· Corrado, Casey R., Suzanne M. DeLong, Emily G. Holt, Edward Y. Hua, and Andreas Tolk. "Combining green metrics and digital twins for sustainability planning and governance of smart buildings and cities." *Sustainability* 14, no. 20 (2022): 12988. (36 citations)

· Kim, Byungmo, Jaewon Oh, and Cheonhong Min. "Development of a simulation model for digital twin of an oscillating water column wave power generator structure with ocean environmental effect." *Sensors* 23, no. 23 (2023): 9472. (3 citations)

12. Digital Twins in Agriculture

References:

· Peladarinos, Nikolaos, Dimitrios Piromalis, Vasileios Cheimaras, Efthymios Tserepas, Radu Adrian Munteanu, and Panagiotis Papageorgas. "Enhancing smart agriculture by implementing digital twins: A comprehensive review." *Sensors* 23, no. 16 (2023): 7128. (60 citations)

· Escribà-Gelonch, Marc, Shu Liang, Pieter van Schalkwyk, Ian Fisk, Nguyen Van Duc Long, and Volker Hessel. "Digital Twins in Agriculture: Orchestration and Applications." *Journal of Agricultural and Food Chemistry* 72, no. 19 (2024): 10737-10752. (12 citations)

· Verdouw, Cor, Bedir Tekinerdogan, Adrie Beulens, and Sjaak Wolfert. "Digital twins in smart farming." *Agricultural Systems* 189 (2021): 103046. (494 citations)

V **Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)** **Seminar (S) On-Site**
2513105, WS 25/26, 2 SWS, Language: English, Open in study portal

Content

Noise, especially in urban areas, is a major environmental issue that impacts quality of life and health, contributing to stress, sleep disturbances, and cardiovascular problems. Traffic noise, primarily from tire-road interactions, has become more prominent as electric vehicles reduce engine noise. Tackling this issue involves both passive methods, like noise barriers, and active solutions such as noise cancellation technologies.

In recent years, artificial intelligence (AI) has emerged as a powerful tool for managing noise. AI-based systems can classify noise sources, create noise maps, and develop control strategies. Advanced AI techniques, including Generative Adversarial Networks (GANs), AutoEncoders, Bi-Long Short-Term Memory (LSTM), and Bi-Gated Recurrent Units (GRUs), Graphical Convolutional Networks (GCN), Physics-informed neural networks, YOLO, Transformer, show great potential for reducing noise. Additionally, many computer vision techniques are used to improve noise conditions. This seminar will explore these AI methods and their role in enhancing conditions safety, minimizing environmental noise, and supporting intelligent transportation systems.

In this seminar, we try to understand Noise through data analysis and other techniques. We discuss current approaches to noise prediction and innovative AI approaches based on data science and machine learning.

Topics:

Introduction to Noise and Tire-Road Noise

Overview on Noise and Tire-Road Noise

Time Series Analysis and Image Analysis

Data Exploration and Visualization

Noise Feature Extraction and Analysis

Machine learning and Deep Learning Approach for Tire-Road Noise

Who are we looking for:

We are looking for students who want to expand their specialist knowledge and practical experience in artificial intelligence, signal processing, computer vision and road-tire noise. Participation provides the opportunity to actively participate in shaping the future of using artificial intelligence, computer vision and signal processing to reduce road-tire and traffic noise.

What we offer:

We provide you with tyre-road noise data. With this data, you can apply many signal processing, computer vision and artificial intelligence algorithms. This is where you can let your creativity run free and implement innovative solutions with our guidance.

Literature

- Stansfeld, S., Clark, C., Smuk, M., Gallacher, J., & Babisch, W. (2021). Road traffic noise, noise sensitivity, noise annoyance, psychological and physical health and mortality. Environmental Health, 20, 1-15.
- Lan, Y., Roberts, H., Kwan, M. P., & Helbich, M. (2020). Transportation noise exposure and anxiety: A systematic review and meta-analysis. Environmental research, 191, 110118.
- WHO. (2018) Environmental Noise Guidelines for the European Region.
- EU. (2019) Regulation (EU) No 540/2014 of the European Parliament and of the Council of 16 April 2014 on the Sound Level of Motor Vehicles and of Replacement Silencing Systems, and Amending Directive 2007/46/EC and Repealing Directive 70/157/EEC.

V **Seminar Linked Data and the Semantic Web (Master)** **Seminar (S)**
2513313, WS 25/26, 3 SWS, Language: German/English, Open in study portal **On-Site**

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V **Seminar Real-World Challenges in Data Science and Analytics (Bachelor)** **On-Site**
2513314, WS 25/26, 3 SWS, Language: German/English, Open in study portal

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V **Seminar Real-World Challenges in Data Science and Analytics (Master)** **On-Site**
2513315, WS 25/26, 3 SWS, Language: German/English, Open in study portal

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V **Seminar Cognitive Automobiles and Robots (Master)** **Seminar (S)**
Blended (On-Site/Online)
2513500, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V

Seminar: From Physical Models to Digital Twins: A Data-Driven Simulation Workshop (Seminar/Master)

Seminar (S)
On-Site

2512101, SS 2026, 2 SWS, Language: English, Open in study portal

Content
This seminar focuses on the data-driven discovery of simulation models in industrial settings, providing a hands-on approach to understanding and optimizing production processes.
Students will start by designing and constructing production lines using Lego Spike and similar modular systems. This activity will include developing comprehensive data-capturing pipelines to collect detailed event-logging raw data from their production lines.
Next, the seminar will explore advanced techniques for transforming this raw data into simulation models, e.g., Petri nets. Participants will learn and apply data-driven model extraction methods, such as process mining to extract workflow processes; statistical methods to fit probability distributions and analyze trends, and machine learning algorithms to model complex behaviors within the production process. Through these techniques, students will extract simulation models that reflect the real-world dynamics of their production lines. The seminar will then guide participants on how to validate the extracted simulation models to ensure their accuracy.
By the end of the seminar, students will be equipped with the skills to build model production lines, collect event logging data from them, transform event log data into actionable simulation models and use these models to drive efficiency and innovation in industrial production settings.

Grading Scheme:

Report - 50%

Presentations - 40%

Implementation - 10%

V

Seminar: Applications of Digital Twins (Master)

Seminar (S)
On-Site

2513103, SS 2026, 2 SWS, Language: English, Open in study portal

Content

Seminar Name: Applications of Digital Twins

Size: 10 students (with 10 different topics)

Workload:

- 2 Lectures:
  - Introduction to Digital Twins and topic distribution
  - "How to Give Effective Presentations" lecture
- 10 student presentations (each 45 minutes in total)
- 10 student reports

Responsible Person: Hui Min Lee, Sanja Lazarova-Molnar

Deliverables for Grade:

· 1 Report per student and topic (8 pages, including references, IEEE Template, compulsory usage of Reference Manager – Zotero or EndNote)

· 25 mins presentation per student plus 20 min discussion (focus on the presentation topic + presentation skills) = 45 minutes for each student

Credits: 3 credits = 90 hours

Format/ Structure of the Seminar (Draft):

· 2 Lectures at the beginning of the semester

· Students have 1 week time to provide a priority list of 5 topics, distribution will be decided based on first come – first serve, ensuring that core topics are covered

· Q&As can be asked and answered over mails or ad-hoc appointments

· Students have time to work on the report and presentation during the semester

· Submission of all reports will be required 2 months after the intro lecture for ensuring fairness

· Presentations are done in blocks of 2 students per class, starting mid-June, presentations will be submitted at the day of the scheduled presentation

Approximate Time Consumption for Students (Draft):

· Lectures: 3 hours

· Student Presentations: 7.5 hours

· Topic Subscription: 1 hour

· Presentation Preparation: 15 hours

· Paper Writing and Literature Review: 63.5 hours

Description:

The seminar focuses on applications of Digital Twins and data-driven modeling, with an additional goal of improving scientific research and presentation skills for Master students. The seminar covers the diverse applications and use cases of Digital Twins in different domains such as manufacturing, energy systems, healthcare and many more, offering students an in-depth understanding of the role of Digital Twins in transforming the industries.

The seminar is structured as a literature review seminar. Each student can select a topic out of a predefined set, conduct further research and then write a comprehensive research paper. Students will also deliver presentations, synthesizing insights from both the provided starting reference literature and their own additional research.

By the end of the course, students will not only have a solid understanding of the current applications of Digital Twins and emerging trends but also be well-prepared to present their findings in an academic setting.

Topics:

1. Digital Twins for Manufacturing Systems

References:

· Zhang, Chenyuan, et al. "A reconfigurable modeling approach for digital twin-based manufacturing system." *Procedia Cirp* 83 (2019): 118-125. (96 citations)

· Kritzinger, Werner, et al. "Digital Twin in manufacturing: A categorical literature review and classification." *Ifac-PapersOnline* 51.11 (2018): 1016-1022. (1934 citations)

· Jaensch, Florian, et al. "Digital twins of manufacturing systems as a base for machine learning." *2018 25th International conference on mechatronics and machine vision in practice (M2VIP)*. IEEE, 2018. (73 citations)

2. Digital Twins for Energy Systems

References:

· Steindl, Gernot, et al. "Generic digital twin architecture for industrial energy systems." *Applied Sciences* 10.24 (2020): 8903. (78 citations)

· Granacher, Julia, et al. "Overcoming decision paralysis—A digital twin for decision making in energy system design." *Applied Energy* 306 (2022): 117954. (33 citations) -> focus on interactive digital twins

· Palensky, Peter, et al. "Digital twins and their use in future power systems." *Digital Twin* 1 (2022): 4. (37 citations)

3. Digital Twins in Healthcare

References:

· Alazab, Mamoun, et al. "Digital twins for healthcare 4.0-recent advances, architecture, and open challenges." *IEEE Consumer Electronics Magazine* (2022). (26 citations)

· Croatti, Angelo, et al. "On the integration of agents and digital twins in healthcare." *Journal of Medical Systems* 44 (2020): 1-8. (163 citations)

· Erol, Tolga, Arif Furkan Mendi, and Dilara Doğan. "The digital twin revolution in healthcare." *2020 4th international symposium on multidisciplinary studies and innovative technologies (ISMSIT)*. IEEE, 2020. (106 citations)

4. Digital Twins of City Infrastructures (in Smart Cities)

References:

· Deren, Li, Yu Wenbo, and Shao Zhenfeng. "Smart city based on digital twins." *Computational Urban Science* 1 (2021): 1-11. (110 citations)

· Deng, Tianhu, Keren Zhang, and Zuo-Jun Max Shen. "A systematic review of a digital twin city: A new pattern of urban governance toward smart cities." *Journal of Management Science and Engineering* 6.2 (2021): 125-134. (192 citations)

· Mylonas, Georgios, et al. "Digital twins from smart manufacturing to smart cities: A survey." *Ieee Access* 9 (2021): 143222-143249. (99 citations)

5. Digital Twins in Logistics

References:

· Moshood, Taofeeq D., et al. "Digital twins driven supply chain visibility within logistics: A new paradigm for future logistics." *Applied System Innovation* 4.2 (2021): 29. (71 citations)

· Agalianos, K., et al. "Discrete event simulation and digital twins: review and challenges for logistics." *Procedia Manufacturing* 51 (2020): 1636-1641. (74 citations)

· Korth, Benjamin, Christian Schwede, and Markus Zajac. "Simulation-ready digital twin for realtime management of logistics systems." *2018 IEEE international conference on big data (big data)*. IEEE, 2018. (64 citations)

6. Cognitive Digital Twins

References:

· Al Faruque, Mohammad Abdullah, et al. "Cognitive digital twin for manufacturing systems." *2021 Design, Automation & Test in Europe Conference & Exhibition (DATE)*. IEEE, 2021. (28 citations)

· Zhang, Nan, Rami Bahsoon, and Georgios Theodoropoulos. "Towards engineering cognitive digital twins with self-awareness." *2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE, 2020. (22 citations)

· Zheng, Xiaochen, Jinzhi Lu, and Dimitris Kiritsis. "The emergence of cognitive digital twin: vision, challenges and opportunities." *International Journal of Production Research* 60.24 (2022): 7610-7632. (92 citations)

7. Fusing Data and Human Expert Knowledge in Digital Twins

References:

· Kulkarni, Vinay, Souvik Barat, and Tony Clark. "Towards adaptive enterprises using digital twins." *2019 winter simulation conference (WSC)*. IEEE, 2019. (22 citations)

· Vogel-Heuser, Birgit, et al. "Potential for combining semantics and data analysis in the context of digital twins." *Philosophical Transactions of the Royal Society A* 379.2207 (2021): 20200368. (16 citations)

· Todorovski, Ljupčo, and Sašo Džeroski. "Integrating knowledge-driven and data-driven approaches to modeling." *ecological modelling* 194.1-3 (2006): 3-13. (80 citations)

8. Digital Twins for Multi-agent / Complex Systems

References:

· Pretel, Elena, Alejandro Moya, Elena Navarro, Víctor López-Jaquero, and Pascual González. "Analysing the synergies between Multi-agent Systems and Digital Twins: A systematic literature review." *Information and Software Technology* (2024): 107503. (2 citations)

· Mariani, S., Picone, M., Ricci, A. (2022). About Digital Twins, Agents, and Multiagent Systems: A Cross-Fertilisation Journey. In: Melo, F.S., Fang, F. (eds) *Autonomous Agents and Multiagent Systems. Best and Visionary Papers. AAMAS 2022*. Lecture Notes in Computer Science, vol 13441. (11 citations)

· Marah H, Challenger M. Adaptive hybrid reasoning for agent-based digital twins of distributed multi-robot systems. *SIMULATION*. 2024;100(9):931-957. (0 citations – new articles)

9. Digital Twins for Energy Systems

References:

· Kabir, Md Rafiul, Dipal Halder, and Sandip Ray. "Digital Twins for IoT-driven Energy Systems: A Survey." *IEEE Access* (2024). (0 citations – new articles)

· Brosinsky, Christoph, Rainer Krebs, and Dirk Westermann. "Embedded Digital Twins in future energy management systems: paving the way for automated grid control." *at-Automatisierungstechnik* 68, no. 9 (2020): 750-764.(21 citations)

· Song, Zhao, Christoph M. Hackl, Abhinav Anand, Andre Thommessen, Jonas Petzschmann, Omar Kamel, Robert Braunbehrens, Anton Kaifel, Christian Roos, and Stefan Hauptmann. "Digital twins for the future power system: An overview and a future perspective." *Sustainability* 15, no. 6 (2023): 5259. .(32 citations)

· Mostafa, Omar & Lazarova-Molnar, Sanja. (2024). Enhancing Reliability of Energy Systems with Digital Twins: Challenges and Opportunities. (0 citations – new articles)

10. Digital Twins in Transportation and Automotive

References:

· Schwarz, Chris, and Ziran Wang. "The role of digital twins in connected and automated vehicles." *IEEE Intelligent Transportation Systems Magazine* 14, no. 6 (2022): 41-51. (91 citations)

· Bhatti, Ghanishtha, Harshit Mohan, and R. Raja Singh. "Towards the future of smart electric vehicles: Digital twin technology." *Renewable and Sustainable Energy Reviews* 141 (2021): 110801. (422 citations)

· Almeaibed, Sadeq, Saba Al-Rubaye, Antonios Tsourdos, and Nicolas P. Avdelidis. "Digital twin analysis to promote safety and security in autonomous vehicles." *IEEE Communications Standards Magazine* 5, no. 1 (2021): 40-46. (135 citations)

11. Digital Twins for Environment and Sustainability

References:

· Tzachor, Asaf, Soheil Sabri, Catherine E. Richards, Abbas Rajabifard, and Michele Acuto. "Potential and limitations of digital twins to achieve the sustainable development goals." *Nature Sustainability* 5, no. 10 (2022): 822-829. (110 citations)

· Corrado, Casey R., Suzanne M. DeLong, Emily G. Holt, Edward Y. Hua, and Andreas Tolk. "Combining green metrics and digital twins for sustainability planning and governance of smart buildings and cities." *Sustainability* 14, no. 20 (2022): 12988. (36 citations)

· Kim, Byungmo, Jaewon Oh, and Cheonhong Min. "Development of a simulation model for digital twin of an oscillating water column wave power generator structure with ocean environmental effect." *Sensors* 23, no. 23 (2023): 9472. (3 citations)

12. Digital Twins in Agriculture

References:

· Peladarinos, Nikolaos, Dimitrios Piromalis, Vasileios Cheimaras, Efthymios Tserepas, Radu Adrian Munteanu, and Panagiotis Papageorgas. "Enhancing smart agriculture by implementing digital twins: A comprehensive review." *Sensors* 23, no. 16 (2023): 7128. (60 citations)

· Escribà-Gelonch, Marc, Shu Liang, Pieter van Schalkwyk, Ian Fisk, Nguyen Van Duc Long, and Volker Hessel. "Digital Twins in Agriculture: Orchestration and Applications." *Journal of Agricultural and Food Chemistry* 72, no. 19 (2024): 10737-10752. (12 citations)

· Verdouw, Cor, Bedir Tekinerdogan, Adrie Beulens, and Sjaak Wolfert. "Digital twins in smart farming." *Agricultural Systems* 189 (2021): 103046. (494 citations)

V **Seminar: New Trends in Artificial Intelligence Techniques for Noise Prediction (Master)** **Seminar (S) On-Site**
2513108, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Noise, especially in urban areas, is a major environmental issue that impacts quality of life and health, contributing to stress, sleep disturbances, and cardiovascular problems. Traffic noise, primarily from tire-road interactions, has become more prominent as electric vehicles reduce engine noise. Tackling this issue involves both passive methods, like noise barriers, and active solutions such as noise cancellation technologies.

