Module Handbook
Industrial Engineering and Management B.Sc.

SPO 2015

Summer term 2025

Date: 31/03/2025

KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT

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1 General Information

1.1 Study program details

KIT-Department	KIT Department of Economics and Management
Academic Degree	Bachelor of Science (B.Sc.)
Examination Regulations Version	2015
Regular terms	6 terms
Maximum terms	9 terms
Credits	180
Language	German and English
Grade calculation	Weighted by (Weight * CP)
Additional Information	Link to study program www.wiwi.kit.edu/studiengangWiingBSc.php Department https://www.wiwi.kit.edu/index.php Business unit Studium und Lehre https://www.sle.kit.edu/vorstudium/bachelor-wirtschaftsingenieurwesen.php

1.2 Content

The Bachelor's degree program in Industrial Engineering and Management is divided into a **foundation program** with compulsory modules (standard duration of study 1st - 3rd semester with a total of 92 credit points (CP)) and a **specialization program** with compulsory elective modules (standard duration of study 4th - 6th semester with a total of 88 CP).

The course is strongly oriented towards quantitative methods. The basis for this is laid in the foundation course through compulsory modules with three courses in mathematics (analysis, linear algebra, differential equations), two courses in statistics (descriptive and inductive statistics, probability theory, regression) and two courses in operations research (various optimization models and methods). In the other compulsory modules, these foundations are taken up and continued with subject-specific focal points.

The interdisciplinary Bachelor's degree program in Industrial Engineering aims to provide a broad qualification in the following five thematic core areas: Business Administration, Economics, Informatics, Operations Research and Engineering. In the specialization program, the study regulations allow students to choose their specialization through elective options, whereby at least one module (9 CP, which usually corresponds to two lectures with exercises) must be completed for each of the five core areas in order to ensure the desired breadth of qualification of the Karlsruhe industrial engineer. In the compulsory elective area, a seminar module and two further modules must be taken. One of these modules must be chosen from business administration or engineering. Otherwise, students can choose modules from informatics, operations research, business administration, economics, engineering, statistics, law or sociology. A full-time internship of at least 12 weeks provides an insight into company practice and the professional development potential of industrial engineering.

At least one seminar and the Bachelor's thesis teach the ability to write and present an independent scientific paper. The opportunity for international exchange is provided within the framework of ERASMUS programs and bilateral direct cooperation programs.

In economics and business administration, all common empirical methods are used in addition to specific theoretical approaches: from the collection and analysis of field data to laboratory experiments and computer-aided simulations.

The business administration program covers the areas of accounting, finance, corporate management, information management, production management and marketing. The economics program includes micro- and macroeconomic theories, industrial economics and network economics, finance and economic policy as well as political economics.

In Operations Research, methods and models of continuous, discrete, stochastic and dynamic optimization are taught and algorithmically implemented.

Informatics is dedicated to both the theoretical foundations and practical methods for the use of information and communication technology in business, administration and society.

In the field of engineering, the basic course introduces students to materials science, technical mechanics and electrical engineering, while the specialization course draws on the wide range of courses offered by the KIT engineering departments, which offer a variety of specialization options in the fields of mechanical and civil engineering, electrical engineering and information technology.

Special features of the degree program

- Anchoring of the program at the KIT Department of Economics and Management
- Individual curriculum design
- Free choice of specialization in the engineering subjects from semester 4 onwards
- 12-week work placement during the course of study
- High proportion of computer science
- Practical relevance through modules such as the "Business & Technology" team project
- Faculty-internal "International Relations Office" to support stays abroad
- Possibility of a German-French double degree as part of the Master's program. Application is made during the Bachelor's degree course.
- Bridge courses and courses during the semester at the MINT-Kolleg
- Partner network with companies for company contacts and internships during your studies
- KIT start-up incubator

1.3 Qualification Goals

The sound methodological training enables graduates to apply subject-specific concepts, methods, models and procedures and to link these in an interdisciplinary way. They are able to analyze and evaluate economic and technological structures and processes. They master the basics of project management and can assume responsibility in interdisciplinary teams. They are able to argue on a subject-related and interdisciplinary basis and defend their point of view vis-à-vis specialist representatives and laypersons. They have the ability to apply the knowledge they have acquired in a professional field in industry, the service sector or public administration and to take up a Master's degree in Industrial Engineering and Management or a related course of study.