In recent years, artificial intelligence (AI) has emerged as a powerful tool for managing noise. AI-based systems can classify noise sources, create noise maps, and develop control strategies. Advanced AI techniques, including Generative Adversarial Networks (GANs), AutoEncoders, Bi-Long Short-Term Memory (LSTM), and Bi-Gated Recurrent Units (GRUs), Graphical Convolutional Networks (GCN), Physics-informed neural networks, YOLO, Transformer, show great potential for reducing noise. Additionally, many computer vision techniques are used to improve noise conditions. This seminar will explore these AI methods and their role in enhancing conditions safety, minimizing environmental noise, and supporting intelligent transportation systems.

In this seminar, we try to understand Noise through data analysis and other techniques. We discuss current approaches to noise prediction and innovative AI approaches based on data science and machine learning.

Topics:

Introduction to Noise and Tire-Road Noise

Overview on Noise and Tire-Road Noise

Time Series Analysis and Image Analysis

Data Exploration and Visualization

Noise Feature Extraction and Analysis

Machine learning and Deep Learning Approach for Tire-Road Noise

Who are we looking for:

We are looking for students who want to expand their specialist knowledge and practical experience in artificial intelligence, signal processing, computer vision and road-tire noise. Participation provides the opportunity to actively participate in shaping the future of using artificial intelligence, computer vision and signal processing to reduce road-tire and traffic noise.

What we offer:

We provide you with tyre-road noise data. With this data, you can apply many signal processing, computer vision and artificial intelligence algorithms. This is where you can let your creativity run free and implement innovative solutions with our guidance.

Organizational:

- Kickoff meeting **on April 23, 2026**: Introduction to topics, information about data, clarification of organizational questions. In the Kickoff Meeting, Groups come together and each group has a theme.
- Interim presentation **28 May 2026**: Presentation of the current situation and information sharing.
- Final presentation on **July 9, 2026**: Presentation of results and submission of documents

Registration: Please briefly state your motivation for taking this course. Optionally you can attach your Transcript of Records and CV.

Deliverables (per team): 1 Report (min 10 pages, scientific paper format, including references) + Presentations (2) + Implementation Files(codes)

Grading relevant Parts: Written Report, Presentations and Implementation

V

Seminar Knowledge Discovery and Data Mining (Master)

2513309, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science

The exact dates and information for registration will be announced at the event page.

Organizational issues
Die Anmeldung erfolgt über das WiWi-Portal https://portal.wiwi.kit.edu/ .

Literature
Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Seminar Data Science & Real-time Big Data Analytics (Master)

Seminar (S)
On-Site

2513311, SS 2026, 2 SWS, Language: English, Open in study portal

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues
Die Anmeldung erfolgt über das WiWi-Portal https://portal.wiwi.kit.edu/ .

V Cognitive Automobiles and Robots

Seminar (S)
On-Site

2513500, SS 2026, 2 SWS, Language: German/English, Open in study portal

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Seminar Knowledge Graphs and Large Language Models (Master)

Seminar (S)
Blended (On-Site/Online)

2513607, SS 2026, 2 SWS, Language: English, Open in study portal

Content
Large language models (LLMs) such as GPT-4 have shown remarkable capabilities in transforming various natural language processing (NLP) tasks across different domains. However, LLMs often generate incorrect answers, known as hallucinations, posing significant challenges to their usability and reliability. Additionally, LLMs operate as black boxes, making it difficult to understand how they arrive at specific conclusions, leading to transparency and explainability issues. Combining LLMs with KGs creates a powerful synergy that significantly enhances the capabilities of artificial intelligence across various tasks. This integration leverages the strengths of both technologies, with LLMs excelling at understanding and generating human-like text, and KGs providing structured, reliable information about entities and their relationships. Together, they offer a robust approach to problem-solving across diverse domains.

This seminar will focus on the intersection of LLMs and KGs, covering areas of interest including, but not limited to:

- KG completion using LLMs
- Question answering with KGs and LLMs
- Explainability of LLMs with KG integration
- Reasoning with LLMs and KGs
- Enhanced prompt engineering using KGs

Contributions of the students:

Each student will be assigned one paper on the topic, which could be a research paper discussing a novel approach or a resource paper presenting datasets, tools, etc. The student will be responsible for the following tasks:

1. **Report Writing**: Read the assigned paper thoroughly and write a 15-page seminar report explaining the methods and findings in their own words.
2. **Presenting**: Prepare and deliver a seminar presentation to share insights from the paper with other seminar participants.
3. **Conducting Experiments**: If the authors provide code, re-implement it for small-scale experiments using Google Colab or make the implementation available via GitHub.

T 7.349 Module component: Seminar in Operations Research A (Master) [T-WIWI-103481]

Coordinators: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	2500056	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter, Pomes, Hoffmann
WT 25/26	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
WT 25/26	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
WT 25/26	2550462	Seminar on Trending Topics in Optimization and Machine Learning (Master)	2 SWS	Seminar / 🧩	Rebennack, Kandora
WT 25/26	2550473	Seminar on Energy and Power Systems Optimization (Master)	2 SWS	Seminar / 🧩	Rebennack, Kandora
ST 2026	2550131	Seminar on Methodical Foundations of Operations Research (BA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
ST 2026	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
Exams					
WT 25/26	7900011_WS2425	Seminar in Operations Research B (Bachelor)			Stein
WT 25/26	7900012_WS2425	Seminar in Operations Research A (Master)			Stein
WT 25/26	7900040	Seminar: Modern OR and Innovative Logistics			Nickel
WT 25/26	7900169	Seminar Trending Topics in Optimization and Machine Learning (Master)			Rebennack
WT 25/26	7900194	Digitalization in the Steel Industry			Nickel
WT 25/26	7900314	Seminar on Power Systems Optimization (Master)			Rebennack
ST 2026	7900200_SS2025	Seminar in Operations Research A (Master)			Stein
ST 2026	7900201_SS2025	Seminar in Operations Research (Bachelor)			Stein

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Seminar: Modern OR and Innovative Logistics**
2500056, WS 25/26, 2 SWS, Language: German, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
This seminar presents current issues in the field of Operations Research and Logistics, critically evaluates them, and discusses them using examples. The focus of the seminar lies on optimization models and algorithms, with particular attention to their practical applicability (especially in supply chain and health care management). All participants are required to write a seminar paper and give a presentation. Depending on the topic, an implementation of the models or heuristics using standard software (e.g., IBM CPLEX or Java) is expected. Further details can be found in the information sheet on Prof. Nickel's website. All topics have the potential to be developed into a thesis.

The seminar topics will be assigned during a preliminary meeting at the beginning of the semester. Attendance is mandatory for the preliminary meeting as well as for all seminar presentations.

In addition, students will receive an introduction to academic writing, literature research, and scientific presenting in three sessions.

Organizational issues
Die Anmeldung erfolgt über das Wiwi-Portal. Nähere Informationen erhalten Sie auf der Homepage dol.ior.kit.edu bzw. im WiWi-Portal sowie bei der Vorbesprechung.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V **Seminar on Methodical Foundations of Operations Research (B)**
2550131, WS 25/26, 2 SWS, Language: German, Open in study portal
Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V

Seminar on Methodical Foundations of Operations Research (BA)

2550131, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

T 7.350 Module component: Seminar in Operations Research B (Master) [T-WIWI-103482]

Coordinators: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	2500056	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter, Pomes, Hoffmann
WT 25/26	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
WT 25/26	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
WT 25/26	2550462	Seminar on Trending Topics in Optimization and Machine Learning (Master)	2 SWS	Seminar / 🧩	Rebennack, Kandora
WT 25/26	2550473	Seminar on Energy and Power Systems Optimization (Master)	2 SWS	Seminar / 🧩	Rebennack, Kandora
ST 2026	2550131	Seminar on Methodical Foundations of Operations Research (BA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
ST 2026	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze, Neussel
Exams					
WT 25/26	7900011_WS2425	Seminar in Operations Research B (Bachelor)			Stein
WT 25/26	7900012_WS2425	Seminar in Operations Research A (Master)			Stein
WT 25/26	7900040	Seminar: Modern OR and Innovative Logistics			Nickel
WT 25/26	7900194	Digitalization in the Steel Industry			Nickel
WT 25/26	7900314	Seminar on Power Systems Optimization (Master)			Rebennack
ST 2026	7900200_SS2025	Seminar in Operations Research A (Master)			Stein
ST 2026	7900201_SS2025	Seminar in Operations Research (Bachelor)			Stein

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Seminar: Modern OR and Innovative Logistics**
2500056, WS 25/26, 2 SWS, Language: German, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
This seminar presents current issues in the field of Operations Research and Logistics, critically evaluates them, and discusses them using examples. The focus of the seminar lies on optimization models and algorithms, with particular attention to their practical applicability (especially in supply chain and health care management). All participants are required to write a seminar paper and give a presentation. Depending on the topic, an implementation of the models or heuristics using standard software (e.g., IBM CPLEX or Java) is expected. Further details can be found in the information sheet on Prof. Nickel's website. All topics have the potential to be developed into a thesis.

The seminar topics will be assigned during a preliminary meeting at the beginning of the semester. Attendance is mandatory for the preliminary meeting as well as for all seminar presentations.

In addition, students will receive an introduction to academic writing, literature research, and scientific presenting in three sessions.

Organizational issues
Die Anmeldung erfolgt über das Wiwi-Portal. Nähere Informationen erhalten Sie auf der Homepage dol.ior.kit.edu bzw. im WiWi-Portal sowie bei der Vorbesprechung.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V **Seminar on Methodical Foundations of Operations Research (B)**
2550131, WS 25/26, 2 SWS, Language: German, Open in study portal
Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V

Seminar on Methodical Foundations of Operations Research (BA)

2550131, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

T 7.351 Module component: Seminar in Statistics A (Master) [T-WIWI-103483]

Coordinators: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	25000111	Statistics and Epidemics	2 SWS	Seminar / 🗣	Bracher, Nemcova
WT 25/26	2500012		2 SWS	Seminar / 🗣	Grothe, Liu
WT 25/26	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner, Pohle
ST 2026	2500012	Making and Evaluating Predictions	2 SWS	Seminar	Schienle, Allen, Zhang
ST 2026	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner
ST 2026	2550561	Fortgeschrittene Themen zu Statistik, Datenanalyse und maschinellem Lernen (Master)	2 SWS	Seminar / 🗣	Grothe, Liu
Exams					
WT 25/26	7900216	Seminar in Statistics A (Master)			Grothe
WT 25/26	7900254	Topics in Econometrics			Schienle, Bracher

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Statistics and Epidemics

25000111, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Motivation

Infectious disease epidemiology gives rise to a large variety of real-time data streams. During the COVID-19 pandemic, the interpretation and statistical analysis of these data has proven crucial, but also highly challenging. In this seminar, students will get to know central concepts of infectious disease surveillance and modelling from a statistical perspective. Following an overview of various aspects in the form of blocked lectures, students will choose a more specific topic for their seminar thesis.

Learning Goals

Students develop an understanding of central modeling tasks and methods, including

- estimation of reproductive numbers
- compartment models of disease spread
- nowcasting and short-term forecasting of disease spread
- detection of outbreaks
- diagnostic testing

Moreover, they get to know various data types commonly used in the analysis of disease spread.

Logistics

The project seminar is worth 4.5 credit points (Leistungspunkte). There will be three blocked lectures (approx. 135 minutes each) in the beginning of the lecture period. For the various topics covered, subjects for seminar theses will be proposed (and students are allowed to propose their own topics). Towards the end of the semester, students present their progress on the chosen topics to the group. Grades will be based on this presentation (25%) and the final report (75%).

Organizational issues

Prerequisites

Students should have a very good working knowledge of statistics, including proficiency in a programming language for applied data analysis. The lecture VWL3 Introduction to Econometrics is a prerequisite for the project seminar. Most available software in the field is in R, but in principle Python can be used as well. Advanced knowledge of biology, medicine or epidemiology is not required.

Application Procedure

Please submit a transcript of records as well as a short letter of motivation (roughly 200 words) via WIWI-Portal: https://portal.wiwi.kit.edu/ys/8902

Application time frame: September 5th, 2025 to October, 31th, 2025.

V Topics in Econometrics

2521310, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)

Organizational issues

Wöchentliche Veranstaltung, Donnerstags 13:00-14:30 Uhr in B17 - R320

V Making and Evaluating Predictions

2500012, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Content

A key goal of statistics and data science is to make predictions. Good predictions are important for decision-making, allowing us to balance risks and mitigate the impacts of potentially damaging events. In this seminar, we will study theoretical questions regarding the evaluation of predictions, such as “What does it mean for a prediction to be good?”, before introducing statistical and machine learning methods to generate both point-valued and probabilistic predictions. We will discuss applications to economics, meteorology, and energy forecasting.

Format: The course will start with a short block course at the beginning of the lecture period. Evaluation will be based on a seminar thesis, which students are required to hand in at the end of the lecture period, and a short presentation. The presentations will also take place towards the end of the lecture period.

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

V

Advanced Topics in Econometrics

2521310, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Organizational issues
wöchentlich, Donnerstags 11:00-12:30, B17, R320

T 7.352 Module component: Seminar in Statistics B (Master) [T-WIWI-103484]

Coordinators: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
WT 25/26	25000111	Statistics and Epidemics	2 SWS	Seminar / 🗣	Bracher, Nemcova
WT 25/26	2500012		2 SWS	Seminar / 🗣	Grothe, Liu
WT 25/26	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner, Pohle
ST 2026	2500012	Making and Evaluating Predictions	2 SWS	Seminar	Schienle, Allen, Zhang
ST 2026	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Bracher, Buse, Koster, Rüter, Leimenstoll, Renner
ST 2026	2550561	Fortgeschrittene Themen zu Statistik, Datenanalyse und maschinellem Lernen (Master)	2 SWS	Seminar / 🗣	Grothe, Liu
Exams					
WT 25/26	7900241	Seminar in Statistics B (Master)			Grothe
WT 25/26	7900254	Topics in Econometrics			Schienle, Bracher

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Additional Information
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Statistics and Epidemics

25000111, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Motivation

Infectious disease epidemiology gives rise to a large variety of real-time data streams. During the COVID-19 pandemic, the interpretation and statistical analysis of these data has proven crucial, but also highly challenging. In this seminar, students will get to know central concepts of infectious disease surveillance and modelling from a statistical perspective. Following an overview of various aspects in the form of blocked lectures, students will choose a more specific topic for their seminar thesis.