Key Qualifications:

The Industrial Engineering and Management program is characterized by an exceptional degree of interdisciplinarity. With the combination of subjects from business administration, economics, computer science, operations research, mathematics as well as engineering and natural sciences, the integration of knowledge from different disciplines is an inherent part of the degree program. Interdisciplinary thinking and thinking in contexts are promoted naturally.

In addition, the tutorial models with over 20 semester hours in the Bachelor's degree program contribute significantly to the promotion of soft skills. The key qualifications taught throughout the entire degree program can be assigned to the following areas:

Basic skills (soft skills)

- Teamwork, social communication and creativity techniques
- Presentation preparation and presentation techniques
- Logical and systematic argumentation and writing
- Structured problem-solving and communication

Practical orientation (enabling skills)

- Competence to act in a professional context
- Project management skills
- Basic knowledge of business administration
- English as a technical language

Orientation knowledge

- Imparting interdisciplinary knowledge
- Institutional knowledge of economic and legal systems
- Knowledge of international organizations
- Media, technology and innovation

The integrative teaching of key qualifications takes place in particular as part of a series of compulsory courses within the Bachelor's programs, namely

- Basic program in business administration and economics
- Seminar module
- Bachelor thesis support
- Work placement
- Specialization modules in business administration, economics, informatics.

1.4 Employment Prospects

You will gain your first practical experience during your Bachelor's degree, not only through your compulsory work placement. You can also gain insights and contacts in the world of work through your participation in lectures and workshops with speakers from the business world and the opportunity to write your thesis in a company.

This will open up career prospects for you as a specialist and manager anywhere in industry, services and public administration where economic and technical issues come together, be it at the interfaces of project and production management, human resources and IT or marketing and logistics. Alternatively, after completing your Bachelor's degree, you can also opt for a Master's degree.

1.5 Acceptance Criterias

The program offers 505 study places and admission is restricted.
Admission is granted for the first semester in the winter semester and for the higher semester in the winter and summer semesters.

Application deadline:

German or EU nationals
1.**First semester:** July 15
Second semester: July 15 for the winter semester, January 15 for the summer semester

Citizens from non-EU countries
1.**1st semester:** 15 July
Higher semester: 15 July for the winter semester, 15 January for the summer semester

1.6 Studies and Examination Regulations

The legal basis for the degree program and the examinations in the degree program is the

Study and Examination Regulations of the Karlsruhe Institute of Technology (KIT) for the Bachelor's degree program in Industrial Engineering and Management

1.7 Organizational issues

Dates and events:

Current information on the degree programs as well as dates for information events and examinations can be found on the KIT department website (https://www.wiwi.kit.edu).

Recognition of achievements according to § 19 SPO

1. Achievements within the university system

   According to § 19 of the Study and Examination Regulations, study and examination achievements that have been completed in study programs at state or state-recognized universities and vocational academies in the Federal Republic of Germany or at foreign state or state-recognized universities can be recognized upon application by the student.

2. Achievements outside the higher education system

   Knowledge acquired outside the higher education system can also be recognized. A common example is the recognition of one or more internships through proof of relevant vocational training.
   For detailed information on the recognition process and the link to the application forms, please refer to the website of the KIT department.

Frequently asked questions

Answers to frequently asked questions from A for "thesis" to Z for "second repetition" can be found in our Hints A-Z.

2 Study plan

The Bachelor's degree program in Industrial Engineering and Management entails a six-semester standard study period. The basic program in the first three semesters is systematically structured. In the fourth to fifth semesters, a more advanced, specialization program that can be structured depending on one's personal interests and goals is offered.

Figure 2 shows the course and module structure with the respective credit points as well as an example of a possible distribution of modules and courses in the basic program over the semesters, which has proven to be useful.

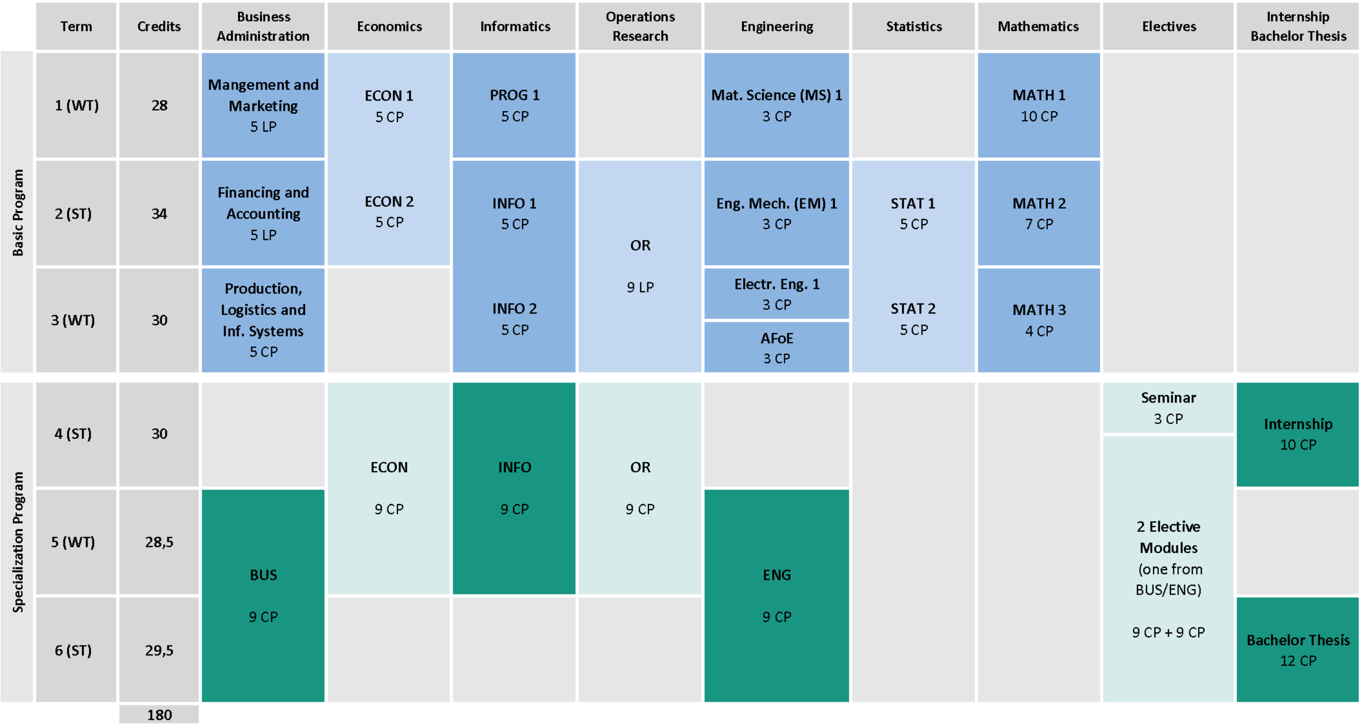

Figure 2: Structure of the Bachelor's degree program in Industrial Engineering and Management SPO 2015 as of winter semester 2021/2022 (recommended)

In the **basic program** (blue), the business administration, economics, informatics, operations research, engineering sciences, statistics and mathematics modules are compulsory. In the 3rd semester, one can choose between Material Transformation and Balances, Engineering Mechanics and Material Science in the engineering basic module.

In the **specialization program** (green), a module must be selected from each of the following areas: business administration, economics, informatics, operations research and engineering. As part of the mandatory courses, one seminar module (independent of the course) and two modules must be completed. One module can be selected from business administration or engineering subjects and the other from business administration, economics, informatics, operations research, engineering, statistics, law or sociology.

The **internship** can be completed before or during the Bachelor's program. The performance record of the completed internship is required for registration for the final module examination in the course.

One is free to structure his/her individual course plan as he/she wishes (taking into account the respective provisions of the study and examination regulations as well as applicable module regulations) and choose the semester he/she wishes to start and/or complete the selected modules. It is however strongly recommended to adhere to the proposal for the first three semesters. The content of the courses is interdisciplinary and coordinated accordingly; the intersection freedom of lectures and examination dates is guaranteed for the recommended study semester.