Learning Goals

Students develop an understanding of central modeling tasks and methods, including

- estimation of reproductive numbers
- compartment models of disease spread
- nowcasting and short-term forecasting of disease spread
- detection of outbreaks
- diagnostic testing

Moreover, they get to know various data types commonly used in the analysis of disease spread.

Logistics

The project seminar is worth 4.5 credit points (Leistungspunkte). There will be three blocked lectures (approx. 135 minutes each) in the beginning of the lecture period. For the various topics covered, subjects for seminar theses will be proposed (and students are allowed to propose their own topics). Towards the end of the semester, students present their progress on the chosen topics to the group. Grades will be based on this presentation (25%) and the final report (75%).

Organizational issues

Prerequisites

Students should have a very good working knowledge of statistics, including proficiency in a programming language for applied data analysis. The lecture VWL3 Introduction to Econometrics is a prerequisite for the project seminar. Most available software in the field is in R, but in principle Python can be used as well. Advanced knowledge of biology, medicine or epidemiology is not required.

Application Procedure

Please submit a transcript of records as well as a short letter of motivation (roughly 200 words) via WIWI-Portal: https://portal.wiwi.kit.edu/ys/8902

Application time frame: September 5th, 2025 to October, 31th, 2025.

V Topics in Econometrics

2521310, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)

Organizational issues

Wöchentliche Veranstaltung, Donnerstags 13:00-14:30 Uhr in B17 - R320

V Making and Evaluating Predictions

2500012, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Content

A key goal of statistics and data science is to make predictions. Good predictions are important for decision-making, allowing us to balance risks and mitigate the impacts of potentially damaging events. In this seminar, we will study theoretical questions regarding the evaluation of predictions, such as “What does it mean for a prediction to be good?”, before introducing statistical and machine learning methods to generate both point-valued and probabilistic predictions. We will discuss applications to economics, meteorology, and energy forecasting.

Format: The course will start with a short block course at the beginning of the lecture period. Evaluation will be based on a seminar thesis, which students are required to hand in at the end of the lecture period, and a short presentation. The presentations will also take place towards the end of the lecture period.

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

V

Advanced Topics in Econometrics

2521310, SS 2026, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Organizational issues
wöchentlich, Donnerstags 11:00-12:30, B17, R320

T 7.353 Module component: Seminar in Transportation [T-BGU-100014]

Coordinators: Prof. Dr.-Ing. Martin Kagerbauer
Prof. Dr.-Ing. Peter Vortisch

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6232903	Seminar Transport Studies	2 SWS	Seminar /	Vortisch, Kagerbauer
ST 2026	6232903	Seminar on Transportation Systems	2 SWS	Seminar /	Vortisch, Kagerbauer
Exams					
WT 25/26	8245100014	Seminar in Transportation			Vortisch, Chlond

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
seminar paper, appr. 10 pages, and presentation, appr. 10 min.

Prerequisites
The seminar is subject to approval. The approval must be applied for at the examination secretariat of the Department of Economics and Management. The application for admission is made via the corresponding engineering seminar form on the department's download page.

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.354 Module component: Seminar on Modeling and Simulation in Transportation [T-BGU-112552]

Coordinators: Prof. Dr.-Ing. Martin Kagerbauer
Prof. Dr.-Ing. Peter Vortisch

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	3 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	6232907	Seminar Modeling and Simulation in Transportation	2 SWS	Seminar / 🗣	Vortisch, Kagerbauer, Mitarbeiter/innen
Exams					
WT 25/26	8245112552	Seminar on Modeling and Simulation in Transportation			Vortisch, Kagerbauer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
work on a practical problem in the area of traffic engineering, traffic simulation or in the area of microscopic travel demand modeling:

final report, appr. 5 pages, and presentation, appr. 10 min.

Prerequisites
The seminar is subject to approval if it is to be credited in the seminar module. The approval must be applied for at the examination secretariat of the Department of Economics and Management. The application for admission is made via the corresponding engineering seminar form on the department's download page.

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.355 Module component: Seminar on Transport Policy [T-BGU-114772]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	3 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	6232908	Seminar on Transport Policy	2 SWS	Seminar / 🗣	Vortisch
Exams					
WT 25/26	8245114772	Seminar on Transport Policy			Vortisch

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
engagement and quality of contributions to debates in the seminar meetings;

final presentation, appr. 15 min.

Prerequisites
none

Recommendations
The seminar is aimed at students who have already acquired initial knowledge in the field of mobility and infrastructure. In addition, an interest in transport policy and debating is desirable.

Additional Information
new selection option offered as from winter term 2025/26

The seminar requires a minimum number of 3 and a maximum number of 10 participants. Please register by e-mail via the person listed as the contact person for the course. Places will be allocated according to the progress of your studies.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Seminar on Transport Policy

6232908, WS 25/26, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
see German version

Organizational issues
Anmeldung erforderlich - Die Anmeldung erfolgt per E-Mail an christian.klinkhardt@kit.edu bis einschließlich dem ersten Tag der Vorlesungszeit. Die Lehrveranstaltung hat eine Mindestzahl von 3 und eine Höchstzahl von 10 Teilnehmenden. Die Plätze werden unter Berücksichtigung des Studienfortschritts vergeben.

Der erste Termin findet am 11.11.2025 statt.

T 7.356 Module component: Seminar Production Technology [T-MACH-109062]

Coordinators: Prof. Dr.-Ing. Jürgen Fleischer
Prof. Dr.-Ing. Gisela Lanza
Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Courses					
ST 2026	2149665	Seminar Production Technology	1 SWS	Seminar / 🗣	Fleischer, Lanza, Schulze, Zanger
Exams					
WT 25/26	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze, Zanger

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Additional Information
The course is offered in German.

The specific topics are published on the homepage of the wbk Institute of Production Science.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Seminar Production Technology

2149665, SS 2026, 1 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
In course of the seminar Production Technology current issues of the wbk main fields of research "Manufacturing and Materials Technology", "Machines, Equipment and Process Automation" as well as "Production Systems" are discussed.

The specific topics are published on the homepage of the wbk Institute of Production Science.

Learning Outcomes:

The students …

- are in a position to independently handle current, research-based tasks according to scientific criteria.
- are able to research, analyze, abstract and critically review the information.
- can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues
siehe http://www.wbk.kit.edu/seminare.php

T 7.357 Module component: Seminar: Commercial and Corporate Law in the IT Industry [T-INFO-111405]

Coordinators: Dr. Georg Nolte
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2400165	Seminar Commercial and Corporate Law in Information Technology	2 SWS	Seminar / 🖳	Nolte
Exams					
WT 25/26	7500182	Seminar: Legal Studies II			Boehm, Raabe, Melullis
WT 25/26	7500310	Seminar: Commercial and Corporate Law in the IT Industry			Matz

Legend: 🖳 Online, 🖳 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.358 Module component: Seminar: IT- Security Law [T-INFO-111404]

Coordinators: Martin Schallbruch
Organisation: KIT Department of Informatics
Part of: M-INFO-106754 - Public Economic and Technology Law

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2424389	Seminar "IT security law"	2 SWS	Seminar / 🗣	Schallbruch
Exams					
WT 25/26	7500249	Seminar: IT- Security Law			Zufall

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.359 Module component: Seminar: Legal Studies Master I [T-INFO-115025]

Coordinators: Professorenschaft des Fachbereichs Recht
Organisation: KIT Department of Informatics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	3 CP	graded	1

Courses					
WT 25/26	2400014	Current Issues in Patent Law	2 SWS	Seminar / 🗣	Melullis
WT 25/26	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / 🗣	Reussner, Raabe, Werner, Müller-Quade
WT 25/26	2400125	Security and Privacy Awareness	2 SWS	Seminar / 🧩	Seidel-Saul, Volkamer, Boehm, Ballreich, Sikra, Veit
WT 25/26	2400165	Seminar Commercial and Corporate Law in Information Technology	2 SWS	Seminar / 💻	Nolte
WT 25/26	2400177	Human vs. Machine: (Un-)Biased Legal Decision-Making?	2 SWS	Seminar / 🗣	Holzhausen
WT 25/26	2400184	EU Digital Regulatory Framework	2 SWS	Seminar / 🗣	Zufall
WT 25/26	2400203	EU Fundamental Rights and EU Economic Law in Smart Cities	2 SWS	Seminar / 🗣	Kasper-Schöniger
WT 25/26	2424186	Seminar Patent Law	2 SWS	Seminar / 🗣	Dammler
WT 25/26	2424389	Seminar "IT security law"	2 SWS	Seminar / 🗣	Schallbruch
ST 2026	2400005	Governance, Risk & Compliance	2 SWS	Seminar / 🗣	Herzig, Siddiq
ST 2026	2400078	Intelligente Chatbots und Recht	2 SWS	Seminar / 🗣	Raabe
ST 2026	2400171	Regulating AI: from ethics to law	2 SWS	Seminar / 🗣	Gil Gasiola
ST 2026	2400177	Designing Data Governance of Digital Systems	2 SWS	Seminar / 🗣	Pathak
ST 2026	2400207	(Generative) AI and Law	2 SWS	Seminar / 🧩	Boehm, Turkovic-Popovski
ST 2026	2400225	Rechtlicher Rahmen für Künstliche Intelligenz	2 SWS	Seminar / 🗣	Sattler
ST 2026	24820	Current Issues in Patent Law	2 SWS	Seminar / 🗣	Melullis
Exams					
WT 25/26	7500249	Seminar: IT- Security Law			Zufall
WT 25/26	7500298	Seminar: Law and Legal Studies			Zufall
WT 25/26	7500310	Seminar: Commercial and Corporate Law in the IT Industry			Matz
ST 2026	7500268	Seminar aus Rechtswissenschaften Bachelor und Master I (LS Zivilrecht u. LS Prof. F. Boehm)			Boehm, Melullis, Raabe, Sattler
ST 2026	7500300	Seminar aus Rechtswissenschaften Master II (LS Zivilrecht u. LS Prof. F. Boehm)			Boehm, Melullis, Raabe, Sattler
ST 2026	7500341	Seminar: Legal Studies Bachelor and Master I (LS Öffentliches Recht und Informatik)			Zufall
ST 2026	7500365	Seminar: Legal Studies Master II (Public Law and Computer Science)			Zufall

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from courses related to this module component:

V Security and Privacy Awareness

2400125, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Important notes:

- The seminar language is English. This means that English is the standard for the presentation and the seminar paper, and German is only permitted for the paper after consultation with the supervisor, for example, if the topic of the thesis requires it.
- The seminar is only for MASTER students (or Mastervorzug)
- The link to enrol is for every student, regardless of the study background

Topics:

The advertised topics can be found in the wiwi portal.

V **Human vs. Machine: (Un-)Biased Legal Decision-Making?** **Seminar (S)**
2400177, WS 25/26, 2 SWS, Language: English, Open in study portal **On-Site**

Content
This seminar provides an overview of the foundational principles of behavioral economics and their relevance to public law. Special attention is given to (biased) decision-making, both from a substantive and procedural perspective. Students will explore how regulation should be designed to account for cognitive biases and achieve intended policy outcomes. In addition, the seminar will address the role of automated decision-making systems - examining how such systems are influenced by, and may also reinforce or mitigate, behavioral biases.

The seminar will cover the following topics:

- Introduction to (behavioral) economic theory and its application to law
- Cognitive biases and their impact on (public) decision-making
- Different types of regulation in light of behavioral insights
- Implications for automated decision-making systems
- The role of human biases in the AI Act

Algorithmic decision-making is often treated as a black box—something that should not be permitted to make decisions in legal contexts. In response, Article 14 of the EU AI Act requires high-risk AI systems to be designed in such a way that they can be effectively overseen by natural persons. This human-in-the-loop requirement stems, among other things, from the perception that AI systems operate ambiguously and produce decisions that are not fully comprehensible.

However, treating humans in comparison as fundamentally transparent or fully rational decision-makers is equally naïve. Understanding how people actually behave—not just how they should behave—is essential for designing effective, fair, and legitimate legal systems. Traditional legal research often assumes rational actors, yet behavioral research shows that cognitive biases, heuristics, and emotional influences shape the decisions of both citizens and public officials.

This seminar addresses that gap by equipping students with behavioral insights to critically assess and improve legal and administrative. A particular focus is placed on how human biases are already embedded in the data underlying automated decision-making systems, potentially reproducing or amplifying unfairness. At the same time, students will explore how such systems can be intentionally designed to mitigate behavioral distortions and support better decision-making.

Organizational issues
1. Termin: 13.11.2025 9:00-15:00 Uhr (Seminarrum Nr. 313, bei uns am Institut)
2. Termin: 05.02.2025 9:00- 16:00 Uhr (Seminarrum Nr. 313, bei uns am Institut).

V **EU Digital Regulatory Framework** **Seminar (S)**
2400184, WS 25/26, 2 SWS, Language: English, Open in study portal **On-Site**

Content
This class aims to provide an overview on the legal instruments forming the EU digital regulatory framework. Following its Digital Single Market Strategy, the EU has set up a new strategic programme for a "Digital Decade". Existing regulations like the General Data Protection Regulation (GDPR), or the E-Commerce Directive, are being complemented by a variety of new instruments that aim to set binding rules on online markets, to regulate data flows in various ways, but also to pioneer a legal framework on AI. Prominent instruments include the new AI Act, the Digital Services Act (DSA) and Digital Markets Act (DMA), the Data Act, Data Governance Act, or Open Data Directive.

The class will provide an overview on the existing framework: Which regulations and directives are relevant? How do they apply and interact which each other in a broader context?

Another objective is to provide students with the ability to read these legal instruments: How to access regulatory instruments that often have more than 100 pages (without having to read every single sentence)? How to gain a comprehensive, high-level understanding of the instrument? How to identify parts relevant to a particular legal problem?

The class will start with an introduction into EU law and regulatory instruments in general. Concrete guidance on reading, analysing and working with legal instruments in English will be given. Based on these instructions, students will be assigned legal instruments to present in the final unit along with a two-pages report.

Grades will be assigned based on the quality of these presentations and the report, as well as participation in the discussion (presentation: 40 %, two-pages report: 40 %, discussion: 20 %).

Organizational issues
WS 2024/25

Hierbei handelt es sich NICHT um eine Pro-Seminar, sondern um ein Seminar (aus Rechtswissenschaften).

Anmeldungen für das Seminar bitte NUR! über das WiWi-Portal!

***Für die Prüfung bitte NUR über CAS (Campus-Portal) anmelden!**

*Erläuterung: nach der für die Teilnahme am Seminar verbindlichen Teilnahme an der Einführungsveranstaltung bitte Anmeldung über das Campus-System (notwendig für die Erfassung der Note der Seminararbeit).

V

EU Fundamental Rights and EU Economic Law in Smart Cities

2400203, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This seminar is designed to instruct students in recognising legal questions as they relate to an interdisciplinary topic, classifying such questions along the hierarchy of norms, and solving them in a convincing argumentative manner. By focusing on „EU Fundamental Rights and EU Economic Law in Smart Cities“, we will discuss the influence of large cities and metropolises on their more rural periphery. Possible aspects of discussion are, inter alia,

- democratic legitimacy questions in such cases,
- elements of structural support/aid
- approaches to implement technical innovations in smart cities,
- questions relating to the development of (large) infrastructures,
- aspects of the efficient use of infrastructure, and
- environmental aspects.

Particularly in times of increasingly comprehensive European regulation, European standards and regulatory approaches will be at the heart of the discussion while not neglecting their interplay with national regulation. Learning in more depth about the interplay of European and national regulation will further accustom participating students to discuss relevant legal questions across (legal) sectors and with a broader view on regulations' effects.

Conducting the seminar in English intends to facilitate students to link their ideas and arguments to current European and international debates.

Organizational issues
This is a seminar (not a pro-seminar).

Registrations only via Wiwi-Portal.

Kick-off-meeting WS 2025/26:

Friday, 7th November 2025, 14:00 - 18:00 h (online)

(Mr. Kasper-Schöniger will send you the according link via ILIAS a few days before the kick-off date.)

Presentations:

- Friday, 6th February 2026, 09:00 - 18:00 h

and

- Saturday, 7th February 2026, 10:00 - 16:00

Place: see section "TERMINE" (below).

V

Regulating AI: from ethics to law

2400171, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This seminar will provide an overview of technology regulation, with a particular focus on the regulation of AI systems. Following an introduction to the different forms of regulation, students will explore the various regulatory instruments in light of the key principles of AI, such as

- fairness / non-discrimination,
- transparency / explainability,
- non-maleficence,
- privacy / data protection,
- sustentability
- security / safety, and
- accountability.

This will enable them to discuss how these principles and rules can be applied in real-world scenarios.

Organizational issues
Please register for the seminar ONLY via the WiWi-Portal!
Please register for the exam ONLY via CAS (Campus-Portal)!*

*ExplanationAfter attending the introductory event, which is mandatory for participation in the seminar, please register via the campus system (necessary for recording the grade of the seminar paper).

Block Seminar in Summer term 2026:

- **Wednesday, 22th April 2026, 09:00 - 13:00 h;**
- **Wednesday, 22th July 2026, 09:00 - 13:00 h.**

Room: each seminar takes place in room no. 313 (building 07.08) .

V

Designing Data Governance of Digital Systems

2400177, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The latest regulations in the digital sector at EU level represent a highly topical and important regulatory instrument with enormous practical relevance for students of computer science and business informatics. The seminar not only enables students to acquire important knowledge in this area, but also to apply it specifically to the governance of digital systems and to learn the practical design of digital systems against the background of legal framework conditions.

Organizational issues
***Please register for the exam ONLY via CAS (Campus-Portal)!**

***Explanation:after attending the introductory event,** which is mandatory for participation in the seminar**, please register via the campus system** (necessary for recording the grade of the seminar paper).

Due to the minimum number of text characters that can be used, please check ILIAS and the WiWi portal for details such as dates and location. Thank you.

T 7.360 Module component: Seminar: Legal Studies Master II [T-INFO-115026]

Coordinators: Professorenschaft des Fachbereichs Recht
Organisation: KIT Department of Informatics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Version
Examination of another type	3 CP	graded	1

Courses					
WT 25/26	2400014	Current Issues in Patent Law	2 SWS	Seminar / 🗣	Melullis
WT 25/26	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / 🗣	Reussner, Raabe, Werner, Müller-Quade
WT 25/26	2400125	Security and Privacy Awareness	2 SWS	Seminar / 🧩	Seidel-Saul, Volkamer, Boehm, Ballreich, Sikra, Veit
WT 25/26	2400165	Seminar Commercial and Corporate Law in Information Technology	2 SWS	Seminar / 💻	Nolte
WT 25/26	2400177	Human vs. Machine: (Un-)Biased Legal Decision-Making?	2 SWS	Seminar / 🗣	Holzhausen
WT 25/26	2400184	EU Digital Regulatory Framework	2 SWS	Seminar / 🗣	Zufall
WT 25/26	2400203	EU Fundamental Rights and EU Economic Law in Smart Cities	2 SWS	Seminar / 🗣	Kasper-Schöniger
WT 25/26	2424186	Seminar Patent Law	2 SWS	Seminar / 🗣	Dammler
WT 25/26	2424389	Seminar "IT security law"	2 SWS	Seminar / 🗣	Schallbruch
ST 2026	2400005	Governance, Risk & Compliance	2 SWS	Seminar / 🗣	Herzig, Siddiq
ST 2026	2400078	Intelligente Chatbots und Recht	2 SWS	Seminar / 🗣	Raabe
ST 2026	2400171	Regulating AI: from ethics to law	2 SWS	Seminar / 🗣	Gil Gasiola
ST 2026	2400177	Designing Data Governance of Digital Systems	2 SWS	Seminar / 🗣	Pathak
ST 2026	2400207	(Generative) AI and Law	2 SWS	Seminar / 🧩	Boehm, Turkovic-Popovski
ST 2026	2400225	Rechtlicher Rahmen für Künstliche Intelligenz	2 SWS	Seminar / 🗣	Sattler
ST 2026	24820	Current Issues in Patent Law	2 SWS	Seminar / 🗣	Melullis
Exams					
WT 25/26	7500249	Seminar: IT- Security Law			Zufall
WT 25/26	7500298	Seminar: Law and Legal Studies			Zufall
WT 25/26	7500310	Seminar: Commercial and Corporate Law in the IT Industry			Matz
ST 2026	7500300	Seminar aus Rechtswissenschaften Master II (LS Zivilrecht u. LS Prof. F. Boehm)			Boehm, Melullis, Raabe, Sattler
ST 2026	7500341	Seminar: Legal Studies Bachelor and Master I (LS Öffentliches Recht und Informatik)			Zufall
ST 2026	7500365	Seminar: Legal Studies Master II (Public Law and Computer Science)			Zufall

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from courses related to this module component:

V **Security and Privacy Awareness**
2400125, WS 25/26, 2 SWS, Language: German/English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Important notes:

- The seminar language is English. This means that English is the standard for the presentation and the seminar paper, and German is only permitted for the paper after consultation with the supervisor, for example, if the topic of the thesis requires it.
- The seminar is only for MASTER students (or Mastervorzug)
- The link to enrol is for every student, regardless of the study background

Topics:

The advertised topics can be found in the wiwi portal.

V **Human vs. Machine: (Un-)Biased Legal Decision-Making?** **Seminar (S)**
2400177, WS 25/26, 2 SWS, Language: English, Open in study portal **On-Site**

Content
This seminar provides an overview of the foundational principles of behavioral economics and their relevance to public law. Special attention is given to (biased) decision-making, both from a substantive and procedural perspective. Students will explore how regulation should be designed to account for cognitive biases and achieve intended policy outcomes. In addition, the seminar will address the role of automated decision-making systems - examining how such systems are influenced by, and may also reinforce or mitigate, behavioral biases.

The seminar will cover the following topics:

- Introduction to (behavioral) economic theory and its application to law
- Cognitive biases and their impact on (public) decision-making
- Different types of regulation in light of behavioral insights
- Implications for automated decision-making systems
- The role of human biases in the AI Act

Algorithmic decision-making is often treated as a black box—something that should not be permitted to make decisions in legal contexts. In response, Article 14 of the EU AI Act requires high-risk AI systems to be designed in such a way that they can be effectively overseen by natural persons. This human-in-the-loop requirement stems, among other things, from the perception that AI systems operate ambiguously and produce decisions that are not fully comprehensible.

However, treating humans in comparison as fundamentally transparent or fully rational decision-makers is equally naïve. Understanding how people actually behave—not just how they should behave—is essential for designing effective, fair, and legitimate legal systems. Traditional legal research often assumes rational actors, yet behavioral research shows that cognitive biases, heuristics, and emotional influences shape the decisions of both citizens and public officials.

This seminar addresses that gap by equipping students with behavioral insights to critically assess and improve legal and administrative. A particular focus is placed on how human biases are already embedded in the data underlying automated decision-making systems, potentially reproducing or amplifying unfairness. At the same time, students will explore how such systems can be intentionally designed to mitigate behavioral distortions and support better decision-making.

Organizational issues
1. Termin: 13.11.2025 9:00-15:00 Uhr (Seminarrum Nr. 313, bei uns am Institut)

2. Termin: 05.02.2025 9:00- 16:00 Uhr (Seminarrum Nr. 313, bei uns am Institut).

V **EU Digital Regulatory Framework** **Seminar (S)**
2400184, WS 25/26, 2 SWS, Language: English, Open in study portal **On-Site**

Content
This class aims to provide an overview on the legal instruments forming the EU digital regulatory framework. Following its Digital Single Market Strategy, the EU has set up a new strategic programme for a "Digital Decade". Existing regulations like the General Data Protection Regulation (GDPR), or the E-Commerce Directive, are being complemented by a variety of new instruments that aim to set binding rules on online markets, to regulate data flows in various ways, but also to pioneer a legal framework on AI. Prominent instruments include the new AI Act, the Digital Services Act (DSA) and Digital Markets Act (DMA), the Data Act, Data Governance Act, or Open Data Directive.

The class will provide an overview on the existing framework: Which regulations and directives are relevant? How do they apply and interact which each other in a broader context?

Another objective is to provide students with the ability to read these legal instruments: How to access regulatory instruments that often have more than 100 pages (without having to read every single sentence)? How to gain a comprehensive, high-level understanding of the instrument? How to identify parts relevant to a particular legal problem?

The class will start with an introduction into EU law and regulatory instruments in general. Concrete guidance on reading, analysing and working with legal instruments in English will be given. Based on these instructions, students will be assigned legal instruments to present in the final unit along with a two-pages report.

Grades will be assigned based on the quality of these presentations and the report, as well as participation in the discussion (presentation: 40 %, two-pages report: 40 %, discussion: 20 %).

Organizational issues
WS 2024/25

Hierbei handelt es sich NICHT um eine Pro-Seminar, sondern um ein Seminar (aus Rechtswissenschaften).

Anmeldungen für das Seminar bitte NUR! über das WiWi-Portal!

***Für die Prüfung bitte NUR über CAS (Campus-Portal) anmelden!**

*Erläuterung: nach der für die Teilnahme am Seminar verbindlichen Teilnahme an der Einführungsveranstaltung bitte Anmeldung über das Campus-System (notwendig für die Erfassung der Note der Seminararbeit).

V

EU Fundamental Rights and EU Economic Law in Smart Cities

2400203, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This seminar is designed to instruct students in recognising legal questions as they relate to an interdisciplinary topic, classifying such questions along the hierarchy of norms, and solving them in a convincing argumentative manner. By focusing on „EU Fundamental Rights and EU Economic Law in Smart Cities“, we will discuss the influence of large cities and metropolises on their more rural periphery. Possible aspects of discussion are, inter alia,

- democratic legitimacy questions in such cases,
- elements of structural support/aid
- approaches to implement technical innovations in smart cities,
- questions relating to the development of (large) infrastructures,
- aspects of the efficient use of infrastructure, and
- environmental aspects.

Particularly in times of increasingly comprehensive European regulation, European standards and regulatory approaches will be at the heart of the discussion while not neglecting their interplay with national regulation. Learning in more depth about the interplay of European and national regulation will further accustom participating students to discuss relevant legal questions across (legal) sectors and with a broader view on regulations' effects.

Conducting the seminar in English intends to facilitate students to link their ideas and arguments to current European and international debates.

Organizational issues
This is a seminar (not a pro-seminar).

Registrations only via Wiwi-Portal.

Kick-off-meeting WS 2025/26:

Friday, 7th November 2025, 14:00 - 18:00 h (online)

(Mr. Kasper-Schöniger will send you the according link via ILIAS a few days before the kick-off date.)

Presentations:

- Friday, 6th February 2026, 09:00 - 18:00 h

and

- Saturday, 7th February 2026, 10:00 - 16:00

Place: see section "TERMINE" (below).

V

Regulating AI: from ethics to law

2400171, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This seminar will provide an overview of technology regulation, with a particular focus on the regulation of AI systems. Following an introduction to the different forms of regulation, students will explore the various regulatory instruments in light of the key principles of AI, such as

- fairness / non-discrimination,
- transparency / explainability,
- non-maleficence,
- privacy / data protection,
- sustentability
- security / safety, and
- accountability.

This will enable them to discuss how these principles and rules can be applied in real-world scenarios.

Organizational issues
Please register for the seminar ONLY via the WiWi-Portal!
Please register for the exam ONLY via CAS (Campus-Portal)!*

*ExplanationAfter attending the introductory event, which is mandatory for participation in the seminar, please register via the campus system (necessary for recording the grade of the seminar paper).

Block Seminar in Summer term 2026:

- **Wednesday, 22th April 2026, 09:00 - 13:00 h;**
- **Wednesday, 22th July 2026, 09:00 - 13:00 h.**

Room: each seminar takes place in room no. 313 (building 07.08) .

V

Designing Data Governance of Digital Systems

2400177, SS 2026, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The latest regulations in the digital sector at EU level represent a highly topical and important regulatory instrument with enormous practical relevance for students of computer science and business informatics. The seminar not only enables students to acquire important knowledge in this area, but also to apply it specifically to the governance of digital systems and to learn the practical design of digital systems against the background of legal framework conditions.

Organizational issues
***Please register for the exam ONLY via CAS (Campus-Portal)!**

***Explanation:after attending the introductory event,** which is mandatory for participation in the seminar**, please register via the campus system** (necessary for recording the grade of the seminar paper).

Due to the minimum number of text characters that can be used, please check ILIAS and the WiWi portal for details such as dates and location. Thank you.

T 7.361 Module component: Service Design Thinking [T-WIWI-102849]

Coordinators: Prof. Dr. Gerhard Satzger
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101503 - Service Design Thinking

Type	Credits	Grading	Term offered	Version
Examination of another type	9 CP	graded	Irregular	5

Courses					
WT 25/26	2595600	Service Design Thinking	2 SWS	Lecture / 🗣	Osaro, Terzidis, Feldmann
ST 2026	2595600	Service Design Thinking	2 SWS	Lecture / 🗣	Osaro, Terzidis, Feldmann

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success is assessed in the form of an alternative exam assessment which consists of a case study, workshops, and a final presentation. The weighting of these components for the grade will be announced at the beginning of the course.

Prerequisites
None

Recommendations
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

Additional Information
Due to practical project work as a component of the program, access is limited. The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June. For more information on the application process and the program itself are provided in the module component description and the program's website (https://sdtkarlsruhe.de/). Furthermore, the lecturers provide an information event for applicants every year in May.

Below you will find excerpts from courses related to this module component:

V Service Design Thinking

2595600, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The Service Design Thinking program is much more than a normal course. Through this program, we provide the knowledge and skills that true innovators need. In this context, we train our participants in the human-centric innovation approach “Design Thinking”. In addition, participants work in small international and interdisciplinary teams on real innovation challenges from practice.

The teams are made up of students from KIT and another university from the global SUGAR network. These include, for example, the Hasso Plattner Institute in Potsdam, Trinity College in Dublin and the University of Science and Technology of China. The program includes visits to international events of the SUGAR Network, which are usually held in places known for their high level of innovation. At these events, our participants present their (interim) results to a large audience consisting of employees from the partner companies and the universities involved.

What students will learn:

- A comprehensive understanding of the globally recognized innovation approach “Design Thinking” as introduced and promoted by the Stanford University
- Development of new, creative solutions through extensive need finding, in particular with regard to the relevant service users
- to develop prototypes of the collected ideas early and independently, to test them and improve them iteratively, thereby solving the issue defined by the partner company
- to communicate, present and network in an interdisciplinary and international environment
- to apply the learned approach in the context of a real innovation project provided by a practical partner.

Course phases (roughly 4 weeks each):

- **Kick off:**
  Learning the basic method elements by solving an exercise challenge. Participation in the Global Kick-Off of the SUGAR Network consisting of method workshops, working on team challenges, networking with other universities and forming project teams for the challenges of the practical partners.
- **Design Space Exploration**:
  Exploring the problem space by questioning the given innovation challenge from practice. Familiarization with the topic area of the respective challenge. Gathering first impressions of the requirements and needs of people related to the problem.
- **Critical Function Prototype:**
  Building an intensive understanding of the needs of the target group of the respective challenge. Deriving critical functions from the customer's perspective that could help solve the overall problem. Building prototypes for the critical functions and testing them in real customer situations.
- **Dark Horse Prototype**:
  Reversal of assumptions and experiences made so far. The goal is to develop radically new and unconventional ideas. Implementation of the ideas into simple prototypes and subsequent testing.
- **Funky Prototype**:
  Integration of the individual successfully tested functions from the critical function and dark horse phase into solution concepts. These are also tested and further developed.
- **Functional Prototype**:
  Selection of successful funky prototypes and development of these towards high-resolution prototypes. The final solution approach for the project is written down in detail and feedback is obtained.
- **Final Prototype**:
  Implementing the final prototype and presenting it to the practical partner as well as the SUGAR Network.