All modules of the basic and advanced program, including the various alternatives within the module, can be found in this module handbook. Seminars that can be taken up as part of the seminar module are published at the WiWi portal at https://portal.wiwi.kit.edu/Seminare.

3 New study plan as of winter semester 2021/2022

For the winter semester 2021/2022, the basic program in the subjects business administration and mathematics has been changed. In the subject business administration, three modules, each worth 5 credit points, must be completed. In mathematics, the distribution of credit points for the three compulsory modules will change.

4 Field of study structure

Mandatory	
Preliminary Exam *This field will not influence the calculated grade of its parent.*	
Bachelor's Thesis	12 CR
Internship	10 CR
Business Administration	24 CR
Economics	19 CR
Informatics	24 CR
Operations Research	18 CR
Engineering Sciences	21 CR
Mathematics	21 CR
Statistics	10 CR
Compulsory Elective Modules	21 CR

4.1 Preliminary Exam

Mandatory		
M-WIWI-100950	Preliminary Exam	0 CR

4.2 Bachelor's Thesis

Credits
12

Mandatory		
M-WIWI-101601	Module Bachelor's Thesis	12 CR

4.3 Internship

Credits
10

Mandatory		
M-WIWI-101419	Internship	10 CR

4.4 Business Administration

Credits
24

Mandatory		
M-WIWI-105768	Management and Marketing	5 CR
M-WIWI-105769	Financing and Accounting	5 CR
M-WIWI-105770	Production, Logistics and Information Systems	5 CR
Specialisation Program Business Administration (Election: at least 9 credits)		
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-103120	Financial Economics	9 CR
M-WIWI-105610	Financial Data Science	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-105928	HR Management & Digital Workplace	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-105981	Information Systems & Digital Business	9 CR
M-WIWI-106860	Leadership & Sustainable HR-Management	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-WIWI-105482	Machine Learning and Data Science	9 CR

4.5 Economics

Credits
19

Mandatory		
M-WIWI-101398	Introduction to Economics	10 CR
Specialisation Program Economics (Election: at least 9 credits)		
M-WIWI-106472	Advanced Macroeconomics	9 CR
M-WIWI-101499	Applied Microeconomics	9 CR
M-WIWI-101403	Public Finance	9 CR
M-WIWI-101599	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
M-WIWI-101668	Economic Policy I	9 CR
M-WIWI-101501	Economic Theory	9 CR

4.6 Informatics

Credits
24

Mandatory		
M-WIWI-101417	Foundations of Informatics	10 CR
M-WIWI-101581	Introduction to Programming	5 CR
Specialisation Program Informatics (Election: at least 9 credits)		
M-WIWI-105112	Applied Informatics	9 CR

4.7 Operations Research

Credits
18

Mandatory		
M-WIWI-101418	Introduction to Operations Research	9 CR
Specialisation Program Operations Research (Election: 1 item)		
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-103278	Optimization under Uncertainty	9 CR

4.8 Engineering Sciences

Credits
21

Mandatory		
M-ETIT-101155	Electrical Engineering	3 CR
M-MACH-101259	Engineering Mechanics	3 CR
M-WIWI-101839	Additional Fundamentals of Engineering	3 CR
M-MACH-101260	Materials Science	3 CR
Specialisation Program Engineering Sciences (Election: at least 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-106995	Automation and Material Flow in Logistics neu	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-106821	Electric Energy Systems and Power Generation	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-106527	Mechanical Design A	9 CR
M-MACH-106236	Mechatronic Product Design	9 CR
M-ETIT-106581	Measurement, Control, and Manufacturing Measurement Technology	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-106590	Production Engineering	9 CR
M-ETIT-106372	Signals and Systems	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-MACH-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR

4.9 Mathematics

Credits
21

Mandatory		
M-MATH-105754	Mathematics 1	10 CR
M-MATH-105756	Mathematics 2	7 CR
M-MATH-105757	Mathematics 3	4 CR

4.10 Statistics

Credits
10

Mandatory		
M-WIWI-101432	Introduction to Statistics	10 CR

4.11 Compulsory Elective Modules

Credits
21

Election notes
Within the scope of the elective compulsory area, the seminar module (independent of subject) and two modules are to be taken. One module must be chosen from the subjects Business Administration or Engineering Sciences, the other from the subjects Business Administration, Economics, Informatics, Operations Research, Engineering Sciences, Statistics, Law or Sociology.

Mandatory		
M-WIWI-101816	Seminar Module	3 CR
Business Administration oder Engineering Sciences (Election: 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-106995	Automation and Material Flow in Logistics neu	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-106821	Electric Energy Systems and Power Generation	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-WIWI-103120	Financial Economics	9 CR
M-WIWI-105610	Financial Data Science	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-105928	HR Management & Digital Workplace	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-105981	Information Systems & Digital Business	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-WIWI-106860	Leadership & Sustainable HR-Management	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-WIWI-105482	Machine Learning and Data Science	9 CR
M-MACH-106527	Mechanical Design A	9 CR
M-ETIT-106581	Measurement, Control, and Manufacturing Measurement Technology	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-106590	Production Engineering	9 CR
M-ETIT-106372	Signals and Systems	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101421	Supply Chain Management	9 CR
M-WIWI-105447	Team Project Management and Technology (BUS/ENG)	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-MACH-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Business Administration (Election: at most 9 credits)		
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR

M-WIWI-101402	eFinance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-103120	Financial Economics	9 CR
M-WIWI-105610	Financial Data Science	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-105928	HR Management & Digital Workplace	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-105981	Information Systems & Digital Business	9 CR
M-WIWI-106860	Leadership & Sustainable HR-Management	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101421	Supply Chain Management	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-WIWI-105482	Machine Learning and Data Science	9 CR
Economics (Election: at most 9 credits)		
M-WIWI-106472	Advanced Macroeconomics	9 CR
M-WIWI-101499	Applied Microeconomics	9 CR
M-WIWI-101403	Public Finance	9 CR
M-WIWI-101599	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
M-WIWI-101668	Economic Policy I	9 CR
M-WIWI-101501	Economic Theory	9 CR
Informatics (Election: at most 9 credits)		
M-WIWI-101426	Electives in Informatics	9 CR
Operations Research (Election: at most 9 credits)		
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-103278	Optimization under Uncertainty	9 CR
Engineering Sciences (Election: at most 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-106995	Automation and Material Flow in Logistics neu	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-106821	Electric Energy Systems and Power Generation	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-106527	Mechanical Design A	9 CR
M-ETIT-106581	Measurement, Control, and Manufacturing Measurement Technology	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-106590	Production Engineering	9 CR
M-ETIT-106372	Signals and Systems	9 CR

M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-MACH-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
M-MACH-106236	Mechatronic Product Design	9 CR
Statistics (Election: at most 9 credits)		
M-WIWI-101599	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
Law or Sociology (Election: at most 9 credits)		
M-INFO-105084	Public and Civil Law	9 CR
M-GEISTSOZ-101167	Sociology/Empirical Social Research	9 CR
Team Project (Election: at most 9 credits)		
M-WIWI-105440	Team Project Management and Technology	9 CR

5 Modules

M 5.1 Module: Additional Fundamentals of Engineering [M-WIWI-101839]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
PD Dr. Volker Gaukel
Prof. Dr. Michael Hoffmann

Organisation: KIT Department of Economics and Management

Part of: Engineering Sciences (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	Grade to a tenth	Each term	1 term	German	3	4

Compulsory Elective Courses (Election: between 3 and 5 credits)			
T-MACH-102079	Material Science II for Business Engineers	5 CR	Wagner
T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics	5 CR	Fidlin
T-CIWVT-106058	Process Fundamentals by the Example of Food Production	3 CR	Gaukel
T-ETIT-100534	Electrical Engineering for Business Engineers, Part II	5 CR	Menesklou

Competence Certificate
See course description.

Prerequisites
None

Competence Goal
See German version.

Content
The module focuses on basic engineering topics related to materials science, engineering mechanics and food processing.