Organizational issues
Bei der Vorlesung handelt es sich um eine zweisemestrige Veranstaltung, die jährlich im September startet.

Literature

- Design Thinking: Das Handbuch; Falk Uebernickel, Walter Brenner, Therese Naef, Britta Pukall, Bernhard Schindlholzer
- The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems; Michael Lewrick, Patrick Link, Larry Leifer
- The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods; Michael Lewrick, Patrick Link, Larry Leifer
- Frame Innovation: Create New Thinking by Design (Design Thinking, Design Theory); Kees Dorst

V **Service Design Thinking** **Lecture (V)**
2595600, SS 2026, 2 SWS, Language: English, Open in study portal **On-Site**

Content

The Service Design Thinking program is much more than a normal course. Through this program, we provide the knowledge and skills that true innovators need. In this context, we train our participants in the human-centric innovation approach "Design Thinking". In addition, participants work in small international and interdisciplinary teams on real innovation challenges from practice.

The teams are made up of students from KIT and another university from the global SUGAR network. These include, for example, the Hasso Plattner Institute in Potsdam, Trinity College in Dublin and the University of Science and Technology of China. The program includes visits to international events of the SUGAR Network, which are usually held in places known for their high level of innovation. At these events, our participants present their (interim) results to a large audience consisting of employees from the partner companies and the universities involved.

What students will learn:

- A comprehensive understanding of the globally recognized innovation approach "Design Thinking" as introduced and promoted by the Stanford University
- Development of new, creative solutions through extensive need finding, in particular with regard to the relevant service users
- to develop prototypes of the collected ideas early and independently, to test them and improve them iteratively, thereby solving the issue defined by the partner company
- to communicate, present and network in an interdisciplinary and international environment
- to apply the learned approach in the context of a real innovation project provided by a practical partner.

Course phases (roughly 4 weeks each):

- **Kick off:**
  Learning the basic method elements by solving an exercise challenge. Participation in the Global Kick-Off of the SUGAR Network consisting of method workshops, working on team challenges, networking with other universities and forming project teams for the challenges of the practical partners.
- **Design Space Exploration**:
  Exploring the problem space by questioning the given innovation challenge from practice. Familiarization with the topic area of the respective challenge. Gathering first impressions of the requirements and needs of people related to the problem.
- **Critical Function Prototype:**
  Building an intensive understanding of the needs of the target group of the respective challenge. Deriving critical functions from the customer's perspective that could help solve the overall problem. Building prototypes for the critical functions and testing them in real customer situations.
- **Dark Horse Prototype**:
  Reversal of assumptions and experiences made so far. The goal is to develop radically new and unconventional ideas. Implementation of the ideas into simple prototypes and subsequent testing.
- **Funky Prototype**:
  Integration of the individual successfully tested functions from the critical function and dark horse phase into solution concepts. These are also tested and further developed.
- **Functional Prototype**:
  Selection of successful funky prototypes and development of these towards high-resolution prototypes. The final solution approach for the project is written down in detail and feedback is obtained.
- **Final Prototype**:
  Implementing the final prototype and presenting it to the practical partner as well as the SUGAR Network.

Organizational issues

Bei der Vorlesung handelt es sich um eine zweisemestrige Veranstaltung, die jährlich im September startet.

Literature

- Design Thinking: Das Handbuch; Falk Uebernickel, Walter Brenner, Therese Naef, Britta Pukall, Bernhard Schindlholzer
- The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems; Michael Lewrick, Patrick Link, Larry Leifer
- The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods; Michael Lewrick, Patrick Link, Larry Leifer
- Frame Innovation: Create New Thinking by Design (Design Thinking, Design Theory); Kees Dorst

T 7.362 Module component: Service Operations and Cyber Security [T-WIWI-114109]

Coordinators: Esther Mohr
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-102805 - Service Operations
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each summer term	1

Exams			
ST 2026	00030	Service Operations and Cyber Security	Nickel

Assessment
The assessment is carried out as a single examination of another type that combines two mandatory components:

1. written dissertation
2. oral final exam (duration ≈ 30 – 40 minutes)

Both components are integrated into one overall assessment, which reflects the overall impression of the combined performance.

Further details on the concrete design (e.g., grading criteria) will be announced during the lecture.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-102872 - Challenges in Supply Chain Management must not have been started.

Recommendations
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Additional Information
The number of course participants is limited to 12 due to the collaborative work in project teams. As a result of this limitation, registration is required before the course begins. Further information can be found on the course's website.
The event takes place irregularly. The planned lectures and courses for the next three years will be announced online.

T 7.363 Module component: SIL Entrepreneurship Emphasis [T-WIWI-110287]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2500002	SIL Entrepreneurship Emphasis	4 SWS	Seminar	Terzidis
Exams					
WT 25/26	7900041	SIL Entrepreneurship Emphasis			Terzidis
ST 2026	7900302	SIL Entrepreneurship Emphasis			Terzidis

Assessment
Alternative exam assessment (§4(2), 3 SPO). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar. In addition, smaller, ungraded tasks are provided in the course to monitor progress.

Prerequisites
None

Recommendations
None

Workload
90 hours

T 7.364 Module component: SIL Entrepreneurship Project [T-WIWI-110166]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each winter term	1

Courses					
WT 25/26	2545082	SIL Entrepreneurship Project	4 SWS	Seminar	Terzidis
Exams					
WT 25/26	7900037	SIL Entrepreneurship Project			Terzidis

Assessment
Success is assessed in the form of an alternative exam assessment. The grade results from the evaluation of two seminar papers. Further details will be provided at the beginning of the course. The points system for the assessment of the two seminar papers is determined by the lecturer of the course. It will be announced at the beginning of the course.

Prerequisites
None

Recommendations
None

Workload
90 hours

T 7.365 Module component: Simulation Game in Energy Economics [T-WIWI-108016]

Coordinators: Dr. Massimo Genoese
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading	Term offered	Version
Examination of another type	3,5 CP	graded	Each summer term	2

Courses					
ST 2026	2581025	Simulation Game in Energy Economics	3 SWS	Lecture / Practice / 🗣	Genoese, Zimmermann
Exams					
ST 2026	7981025	Simulation Game in Energy Economics			Fichtner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Prerequisites
None

Recommendations
Visiting the course "Introduction to Energy Economics"

Additional Information
The number of participants is limited.
There is a registration procedure via CAS followed by a selection of the participants.

Below you will find excerpts from courses related to this module component:

V Simulation Game in Energy Economics

2581025, SS 2026, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

Assessment: presentation and written summary

Prerequisites: Basics in Energy economics ad markets are advantageous.

Organizational issues
CIP-Pool West, Raum 102, Geb. 06.41 - siehe Institutsaushang

Literature
Weiterführende Literatur:

Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

T 7.366 Module component: Simulation of Nanoscale Systems, without Seminar [T-PHYS-102504]

Coordinators: Prof. Dr. Wolfgang Wenzel
Organisation: KIT Department of Physics
Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	6 CP	graded	Irregular	1

Prerequisites
none

T 7.367 Module component: Site Management [T-BGU-103427]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	1,5 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2026	6241801	Site Management	1 SWS	Lecture / Practice / 🗣	N.N.
Exams					
WT 25/26	8240103427	Site Management			Haghsheno

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 15 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
45 hours

T 7.368 Module component: Smart Energy Infrastructure [T-WIWI-107464]

Coordinators: Dr. Armin Ardone
Dr. Dr. Andrej Marko Pustisek
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading	Term offered	Version
Written examination	5,5 CP	graded	Each winter term	2

Courses					
WT 25/26	2581023	(Smart) Energy Infrastructure	4 SWS	Lecture / 🗣	Ardone, Pustisek, Schuler
Exams					
WT 25/26	7900178	Smart Energy Infrastructure NEW			Fichtner
ST 2026	7900228	Smart Energy Infrastructure NEW			Fichtner

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (90 minutes). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Workload
165 hours

Below you will find excerpts from courses related to this module component:

V (Smart) Energy Infrastructure

2581023, WS 25/26, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture provides a techno-economic overview of different infrastructures of the energy system and their importance regarding the future energy system (“Energiewende”) – in particular

- for electricity:
  - the supply side (e.g. power plants)
  - the demand side (e.g. load structures of appliances, flexibilities) as well as
  - transport infrastructures (electricity grids)
- for fuel transportation:
  - pipeline infrastructures (focus on natural gas)
  - shipping of LNG
  - crude oil and oil product transportation
  - hydrogen transportation
  - comparison of potential energy carriers for global trade of renewable energy (e.g., hydrogen and its derivates, e-fuels, reactive metals)
- storage systems (e.g. batteries)

Additionally, the lecture provides a toolbox for energy system analysis such as an overview and classification of energy systems modelling approaches as well as the usage of scenario techniques for energy systems analysis.

The lecture also provides practical examples for the relevant methods presented.

T 7.369 Module component: Smart Grid Applications [T-WIWI-107504]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	see Annotations	2

Assessment
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendations
None

Additional Information
The lecture will no longer be offered from the coming winter semester 2023/24. It is only possible to take part in the main exam (first-time writer) and follow-up exam (repeater).

T 7.370 Module component: Social Choice Theory [T-WIWI-102859]

Coordinators: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-101504 - Collective Decision Making

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	3

Courses					
ST 2026	2520537	Social Choice Theory	2 SWS	Lecture / 🗣	Puppe, Kretz
ST 2026	2520539	Übung zu Social Choice Theory	1 SWS	Practice / 🗣	Puppe, Kretz

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of a written exam (60 min.). The examination is offered every summer semester.

Prerequisites
None

Below you will find excerpts from courses related to this module component:

V Social Choice Theory

2520537, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
How should (political) candidates be elected? What are good ways of merging individual judgments into collective judgments? Social Choice Theory is the systematic study and comparison of how groups and societies can come to collective decisions.

The course offers a rigorous and comprehensive treatment of judgment and preference aggregation as well as voting theory. It is divided into two parts. The first part deals with (general binary) aggregation theory and builds towards a general impossibility result that has the famous Arrow theorem as a corollary. The second part treats voting theory. Among other things, it includes prooving the Gibbard-Satterthwaite theorem.

Workload:
Total workload for 4.5 credit points: approx. 135 hours
Attendance: 30 hours
Self-study: 105 hours

Literature
Main texts:

- Moulin, H. 1988. *Axioms of Cooperative Decision Making*. Cambridge University Press.
- List, C. and Puppe, C. 2009. Judgement Aggregation. A survey. In: *The Handbook of rational & social choice*. P. Anand, P. Pattanaik, C. Puppe (Eds.). Oxford University Press.

Secondary texts:

- Sen, A. K. 1970. *Collective Choice and Social Welfare*. Holden-Day.
- Gaertner, W. 2009. *A Primer in Social Choice Theory*. Revised edition. Oxford University Press.
- Gaertner, W. 2001. *Domain Conditions in Social Choice Theory*. Cambridge University Press.

T 7.371 Module component: Software Quality Management [T-WIWI-102895]

Coordinators: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	3

Courses					
ST 2026	2511208	Software Quality Management	2 SWS	Lecture / 🗣	Oberweis
ST 2026	2511209	Übungen zu Software-Qualitätsmanagement	1 SWS	Practice / 🗣	Kruse
Exams					
WT 25/26	79AIFB_STQM_C1	Software Quality Management (Registration extended until 16.02.2026)			Oberweis
ST 2026	791-AIFB-STQM-HK	Software Quality Management (Registration until 20.07.2026)			Oberweis

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from courses related to this module component:

V Software Quality Management

2511208, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

Learning objectives:

Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of sofware certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

Recommendations:

Programming knowledge in Java and basic knowledge of computer science are expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 2008
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Weitere Literatur wird in der Vorlesung bekanntgegeben.

T 7.372 Module component: Spatial Economics [T-WIWI-103107]

Coordinators: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101485 - Transport Infrastructure Policy and Regional Development
M-WIWI-107010 - Economics in a Connected World

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2561260	Spatial Economics	2 SWS	Lecture / 🗣	Ott
WT 25/26	2561261	Exercise for Spatial Economics	1 SWS	Practice / 🗣	Ott, Mirzoyan
Exams					
WT 25/26	7900075	Spatial Economics			Ott
WT 25/26	7900276	Spatial Economics			Ott

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Depending on further pandemic developments, the examination will be offered either as an open-book examination, or as a 60-minute written examination.

Prerequisites
None

Recommendations
Basic micro- and macroeconomic knowledge is required, such as that taught in the courses "Economics I" [2600012] and "Economics II" [2600014], attendance of which is strongly recommended (but not mandatory). An interest in quantitative-mathematical modeling is also a prerequisite. Attendance of the course "Introduction to Economic Policy" [2560280] is recommended.

Below you will find excerpts from courses related to this module component:

V Spatial Economics

2561260, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course covers the following topics:

- Geography, trade and development
- Geography and economic theory
- Core models of economic geography and empirical evidence
- Agglomeration, home market effect, and spatial wages
- Applications and extensions

Learning objectives:

The student

- analyses how spatial distribution of economic activity is determined.
- uses quantitative methods within the context of economic models.
- has basic knowledge of formal-analytic methods.
- understands the link between economic theory and its empirical applications.
- understands to what extent concentration processes result from agglomeration and dispersion forces.
- is able to determine theory based policy recommendations.

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. An interest in mathematical modeling is advantageous.

Workload:

The total workload for this course is approximately 135 hours.

- Classes: ca. 30 h
- Self-study: ca. 45 h
- Exam and exam preparation: ca. 60 h

Assessment:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Literature
Steven Brakman, Harry Garretsen, Charles van Marrewijk (2009): The New Introduction to Geographical Economics, 2nd ed, Cambridge University Press.

Weitere Literatur wird in der Vorlesung bekanntgegeben.
(Further literature will be announced in the lecture.)

T 7.373 Module component: Special Topics in Information Systems [T-WIWI-113727]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101411 - Information Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	1

Assessment
The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

Prerequisites
see below

Recommendations
None

Additional Information
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in “Information Systems” so far. With this course students majoring in “Industrial Engineering and Management“ and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 7.374 Module component: Special Topics in Information Systems [T-WIWI-113724]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101410 - Business & Service Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	1

Assessment
The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

Prerequisites
see below

Recommendations
None

Additional Information
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in “Information Systems” so far. With this course students majoring in “Industrial Engineering and Management“ and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 7.375 Module component: Special Topics in Information Systems [T-WIWI-113726]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	1

Assessment
The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

Prerequisites
see below

Recommendations
None

Additional Information
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in “Information Systems” so far. With this course students majoring in “Industrial Engineering and Management“ and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 7.376 Module component: Special Topics in Information Systems [T-WIWI-113725]

Coordinators: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101506 - Service Analytics

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each term	1

Assessment
The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

Prerequisites
see below

Recommendations
None

Additional Information
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in “Information Systems” so far. With this course students majoring in “Industrial Engineering and Management“ and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 7.377 Module component: Startup Experience [T-WIWI-111561]

Coordinators: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Each term	1

Courses					
WT 25/26	2545004	Startup Experience	4 SWS	Seminar / 🗣	Weimar, Martjan, Terzidis
ST 2026	2545004	Startup Experience	4 SWS	Seminar / 🗣	Weimar, Terzidis, Martjan, Osaro
Exams					
WT 25/26	7900186	Startup Experience			Terzidis
ST 2026	7900186	Startup Experience			Terzidis

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessment. Details on the design of the examination performance of other types will be announced in the course.The grade is composed of a presentation and a written paper (plus any specified documentation, e.g. work results, experience diary, reflection).

Recommendations
Lecture Entrepreneurship already completed

Additional Information
The language in the seminar is English. The seminar contents will be published on the chair homepage.

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V Startup Experience

2545004, WS 25/26, 4 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

In the Startup Experience seminar you will develop entrepreneurial competences that will enable you to build a new business. In an entrepreneurial project, you have three main objectives:

1. Identify and develop an opportunity. Who is your target customer and what problem or task does he or she have? How attractive and how big is this market?
2. How will you add value to it? How can you use specific resources, including technology, to develop a solution?
3. How can you design and set up a viable organisation? What business model do you propose to create, deliver and capture value?

Our primary focus is on digital healthcare ventures, granting you the opportunity to delve into the realm of entrepreneurship within the healthcare system. After gaining a deep understanding of healthcare needs, you will utilize creativity techniques to uncover potential business ideas that provide value for patients and doctors. Additionally, you will learn how to create viable business models, dive into health regulations, and pitch your idea to a jury.

Learning Objectives

After completing this course, the course participants will be able to:

- Work effectively in a cohesive team
- Understand the role of digital entrepreneurship in healthcare
- Apply creativity techniques to ideate
- Use utility analysis approaches to select promising solutions
- Develop a value proposition based on techniques like the value proposition canvas or the jobs-to-be-done method
- Apply advanced business modeling methods to develop a sound business concept
- Develop and deliver a concise presentation (“pitch”) to communicate your project
- Gain basic knowledge of healthcare regulations and reimbursement ways

Additional information:

Alternative exam assessment. The grade consists of the presentation and the written elaboration. Potentially, a ‘project diary’ of the seminar progress may be part of the deliverables (depends on tutor and will be communicated at the kick-off).

For a successful course completion, we expect you to submit a Business Plan with the following features:

- Scope: 9000 words,
- Sound and clear structure,
- Expression and spelling are correct
- Complete and correct references, quotations, etc.
- Visual elements are chosen appropriately
- Documentation and traceability of data acquisition, analysis and evaluation,
- Content is developed according to the course instructions.

Furthermore, we expect you to deliver a team Pitch.

- Duration: will be communicated (typically 5-10 minutes)
- Content: Introduction/Purpose; Problem; Solution; Business Model; Prototype; Competition; Management Team; Current Status and next steps,
- Layout and form: appropriate choice,
- Appearance: appropriate amount of visual elements,
- Data: well researched and organized visually
- Story Line: is sound; clear and convincing.

Organizational issues

Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of max. 5 persons. The groups are formed in the seminar.

V **Startup Experience** **Seminar (S)**
2545004, SS 2026, 4 SWS, Language: English, Open in study portal **On-Site**

Content
Content

In the Startup Experience seminar you will develop entrepreneurial competences that will enable you to build a new business. In an entrepreneurial project, you have three main objectives:

1. Identify and develop an opportunity. Who is your target customer and what problem or task does he or she have? How attractive and how big is this market?
2. How will you add value to it? How can you use specific resources, including technology, to develop a solution?
3. How can you design and set up a viable organisation? What business model do you propose to create, deliver and capture value?

Our primary focus is on digital healthcare ventures, granting you the opportunity to delve into the realm of entrepreneurship within the healthcare system. After gaining a deep understanding of healthcare needs, you will utilize creativity techniques to uncover potential business ideas that provide value for patients and doctors. Additionally, you will learn how to create viable business models, dive into health regulations, and pitch your idea to a jury.

Learning Objectives

After completing this course, the course participants will be able to:

- Work effectively in a cohesive team
- Understand the role of digital entrepreneurship in healthcare
- Apply creativity techniques to ideate
- Use utility analysis approaches to select promising solutions
- Develop a value proposition based on techniques like the value proposition canvas or the jobs-to-be-done method
- Apply advanced business modeling methods to develop a sound business concept
- Develop and deliver a concise presentation (“pitch”) to communicate your project
- Gain basic knowledge of healthcare regulations and reimbursement ways

Additional information:

Alternative exam assessment. The grade consists of the presentation and the written elaboration. Potentially, a ‘project diary’ of the seminar progress may be part of the deliverables (depends on tutor and will be communicated at the kick-off).

For a successful course completion, we expect you to submit a Business Plan with the following features:

- Scope: 9000 words,
- Sound and clear structure,
- Expression and spelling are correct
- Complete and correct references, quotations, etc.
- Visual elements are chosen appropriately
- Documentation and traceability of data acquisition, analysis and evaluation,
- Content is developed according to the course instructions.

Furthermore, we expect you to deliver a team Pitch.

- Duration: will be communicated (typically 5-10 minutes)
- Content: Introduction/Purpose; Problem; Solution; Business Model; Prototype; Competition; Management Team; Current Status and next steps,
- Layout and form: appropriate choice,
- Appearance: appropriate amount of visual elements,
- Data: well researched and organized visually
- Story Line: is sound; clear and convincing.

Organizational issues

Registration is via the Wiwi-Portal.

Attention: The Startup X seminar overlaps in some instances with the entrepreneurship lecture. Please be aware of this before applying for the seminar.

In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation. The seminars will be held in English.

T 7.378 Module component: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

Coordinators: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture	Heller
Exams					
WT 25/26	7900011	Statistical Modeling of Generalized Regression Models			Heller
WT 25/26	7900146 (WS23/24)	Statistical Modeling of generalized regression models			Heller

Assessment
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Recommendations
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Below you will find excerpts from courses related to this module component:

V Statistical Modeling of Generalized Regression Models

2521350, WS 25/26, 2 SWS, Open in study portal — **Lecture (V)**

Content
Learning objectives:

The student has profound knowledge of generalized regression models.

Requirements:

Knowledge of the contents covered by the course *Economics III: Introduction in Econometrics" [2520016].*

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

T 7.379 Module component: Stochastic Calculus and Finance [T-WIWI-103129]

Coordinators: Dr. Mher Safarian
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2521331	Stochastic Calculus and Finance	2 SWS	Lecture	Safarian
WT 25/26	2521332	Übungen zu Stochastic Calculus and Finance	2 SWS	Practice	Safarian
Exams					
WT 25/26	7900225	Stochastic Calculus and Finance			Safarian

Assessment
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.).

Prerequisites
None

Additional Information
For more information see http://statistik.econ.kit.edu/

Below you will find excerpts from courses related to this module component:

V Stochastic Calculus and Finance

2521331, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Learning objectives:

After successful completion of the course students will be familiar with many common methods of pricing and portfolio models in finance. Emphasis we be put on both finance and the theory behind it.

Content:

The course will provide rigorous yet focused training in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus: Stochastic Processes, Brownian Motion and Martingales, Entropy, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes, Stable and Levy processes.
2. Mathematical Finance: Pricing Models, The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Incomplete Markets, Markets with Transaction Costs, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem, CAPM), Equilibrium models, Numerical Methods.

Workload:

Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours

Organizational issues
Blockveranstaltung, Termine werden über Ilias bekannt gegeben

Literature

- Dynamic Asset Pricing Theory, Third Edition by D. Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models by S. E. Shreve, Springer, 2003
- Stochastic Finance: An Introduction in Discrete Time by H. Föllmer, A. Schied, de Gruyter, 2011
- Methods of Mathematical Finance by I. Karatzas, S. E. Shreve, Springer, 1998
- Markets with Transaction Costs by Yu. Kabanov, M. Safarian, Springer, 2010
- Introduction to Stochastic Calculus Applied to Finance by D.Lamberton, B. Lapeyre, Chapman&Hall,1996

T 7.380 Module component: Strategic Decision-Making in Global Production Networks through Optimization and Simulation [T-MACH-114969]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Michael Martin

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each summer term	2

Courses					
ST 2026	2150659	Strategic Decision-Making in Global Production Networks through Optimization and Simulation	2 SWS	Lecture / 🗣	Lanza, Martin

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of success takes the form of an examination with a different type of assessment in accordance with Section 4 (2) No. 3 of the SPO. The project work, two milestone-based presentations of the results in presentation form (each lasting approx. 20 minutes) and a final presentation (lasting approx. 30 minutes) are included in the assessment. The project work and the presentations are carried out in small groups.

Prerequisites
Depending on the degree program, one of the following partial achievements must be passed in order to register for an examination:
T-MACH-110991 - Global ProductionPartial achievement
T-MACH-105158 - Global Production and Logistics - Part 1: Global ProductionPartial
T-MACH-108848 - Global Production and Logistics - Part 1: Global Production
T-MACH-110337 - Global Production and LogisticsPartial
T-MACH-108849 - Integrated Production Planning in the Age of Industry 4.0
T-MACH-109054 - Integrated Production Planning in the Age of Industry 4.0
T-MACH-114031 - Global ProductionPartial service
T-MACH-113832 - Global ProductionPartial service
T-MACH-114800 - Global ProductionPartial service

The partial achievement T-MACH-113372 - Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation must not have been started for exam registration.

Recommendations
Participation in the following lectures:
Introduction to Operations Research I [2550040] + II [2530043]

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Strategic Decision-Making in Global Production Networks through Optimization and Simulation** — **Lecture (V) On-Site**
2150659, SS 2026, 2 SWS, Language: English, Open in study portal

Content

The lecture "Strategic Decision-Making in Global Production Networks through Optimization and Simulation" offers students a comprehensive insight into the application of quantitative models from operations research in global production networks. The course places special emphasis on practical applications and allows students to deepen their skills through a real-world use case during the semester.

The classroom sessions serve to convey important basics and to introduce and present the practice-relevant cases. In the self-study phase, the topics covered are worked on in greater depth. The curriculum covers various phases. Optimization techniques for network design are covered first, followed by simulation methods for network management. Subsequently, open questions are dealt with, e.g. from the consideration of uncertainty, sustainability aspects or the search for the overall optimum in the production network.

The students are divided into small groups to work together on the questions. The methods taught in the course are implemented in python. In order to strengthen the students' presentation skills, regular presentations of interim results are planned. The progress made is supported by feedback and interaction with an internationally operating consulting firm.

The practical orientation of the course, combined with the application of quantitative models and the use of Python, enables students to prepare holistically for complex challenges in global production.

Learning Outcomes:

The students are able to

1. **put concepts of global production into practice:**
   - Understand how global production networks can be implemented in real business scenarios.
   - Develop and implement strategies for adapting global production networks to specific business requirements.
2. **in-depth knowledge and use of optimization in global production:**
   - Develop an in-depth understanding of various optimization techniques in global production processes.
   - Apply optimization models to complex production networks and continuously improve them.
3. **approach to improving network configuration, site selection and transportation routes:**
   - Understand methods to evaluate and optimize production networks.
   - Effectively plan and improve site selection decisions and transportation routes.
4. **deepen knowledge and use of simulations in global production:**
   - Understand how simulations can be used as a tool to analyze and optimize global production processes.
   - Gain experience in the application of simulation techniques for modeling and analyzing production processes.
5. **approach to improving delivery reliability:**
   - Develop and implement strategies to improve delivery reliability.
   - Optimize processes that can affect delivery reliability.
6. **consider uncertainties, aspects of sustainability and multidimensionality:**
   - Recognize and manage uncertainties in global production environments.
   - Consider sustainability aspects and multidimensional challenges when making decisions in global production.
7. **linking results and models:**
   - Link models and analytical results to create holistic solutions to complex problems in global production.
   - Strengthen the ability to iteratively improve models based on real-world results.
8. **presentations to management:**
   - Present complex global manufacturing concepts to management in an understandable and persuasive manner.
   - Build confidence in the use of visual aids and effective communication techniques in front of management levels.

Workload:

regular attendance: ~ 30 hours
self-study: ~ 99 hours

Media:

E-learning plattform Ilias, Powerpoint, photo protocol.
The Media are provided through Ilias (https://ilias.studium.kit.edu/).

Organizational issues

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Studierende begrenzt. Termine und Fristen zur Veranstaltung werden über die Homepage des wbk (https://www.wbk.kit.edu/studium-und-lehre.php) bekannt gegeben.

For organizational reasons the number of students is limited to 20. Dates and deadlines for the seminar will be announced via the homepage of wbk (https://www.wbk.kit.edu/studium-und-lehre.php).

Literature

Vorlesungsskript der Lehrveranstaltungen / Lecture notes of the courses:
Abele et al. (2008): Global Production [978-3-540-71652-5]
Domschke et al. (2015): Einführung in das Operations Research [Einführung in Operations Research]
Friedli et al. (2021): Global Manufacturing Management: From Excellent Plants Toward Network Optimization [978-3-030-72739-0]

T 7.381 Module component: Strategic Transport Planning [T-BGU-103426]

Coordinators: Volker Waßmuth
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	2

Courses					
ST 2026	6232808	Strategic Traffic Planning	2 SWS	Lecture / 🗣	Waßmuth
Exams					
WT 25/26	8240103426	Strategic Transport Planning			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
None

Recommendations
None

Additional Information
None

Workload
90 hours

T 7.382 Module component: Strategy and Management Theory: Developments and “Classics” [T-WIWI-106190]

Coordinators: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Courses					
WT 25/26	2577921	Strategy and Management Theory: Developments and "Classics" (Master)	2 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 25/26	7900120	Strategy and Management Theory: Developments and “Classics”			Lindstädt

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a conclusion meeting. Details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendations
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Additional Information
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Strategy and Management Theory: Developments and "Classics" (Master)

2577921, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

This course covers highly topical issues of great relevance to the management of organizations. Students will be enabled to take strategic management positions. By applying appropriate models from the fields of strategy and management - or models developed in-house - participants will learn to evaluate the strategic starting position of an organization and derive precise and well-founded recommendations for action based on this.

This course offers students the opportunity to explore current management issues and sharpen their skills in strategic analysis and evaluation. Through intensive collaboration and practical application of the knowledge learned, students are optimally prepared for the demands and challenges of modern business management.

Structure

The course begins with an overarching theme, based on which students are divided into groups of two. The core of the course consists of the preparation of a written paper as well as the presentation and discussion of the results.

Learning Objectives

Upon completion of the course, students will be able to,

- analyze complex business situations, think strategically and derive sound management decisions.
- compose clear and convincing written papers that accurately present the analyses and recommendations developed.
- present results in an engaging manner and actively participate in substantive discussions.

Recommendations:

Prior attendance of the Bachelor's module "Strategy and Organization" or another module with comparable content at another university is recommended.

Workload:

Total effort approx. 90 hours

Attendance time: 15 hours

Preparation and follow-up: 75 hours

Examination and preparation: not applicable

Success Monitoring:

The success control according to § 4(2), 3 SPO is done by writing a scientific paper and a presentation of the results of the paper in the context of a final event. Details on the design of the performance review will be announced during the lecture.

Annotation:

The course is admission restricted. In case of prior admission to another course in the module "Strategy and Management: Advanced Topics" [M-WIWI-103119], participation in this course is guaranteed. For more information on the application process, see the IBU website.

Exams are offered at least every other semester, so the entire module can be completed in two semesters.

T 7.383 Module component: Successful Transformation Through Innovation [T-WIWI-111823]

Coordinators: Malte Busch
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each summer term	1

Courses					
ST 2026	2500018	Successful transformation through innovation	2 SWS	Seminar / 🗣	Busch

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Alternative exam assessments. The grade consists of an presentation of the results (50%) and a seminar paper (50%).

Recommendations
Prior attendance of the course Innovation Management [2545015] is recommended.

Additional Information
Teaching and learning format: Seminar

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Successful transformation through innovation

2500018, SS 2026, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
This seminar uses strategic innovation management and concepts such as organizational ambidexterity, boundary spanning and stakeholder approaches to shed light on how companies can increase their innovative capacity through innovation. Students will use a core paper to understand the steps a company takes to become an innovative organization. The aim is to understand how medium-sized companies can develop into innovation-driven organizations in the context of organizational inertia and path dependency with the help of the aforementioned concepts. Part of the seminar will be to analyze the role of different stakeholders and how companies can become part of innovation ecosystems.