Annotation
Please note that "Materials Science 2" and "Electrical Engineering II for Industrial Engineers" are not offered in the winter semester, but only in the summer semester.

Workload
The total workload for this module is approximately 90 hours.

5.2 Module: Advanced Macroeconomics [M-WIWI-106472]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	English	3	2

Compulsory Elective Courses (Election:)			
T-WIWI-112723	Computational Macroeconomics	4,5 CR	Brumm
T-WIWI-112735	Macroeconomics: Theory and Computation	9 CR	Brumm
T-WIWI-109121	Macroeconomic Theory	4,5 CR	Brumm

Competence Certificate
The module examination takes place either in the form of an overall examination of 9 LP on the course Macroeconomic Theory and the course Computational Macroeconomics, or via two individual examinations of 4.5 LP each. The duration of the overall examination is 120 minutes. The duration of an individual exam is 60 minutes. The examinations are offered every semester and can be repeated at any regular examination date.

Competence Goal
The student

- acquires knowledge of modern macroeconomic models
- is able to analyze and discuss fiscal and monetary policy issues
- understands algorithms for solving dynamic, stochastic models
- is able to apply learned numerical methods independently

Content
The module focuses on teaching both theoretical foundations and solution procedures for macroeconomic models.

Annotation
The two courses can be taken in any order. They complement each other, but do not build on each other.

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.

M 5.3 Module: Applications of Operations Research [M-WIWI-101413]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Operations Research (Specialisation Program Operations Research)
Compulsory Elective Modules (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	9

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-106199	Modeling and OR-Software: Introduction	4,5 CR	Nickel
T-WIWI-106545	Optimization under Uncertainty	4,5 CR	Rebennack

Competence Certificate
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*Facility Location and strategic Supply Chain Management*and*Tactical and operational Supply Chain Management*has to be taken.

Competence Goal
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of Supply Chain Management and their respective optimization problems,
- is acquainted with classical location problem models (in the plane, on 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 Supply Chain Management. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities like 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 Management, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

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

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

Recommendation
The courses Introduction to Operations Research I and II are helpful.

5.4 Module: Applied Informatics [M-WIWI-105112]

Responsible: Dr.-Ing. Tobias Käfer
Prof. Dr. Andreas Oberweis
Prof. Dr. Ali Sunyaev
Prof. Dr. Melanie Volkamer

Organisation: KIT Department of Economics and Management

Part of: Informatics (Specialisation Program Informatics)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	3	2

Advanced Programming (Election: 1 item)			
T-WIWI-102747	Advanced Programming - Java Network Programming	4,5 CR	Ratz, Zöllner
T-WIWI-102748	Advanced Programming - Application of Business Software	4,5 CR	Klink, Oberweis
Compulsory Elective Area (Election: 1 item)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	Käfer
T-WIWI-114156	Applied Informatics – Cybersecurity	4,5 CR	Volkamer
T-WIWI-110341	Applied Informatics – Database Systems	4,5 CR	Oberweis
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-113957	Applied Informatics – Mobile Computing	4,5 CR	Oberweis
T-WIWI-110338	Applied Informatics – Modelling	4,5 CR	Oberweis
T-WIWI-110343	Applied Informatics – Software Engineering	4,5 CR	Oberweis

Competence Certificate
The assessment is carried out as two partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

- Partial exam I: *Advanced Programming - Java Network Programming* or alternativly *Advanced Programming - Application of Business Software*
- Partial exam II: all the rest

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.

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.

Competence Goal
The student

- has the capability of dealing with the practical application of the Java programming language (which is the dominating programming language in many application areas) or alternatively the ability to configure, parameterize and deploy enterprise software to enable, support and automate business processes,
- knows in depth methods and systems of a core area or a core application area of Informatics according to the contents dealt with in the lectures,
- can choose these methods and system situation adequately and can furthermore design and employ them for problem solving,
- is able to independently find strategic and creative answers in the finding of solutions to well defined, concrete, and abstract problems.

Content
In this module, object-oriented programming skills using the Java programming language are further deepened. Alternatively important fundamentals of business information systems are conveyed that enable, support and accelerate new forms of business processes and organizational forms. Based on a core application area, basic methods and techniques of computer science are presented.