Based on the impulses and the core paper, students will apply the concepts they have learned to selected companies and present their results. These are also incorporated into academic seminar papers. As part of this work process, students deal independently with a current, research-oriented question and apply scientific criteria consistently. They research relevant information, analyze and abstract it critically and draw their own conclusions on this basis, reflecting their interdisciplinary knowledge and selectively developing current research findings.

The results obtained are systematically presented in written and oral form in compliance with academic standards - including structured presentation, correct specialist terminology and comprehensible references. In doing so, the students argue in a technically sound manner and are able to defend their positions in scientific discourse with experts. In addition, they are familiar with the DFG Code of Conduct “Guidelines for Safeguarding Good Scientific Practice” and successfully apply these guidelines in the preparation of their scientific work.

Organizational issues
Weblink: https://itm.entechnon.kit.edu/192_1281.phphttps://itm.entechnon.kit.edu/192_1673.php

T 7.384 Module component: Supplement Enterprise Information Systems [T-WIWI-110346]

Coordinators: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each term	1

Assessment
Success is assessed in the form of a written examination (60 minutes) or, if applicable, an oral examination (approx. 30 minutes).

Prerequisites
None

Additional Information
This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but is not equivalent to another course of this topic.

Workload
135 hours

T 7.385 Module component: Supplement Software- and Systemsengineering [T-WIWI-110372]

Coordinators: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each term	1

Assessment
The assessment of this course is a written or (if necessary) oral examination.

Prerequisites
None

Additional Information
This course can be used in particular for the acceptance of external courses whose content is in the broader area of software and systems engineering, but cannot assigned to another course of this topic.

T 7.386 Module component: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]

Coordinators: Claus J. Bosch
Dr. Mathias Göbelt

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading	Term offered	Version
Written examination	3,5 CP	graded	Each summer term	1

Courses					
ST 2026	2581961	Supply Chain Management with Advanced Planning Systems	2 SWS	Lecture / 🗣	Göbelt, Bosch
Exams					
WT 25/26	7981961	Supply Chain Management with Advanced Planning Systems			Schultmann

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Supply Chain Management with Advanced Planning Systems

2581961, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

This lecture deals with supply chain management from a practitioner's perspective with a special emphasis Advanced Planning Systems (APS) and the planning domain. The software solution SAP SCM, one of the most widely used Advanced Planning Systems, is used as an example to show functionality and application of an APS in practice.

First, the term supply chain management is defined and its scope is determined. Methods to analyze supply chains as well as indicators to measure supply chains are derived. Second, the structure of an APS (advanced planning system) is discussed in a generic way. Later in the lecture, the software solution SAP SCM is mapped to this generic structure. The individual planning tasks and software modules (demand planning, supply network planning / sales & operations planning, production planning / detailed scheduling, deployment, transportation planning, global available-to-promise) are presented by discussing the relevant business processes, providing academic background, describing typical planning processes and showing the user interface and user-related processes in the software solution. At the end of the lecture, implementation methodologies and project management approaches for SAP SCM are covered.

Contents

1. Introduction to Supply Chain Management

1.1. Supply Chain Management Fundamentals

1.2. Supply Chain Management Analytics

2. Structure of Advanced Planning Systems

3. SAP SCM

3.1. Introduction / SCM Solution Map

3.2. Demand Planning

3.3. Supply Network Planning / Sales & Operations Planning

3.4. Production Planning and Detailed Scheduling

3.5. Deployment

3.6. Transportation Planning / Global Available to Promise

3.7. Cloud-based Supply Chain Planning

4. SAP SCM in Practice

4.1. Project Management and Implementation

4.2. SAP Implementation Methodology

Literature

will be announced in the course

T 7.387 Module component: Sustainability in Mobility Systems [T-BGU-111057]

Coordinators: Prof. Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6232906	Sustainability in Mobility Systems	2 SWS	Lecture / 🗣	Kagerbauer, Plötz, Gnann
Exams					
WT 25/26	8245111057	Sustainability in Mobility Systems			Kagerbauer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min., computer-based

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.388 Module component: Sustainable Vehicle Drivetrains [T-MACH-111578]

Coordinators: Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2133132	Sustainable Vehicle Drivetrains	3 SWS	Lecture / 🗣	Toedter
Exams					
WT 25/26	76-T-MACH-105655	Sustainable Vehicle Drivetrains			Toedter

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam (approx. 20 minutes)

Prerequisites
none

Additional Information
Starting in winter term 25/26, the course consists of a lecture (2h / week) and a tutorial (1 h / week).

This course is offered in German.

Workload
120 hours

T 7.389 Module component: System Integration in Micro- and Nanotechnology I [T-MACH-114552]

Coordinators: apl. Prof. Dr. Ulrich Gengenbach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	2

Courses					
ST 2026	2106033	System Integration in Micro- and Nanotechnology I	2 SWS	Lecture / 🗣	Gengenbach
Exams					
WT 25/26	76-T-MACH-114552	System Integration in Micro- and Nanotechnology I			Gengenbach

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral exam (Duration: 30 min)

Prerequisites
None

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V System Integration in Micro- and Nanotechnology I

2106033, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Content:

- Introduction to system integration (fundamentals)
- Brief introduction to MEMS processes
- Flexures
- Surfaces and plasma processes for surface treatment
- Adhesive bonding in engineering
- Mounting techniques in electronics
- Molded Interconnect devices (MID)
- Functional Printing
- Low temperature cofired ceramics in system integration

Learning objectives:

The students acquire basic knowledge of challenges and system integration technologies from mechanical engineering, precision engineering and electronics.

Literature

- A. Risse, Fertigungsverfahren der Mechatronik, Feinwerk- und Präzisionsgerätetechnik, Vieweg+Teubner Verlag, Wiesbaden, 2012
- M. Madou, Fundamentals of microfabrication and nanotechnology, CRC Press Boca Raton, 2012
- G. Habenicht, Kleben Grundlagen, Technologien, Anwendungen, Springer-Verlag Berlin Heidelberg, 2009
- J. Franke, Räumliche elektronische Baugruppen (3D-MID), Carl Hanser-Verlag München, 2013

T 7.390 Module component: System Integration in Micro- and Nanotechnology II [T-MACH-114553]

Coordinators: apl. Prof. Dr. Ulrich Gengenbach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	2

Courses					
WT 25/26	2105040	System Integration in Micro- and Nanotechnology II	2 SWS	Lecture / 🗣	Gengenbach
Exams					
WT 25/26	76-T-MACH-114553	System Integration in Micro- and Nanotechnology II			Gengenbach

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral exam (Duration: 30 min)

Prerequisites
None

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V System Integration in Micro- and Nanotechnology II

2105040, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Introduction to system integration (novel processes and applications)

Assembly of hybrid microsystems

Packaging processes

Applications:

- Lab-on-chip systems
- Microoptical systems
- Silicon Photonics

Novel integration processes:

- Direct Laser Writing
- Self Assembly

Learning objectives
The students acquire knowledge of novel system integration technologies and their application in microoptic and microfluidic systems.

Literature
N.-T. Nguyen, Fundamentals and Applications of Microfluidics, Artech House

G. T. Reed, Silicon Photonics: An Introduction, Wiley

T 7.391 Module component: Tax Law [T-INFO-111437]

Coordinators: Detlef Dietrich
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	24646	Tax Law	2 SWS	Lecture /	Dietrich
Exams					
WT 25/26	7500062	Tax Law			Matz
ST 2026	7500120	Tax Law			Sattler

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 7.392 Module component: Telecommunications and Internet – Economics and Policy [T-WIWI-113147]

Coordinators: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101409 - Electronic Markets
M-WIWI-107010 - Economics in a Connected World

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2561232	Telecommunication and Internet - Economics and Policy	2 SWS	Lecture / 🔀	Mitusch
WT 25/26	2561233	Excercises to Telecommunication and Internet - Economics and Policy	1 SWS	Practice / 🔀	Mitusch
Exams					
WT 25/26	7900246	Telecommunications and Internet – Economics and Policy			Mitusch

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Students' understanding and knowledge will be assessed through either an oral or a written exam. The actual method used will be announced during the course. The course takes place every winter term, and exams are offered two times a year, in March and in September.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-WIWI-102713 - Telecommunication and Internet Economics must not have been started.

Recommendations
Basic knowledge of microeconomics is a precondition. Further knowledge of industrial economics or networks economics is useful, but not necessary. No prior knowledge of telecommunications or internet technologies is required.

Additional Information
Disclaimer:
German wording is sometimes provided in parallel. Some German original literature is used (especially official and legislative texts) where we will try to provide English translations in parallel.

Workload
135 hours

Below you will find excerpts from courses related to this module component:

V Telecommunication and Internet - Economics and Policy

2561232, WS 25/26, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Description:

The course provides students with a comprehensive understanding of the economic principles, dynamics, and policies that govern the telecommunication and internet industries and markets. It focuses on the infrastructure of the internet, both physical and logical.

Course Objectives:

Understand the telecommunication and internet landscape: Students will be introduced to the historical development, evolution, and current state of the telecommunication and internet industries. This includes technology, industrial organization, regulation, and other policies. Students will explore the emergence of modern telecommunication networks, the birth of the internet, and key milestones that have shaped the global communication landscape.

Examine network economics: Students will explore the unique economic characteristics of telecommunications networks, including network effects, economies of scale, the implications for investment decisions and market entry barriers, and regulatory responses.

Analyse market structures and competition policies: Students will dive into the various market structures that exist within the telecommunication and internet industries, including: access to the internet by users, access to the infrastructure by firms, economic interactions between the autonomous systems (i.e. sub-networks) and other players (like internet exchange points) of the internet, implications for quality of services and network neutrality. Emphasis will be placed on competitiveness of markets, resp. market power, on the role of regulation, and how they impact market dynamics.

Investigate infrastructure investment and policy: The course will address the significant role of infrastructure investment in the telecommunication and internet sectors. Students will analyse the economic drivers behind infrastructure construction, government policies, and regulatory frameworks that influence investment decisions.

Address emerging trends: The course will address the latest trends and technologies in telecommunication and the internet, such as 5G, Internet of Things (IoT), and cloud computing, content delivery networks, and their economic implications.

Assess platform economics: The role of digital platforms in the telecommunication and internet industries will be addressed. Students will understand platform business models and the economics of multisided markets. In this context, the "hypergiants" of the internet get into the focus as well as the challenges and opportunities they present.

Teaching Methodology:

The course will adopt a combination of lectures, case studies, and guest lectures from (industry) experts. Real-world examples will be used to illustrate economic principles in action within the telecommunication and internet sectors. A few economic models will be analysed, but most of the issues will be addressed verbally.

T 7.393 Module component: Telecommunications Law [T-INFO-101309]

Organisation: KIT Department of Informatics
Part of: M-INFO-106754 - Public Economic and Technology Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	1

Courses					
ST 2026	2424632	Telekommunikationsrecht	2 SWS	Lecture / 🗣	Döveling
Exams					
WT 25/26	7500049	Telecommunications Law			Zufall
ST 2026	7500085	Telecommunications Law			Zufall

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.394 Module component: Tendering, Planning and Financing in Public Transport [T-BGU-101005]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	1

Courses					
ST 2026	6232807	Competition, Planning and Financing in Public Transport	2 SWS	Lecture / 🗣	Pischon

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.395 Module component: Topics in Experimental Economics [T-WIWI-102863]

Coordinators: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101505 - Experimental Economics

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Irregular	1

Assessment
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendations
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

Additional Information
The repeat examination can be taken at any later, regular examination date. The examination dates are only offered in the semester in which the course is offered and in the semester immediately following. The subject matter relates to the last course held.

Workload
135 hours

T 7.396 Module component: Topics in Stochastic Optimization [T-WIWI-112109]

Coordinators: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading	Term offered	Version
Examination of another type	4,5 CP	graded	Each winter term	1

Assessment
Students will be given problem sets on which they work in groups. The problem sets will involve the implementation of the models presented in the course, and exploring features of these models. The groups will present their findings in front of the class. The grading will be based on the presentation.

Recommendations
A solid understanding of Stochastic Optimization and/or Optimization under Uncertainty as well as optimization in general is highly recommended, since we will heavily build upon basics of these areas.

Additional Information
Teaching and learning format: Lecture and exercise

Workload
135 hours

T 7.397 Module component: Trademark and Unfair Competition Law [T-INFO-101313]

Coordinators: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each term	1

Courses					
WT 25/26	2424136	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
ST 2026	24609	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
Exams					
WT 25/26	7500061	Trademark and Unfair Competition Law			Matz
ST 2026	7500051	Trademark and Unfair Competition Law			Matz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment is carried out as a written examination (§ 4 Abs. 2 No. 1 SPO) lasting 60 minutes.

Prerequisites
None.

T 7.398 Module component: Traffic Engineering [T-BGU-101798]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6232703	Road Traffic Engineering	2 SWS	Lecture / Practice /	Vortisch, Mitarbeiter/innen
Exams					
WT 25/26	8240101798	Traffic Engineering			Vortisch
ST 2026	8240101798	Traffic Engineering			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
None

Recommendations
None

Additional Information
None

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Road Traffic Engineering

6232703, WS 25/26, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture teaches basic principles and skills necessary to understand the methods and tools of traffic engineering, including theoretical background information as well as application of the relevant manuals and guidelines.

- Applications of traffic engineering: design of infrastructure and traffic control
- Description and analysis of traffic flow: Basic principles (kinematics, measurements of traffic flows, microscopic and macroscopic traffic parameters, Fundamental diagram)
- Methods in traffic engineering: travel demand structure, traffic flow characteristics, Queuing theory, Level-of-Service-concepts
- Capacity analysis for intersections with and without signalisation (entries and weaving sections, roundabouts and signal-controlled intersection),
- Backgrounds and application of the German Highway Capacity Manual
- Design of signal control (Fixed time signal controls, vehicle actuated control, „green waves“, network control, progressive signal systems) including public transport (prioritizing systems) and other transport modes (bicycles, pedestrians)
- Introduction to traffic management (for more detailed information see lecture “Transport Management and Transport Telematics [6232802])

Coordination: Baumann, Marvin

T 7.399 Module component: Traffic Flow Simulation [T-BGU-101800]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	1

Courses					
ST 2026	6232804	Traffic Simulation	2 SWS	Lecture / Practice /	Vortisch, Mitarbeiter/innen
Exams					
WT 25/26	8240101800	Traffic Flow Simulation			Vortisch
ST 2026	8240101800	Traffic Flow Simulation			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
None

Recommendations
None

Additional Information
None

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Traffic Simulation

6232804, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture teaches basic principles and application of traffic flow simulation tools in traffic engineering and transport planning.

This includes application of simulation software as well as the knowledge about models and how to deal with the stochastic nature of simulation results.

The lecture teaches the application of microscopic traffic flow simulation using the simulation software PTV Vissim, combining practical and theoretical aspects. Theoretical aspects include car following models, lane changing behavior and route choice models. Calibration and validation of the models will be explained and demonstrated by practical examples. Furthermore, German and American guidelines for the application of simulation models will be discussed and background information will be given.

In addition to the lectures, students will build a microscopic traffic flow model of an intersection. The aim is to practically apply what has been learned and to deepen the modeling knowledge.

Coordination: Grau, Josephine

T 7.400 Module component: Traffic Management and Transport Telematics [T-BGU-101799]

Coordinators: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	2

Courses					
ST 2026	6232802	Traffic Management and Telematics	2 SWS	Lecture / Practice / 🗣	Vortisch
Exams					
WT 25/26	8240101799	Traffic Management and Transport Telematics			Vortisch
ST 2026	8240101799	Traffic Management and Transport Telematics			Vortisch

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral Exam, appr. 20. min.

Prerequisites
Exercise Transportation Data Analysis must be passed

Recommendations
None

Additional Information
None

Workload
90 hours

T 7.401 Module component: Transport Economics [T-WIWI-100007]

Coordinators: Prof. Dr. Kay Mitusch
Dr. Eckhard Szimba

Organisation: KIT Department of Business and Economics

Part of: M-WIWI-101406 - Network Economics
M-WIWI-101468 - Environmental Economics
M-WIWI-101485 - Transport Infrastructure Policy and Regional Development

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each summer term	1

Courses					
ST 2026	2560230	Transport Economics	2 SWS	Lecture	Mitusch, Szimba
ST 2026	2560231	Übung zu Transportökonomie	1 SWS	Practice	Krenn
Exams					
WT 25/26	7900232	Transport Economics			Mitusch

Assessment
The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Below you will find excerpts from courses related to this module component:

V Transport Economics

2560230, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticans and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport
- empirical analysis of transport demand
- assessment of transport infrastructure projects
- external effects in transport
- transport policy
- cost structures of transport infrastructure
- Project evaluation from the perspective of the public sector

Literature
Literatur:

Aberle, G: Transportwirtschaft: einzelwirtschaftliche und gesamtwirtschaftliche Grundlagen München; Wien: Oldenbourg, 2003.

Blauwens, G., De Baere, P. and Van der Voorde, E. (2006): Transport Economics.

Frerich, J; Müller, G: Europäische Verkehrspolitik, Landverkehrspolitik München; Wien: Oldenbourg, 2004.

Dasgupta, A, Pearce, D (1972): Cost-Benefit Analysis, MacMillan, London.

Europäische Kommission (2008): Guide to Cost Benefit Analysis of Investment Projects, online unter http://ec.europa.eu/regional_policy/sources/Ben-Akiva, M., Meerseman, H., and Van de Voorde, E. (2008): Recent developments in transport modelling: Lessons for the freight sector.

Ortúzar, J. d. D. and Willumsen, L. (1990): Modelling Transport.

T 7.402 Module component: Transportation Data Analysis [T-BGU-100010]

Coordinators: Prof. Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	2

Courses					
WT 25/26	6232901	Empirical Data in Transportation	2 SWS	Lecture / Practice / 🗣	Kagerbauer
Exams					
WT 25/26	8245100010	Transportation Data Analysis			Kagerbauer
ST 2026	8240100010	Transportation Data Analysis			Kagerbauer

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
The Exercise Transportation Data Analysis (T-BGU-113671) has to be passed.

Recommendations
None

Additional Information
None

Workload
90 hours

T 7.403 Module component: Tunnel Construction and Blasting Engineering [T-BGU-101846]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6241903	Tunnel Construction and Blasting Engineering	2 SWS	Lecture / 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 25/26	8240101846	Tunnel Construction and Blasting Engineering			Haghsheno, Schneider

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam, appr. 20 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.404 Module component: Turnkey Construction [T-BGU-111921]

Coordinators: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction
M-BGU-105592 - Digitalization in Facility Management

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	1

Courses					
ST 2026	6241808	Turnkey Construction	2 SWS	Lecture / Practice / 🗣	Teizer
Exams					
WT 25/26	8240111921	Turnkey Construction			Haghsheno

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.405 Module component: Tutoring: Training and Practice [T-WIWI-112967]

Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading	Term offered	Version
Coursework	2 CP	pass/fail	Each term	1

Assessment

- Successful participation in the KIT-PEBA tutor training course "Start in die Lehre": 2 credit points.
- Successful participation in the tutor training course "Start in die Lehre" and supplementary tutoring activity over at least two semesters: 3 credit points.

Additional Information
The successful participation in the tutor training "Start in die Lehre" of KIT-PEBA can be credited in the seminar module WiIng/TVWL M.Sc. as interdisciplinary qualification with two or three credit points.

The online application with further information can be found at https://portal.wiwi.kit.edu/forms/form/AnerkennungTutorent%C3%A4tigkeit.

T 7.406 Module component: Upgrading of Existing Buildings [T-BGU-111218]

Coordinators: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each term	1 semesters	1

Courses					
WT 25/26	6240901	Upgrading of Existing Buildings	3 SWS	Lecture / Practice / 🗣	Lennerts, Schneider
Exams					
WT 25/26	8240111218	Upgrading of Existing Buildings			Lennerts, Schneider

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
written exam, 60 min.

Prerequisites
none

Recommendations
none

Additional Information
none

Workload
90 hours

T 7.407 Module component: Valuation [T-WIWI-102621]

Coordinators: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Each winter term	1

Courses					
WT 25/26	2530212	Valuation	2 SWS	Lecture / 🗣	Ruckes
WT 25/26	2530213	Übungen zu Valuation	1 SWS	Practice / 🗣	Ruckes, Luedecke
Exams					
WT 25/26	7900057	Valuation			Ruckes
ST 2026	7900072	Valuation			Ruckes

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
See German version.

Prerequisites
None

Recommendations
None

Below you will find excerpts from courses related to this module component:

V Valuation
2530212, WS 25/26, 2 SWS, Language: English, Open in study portal
Lecture (V)
On-Site

Literature
Weiterführende Literatur
Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T 7.408 Module component: Vehicle Systems for Urban Mobility [T-MACH-113069]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106496 - Modern Mobility on Rails and Roads

Type	Credits	Grading	Version
Oral examination	4,5 CP	graded	3

Courses					
WT 25/26	2115922	Vehicle Systems for Urban Mobility	2 SWS	Lecture / 🗣	Ziesel, Cichon
ST 2026	2115922	Vehicle Systems for Urban Mobility	2 SWS	Lecture / 🗣	Ziesel, Cichon
Exams					
WT 25/26	76-T-MACH-113069	Vehicle Systems for Urban Mobility			Ziesel, Cichon
ST 2026	76-T-MACH-113069	Vehicle Systems for Urban Mobility			Ziesel, Cichon

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral examination
Duration: approx. 20 minutes
No tools or reference material may be used during the exam.

Additional Information
The course is offered in German.

Workload
135 hours

T 7.409 Module component: Warehousing and Distribution Systems [T-MACH-105174]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	3

Courses					
ST 2026	2118097	Warehousing and distribution systems	2 SWS	Lecture / 🗣	Furmans

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites
none

Additional Information
The course is offered in German

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Warehousing and distribution systems

2118097, SS 2026, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Vorlesung:

Die Vorlesung wird in diesem Semester als **Blockveranstaltung** angeboten.

Die Veranstaltungstermine sind:

- Di., 19. Mai 2026
- Mi., 20. Mai 2026
- Fr., 22. Mai 2026

Die Vorlesung findet jeweils von 08:00 Uhr bis 15:30 Uhr im **Selmayr-HS (Geb. 50.38)** statt. Bitte beachten Sie für mögliche kurzfristige Raumänderungen die Informationen im ILIAS-Kurs.

Die Vorlesung wird von einem externen Dozenten aus der Logistikberatung gehalten.

Fokusthemen:

- Grundlagen von Lagerplanung und Intralogistik-Technik
- Je eine Vorlesungseinheit für alle Bereiche eines Lagers
- Praxisbeispiele und Fallstudien
- Übersicht über Logistiknetzwerke und Lean Logistics

Klausur:

- Informationen zur Klausur werden zeitnah über den Ilias-Kurs bekanntgegeben.

Vorlesungsbegleitende Unterlagen:

- Die vorlesungsbegleitenden Unterlagen finden Sie ebenfalls im Ilias-Kurs.

Ansprechpartner:

Keno Büscher

Literature

ARNOLD, Dieter, FURMANS, Kai (2005)
Materialfluss in Logistiksystemen, 5. Auflage, Berlin: Springer-Verlag

ARNOLD, Dieter (Hrsg.) et al. (2008)
Handbuch Logistik, 3. Auflage, Berlin: Springer-Verlag

BARTHOLDI III, John J., HACKMAN, Steven T. (2008)
Warehouse Science

GUDEHUS, Timm (2005)
Logistik, 3. Auflage, Berlin: Springer-Verlag

FRAZELLE, Edward (2002)
World-class warehousing and material handling, McGraw-Hill

MARTIN, Heinrich (1999)
Praxiswissen Materialflußplanung: Transport, Hanshaben, Lagern, Kommissionieren, Braunschweig, Wiesbaden: Vieweg

WISSER, Jens (2009)
Der Prozess Lagern und Kommissionieren im Rahmen des Distribution Center Reference Model (DCRM); Karlsruhe : Universitätsverlag

Eine ausführliche Übersicht wissenschaftlicher Paper findet sich bei:

ROODBERGEN, Kees Jan (2007)
Warehouse Literature

T 7.410 Module component: Water Technology [T-CIWVT-106802]

Coordinators: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101121 - Water Chemistry and Water Technology I

Type	Credits	Grading	Term offered	Version
Oral examination	6 CP	graded	Each winter term	1

Courses					
WT 25/26	2233030	Water Technology	2 SWS	Lecture / 🗣	Horn
WT 25/26	2233031	Exercises to Water Technology	1 SWS	Practice / 🗣	Horn, und Mitarbeitende
Exams					
WT 25/26	7233030	Water Technology			Horn
ST 2026	7233030	Water Technology			Horn

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.411 Module component: Web App Programming for Finance [T-WIWI-110933]

Coordinators: Prof. Dr. Julian Thimme
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-101480 - Finance 3

Type	Credits	Grading	Term offered	Version
Written examination	4,5 CP	graded	Once	1

Assessment
Non exam assessment according to § 4 paragraph 3 of the examination regulation. (Anmerkung: gilt nur für SPO 2015). The grade is made up as follows: 50% result of the project (R-code), 50% presentation of the project.

Prerequisites
None

Recommendations
The content of the bachelor course Investments is assumed to be known and necessary to follow the course.

Workload
135 hours

T 7.412 Module component: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

Coordinators: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Courses					
ST 2026	2577922	Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)	2 SWS	Lecture / 🗣	Lindstädt
Exams					
ST 2026	7900071	Workshop Business Wargaming – Analyzing Strategic Interactions			Lindstädt

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendations
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Additional Information
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)

2577922, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

This course enables the simulation of strategic conflicts in which the participants assume the roles of selected actors. With the help of specially programmed wargaming software, strategic conflicts are simulated interactively and then reflected upon and discussed.

The course focuses on the simulation and analysis of real conflict situations with strategic interaction. Students gain a better understanding of the structural characteristics of strategic conflicts in the fields of economics and politics as well as the ability to derive their own strategies for action.

Through a combination of group work, simulation, and reflection, the seminar provides a learning experience that both strengthens team skills and develops analytical skills in strategic conflict. Join this seminar to gain sound insights into conflict dynamics and develop effective action strategies for complex situations.

Learning Objectives

Upon completion of the course, students will be able to,

- learn the basic methodologies, features and benefits of business wargaming
- improve their understanding of conflict dynamics by reflecting on strategic conflicts
- Strengthen analytical skills by processing a variety of courses of action and deriving strategies for action

Recommendations:

Prior attendance of the Bachelor's module "Strategy and Organization" or another module with comparable content at another university is recommended.

Workload:

- Total workload: approx. 90 hours
- Attendance time: 15 hours
- Preparation and follow-up: 75 hours
- Examination and preparation: not applicable

Competence Certificate:

In this course, real conflict situations are simulated and analyzed with the help of various methods from business wargaming. Details on the design of the performance review will be announced during the lecture.

Note:

The course is admission restricted. In case of prior admission to another course in the module "Strategy and Management: Advanced Topics" [M-WIWI-103119], participation in this course is guaranteed. For more information on the application process, see the IBU website.

Exams are offered at least every other semester, so the entire module can be completed in two semesters.

Organizational issues

IBU-Seminarraum, Geb. 05.20, Raum 2A-12.1

T 7.413 Module component: Workshop Current Topics in Strategy and Management [T-WIWI-106188]

Coordinators: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Irregular	1

Courses					
WT 25/26	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 25/26	7900171	Workshop Current Topics in Strategy and Management			Lindstädt

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The evaluation of the performance takes place through the active participation in the discussion rounds; an appropriate preparation is expressed here and a clear understanding of the topic and framework becomes recognizable. Further details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendations
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Additional Information
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V **Workshop aktuelle Themen Strategie und Management (Master)** — **Lecture (V) On-Site**
2577923, WS 25/26, 2 SWS, Language: German, Open in study portal

Content

Aspects of strategic management can be found in a variety of daily events. In this course, current strategic and industrial policy issues are discussed and the exchange of ideas on current management topics is promoted.

For this purpose, practice-relevant case studies and dedicated questions are communicated to the students in advance so that they can prepare themselves individually for the discussion. The chair team actively moderates the discussion and creates typical discussion situations such as pro/con discussions and conflicting interests of different groups in order to bring opposing opinions into an exchange and to promote the power of argumentation. In this way, the discussion not only imparts knowledge about the content, but also strengthens the participants' skills by simulating real discussion situations in a management team.

In addition, company representatives and managers participate in individual case studies to strengthen the context of the content and experience the daily dynamics of discussion in strategic business areas.

Learning Objectives:

Students will

- are able to evaluate strategic decisions using appropriate models of strategic business management,
- are able to present and critically evaluate theoretical approaches and models in the field of strategic business management and illustrate them using practical examples, and
- have the ability to present their position convincingly through a reasoned argumentation in structured discussions.

Recommendations:

Previous attendance of the Bachelor's module "Strategy and Organization" or another module with comparable content at another university is recommended.

Workload:

Total effort approx. 90 hours

Attendance time: 15 hours

Preparation and follow-up: 75 hours

Examination and preparation: not applicable

Competence Certificate:

Performance will be assessed through active discussion participation in the discussion rounds; here, adequate preparation will be expressed and a clear understanding of the topic and framework will be evident. Further details on the design of the performance assessment will be announced during the lecture.

Annotation:

This course is admission restricted. In case of prior admission to another course in the module "Strategy and Management: Advanced Topics"[M-WIWI-103119], participation in this course is guaranteed. For more information on the application process, see the IBU website.

Exams are offered at least every other semester so that the entire module can be completed in two semesters.

T 7.414 Module component: X-ray Optics [T-MACH-109122]

Coordinators: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each term	2

Courses					
WT 25/26	2141007	X-ray Optics	2 SWS	Lecture / 🗣	Last
ST 2026	2141007	X-ray optics	2 SWS	Lecture / 🗣	Last
Exams					
WT 25/26	76-T-MACH-109122	X-ray Optics			Last
ST 2026	76-T-MACH-109122	X-ray Optics			Last

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral exam (about 20 min)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V X-ray Optics

2141007, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Introduction: X-ray optics and applications
X-ray generation: sources
Propagation of X-rays in matter
Principles of optics and imaging
Types of X-ray optics: reflecting, refracting, diffracting, absorbing
Characteristics of X-ray optics
Methods to simulate X-ray optics (ray tracing, wave propagation)
Manufacturing of X-ray optics
Characterization of X-ray optics
X-ray detection
Applications: Medical, material sciences…
X-ray analytical methods

Organizational issues
Termin und Ort nach Absprache mit den Angemeldeten

Literature

M. Born und E. Wolf
Principles of Optics, 7th (expanded) edition
Cambridge University Press, 2010

A. Erko, M. Idir, T. Krist und A. G. Michette
Modern Developments in X-Ray and Neutron Optics
Springer Series in Optical Sciences, Vol. 137
Springer-Verlag Berlin Heidelberg, 2008

D. Attwood
Soft X-Rays and Extreme Ultraviolet Radiation: Principles and Applications
Cambridge University Press, 1999

V

X-ray optics

2141007, SS 2026, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

Introduction: X-ray optics and applications
X-ray generation: sources
Propagation of X-rays in matter
Principles of optics and imaging
Types of X-ray optics: reflecting, refracting, diffracting, absorbing
Characteristics of X-ray optics
Methods to simulate X-ray optics (ray tracing, wave propagation)
Manufacturing of X-ray optics
Characterization of X-ray optics
X-ray detection
Applications: Medical, material sciences…
X-ray analytical methods

Organizational issues

Viertägiger Blockkurs im Juni oder Juli 2026. Interessenten melden sich bitte zur Terminabsprache bis zum 30.5.2026 bei arndt.last@kit.edu