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

5.5 Module: Applied Microeconomics [M-WIWI-101499]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	4

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102876	Auction & Mechanism Design	4,5 CR	Szech
T-WIWI-112228	Digital Markets and Market Design	4,5 CR	Hillenbrand
T-WIWI-102892	Economics and Behavior	4,5 CR	Szech
T-WIWI-102850	Introduction to Game Theory	4,5 CR	Puppe, Reiß
T-WIWI-102844	Industrial Organization	4,5 CR	Reiß
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-102736	Economics III: Introduction in Econometrics	5 CR	Schienle
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

Competence Certificate
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
None.

Competence Goal
Students

- are introduced to the basic theoretical analysis of strategic interaction situations and shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings, (course "Introduction to Game Theory");
- are exposed to the basic problems of imperfect competition and its implications for policy making; (course "Industrial Organization");
- are provided with the basic economics of network industries (e.g., telecom, utilities, IT, and transport sectors) and should get a vivid idea of the special characteristics of network industries concerning planning, competition, competitive distortion, and state intervention, (course "Competition in Networks").

Content
The module's purpose is to extend and foster skills in microeconomic theory by investigating a variety of applications. Students shall be able to analyze real-life problems using microeconomics.

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.

Recommendation
Completion of the module Economics is strongly recommended.

5.6 Module: Automation and Material Flow in Logistics [M-MACH-106995]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	2

Automation and material flow in logistics (Election:)			
T-MACH-113566	Automation and Autonomy in Logistics	4,5 CR	Furmans
T-MACH-113013	Basics of Technical Logistics	4,5 CR	Mittwollen, Oellerich
T-MACH-112968	Material Flow in Production and Logistics	4,5 CR	Furmans

Competence Certificate
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

- acquires comprehensive and well-founded knowledge on the main topics of logistics, an overview of different logistic questions in practice and knows the functionality of material handling systems,
- is able to illustrate logistic systems with adequate accuracy by using simple models,
- is able to realize coherences within logistic systems,
- is able to evaluate logistic systems by using the learnt methods.
- has an understanding of the various approaches and possibilities of automation and autonomy in logistics and can describe the associated technical requirements and approaches.

Content
The module Automation and Material Flow in Logistics provides the basics for the main topics in logistics and industrial material flows. The lectures illustrate the interaction of different modules of logistics systems. Depending on the specialisation, the technical features of conveyor technology are discussed in detail on the one hand, and on the other hand, methods for mapping and evaluating logistics systems are taught. The various levels and possibilities of automation and autonomy in logistics are analysed and the technical implementation is discussed and tested using practical experiments, models and approaches.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is based on the credit points of the module's courses.

Recommendation
none

Learning type
see individual courses

5.7 Module: Automotive Engineering [M-MACH-101266]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	6

Automotive Engineering (Election: at least 9 credits)			
T-MACH-102203	Automotive Engineering I	6 CR	Gauterin, Gießler
T-MACH-112126	Data-Driven Algorithms in Vehicle Technology	4 CR	Scheubner
T-MACH-102093	Fluid Power Systems	5 CR	Geimer
T-MACH-100092	Automotive Engineering I	6 CR	Gießler
T-MACH-102117	Automotive Engineering II	3 CR	Gießler
T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I	1,5 CR	Bardehle
T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II	1,5 CR	Bardehle
T-MACH-110796	Python Algorithms for Vehicle Technology	4 CR	Rhode
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gießler
T-MACH-111820	Control of Mobile Machines – Prerequisites	0 CR	Becker, Geimer
T-MACH-111821	Control of Mobile Machines	4 CR	Becker, Geimer

Competence Certificate
The assessment is carried out as partial exams.

The partial exams consists of a written exam (90 to 120 minutes) or an oral exam (duration 30 to 40 minutes).

Prerequisites
None

Competence Goal
The student

- knows the most important components of a vehicle,
- knows and understands the functioning and the interaction of the individual components,
- knows the basics of dimensioning the components.

Content
In the module Automotive Engineering the basics are taught, which are important for the development, the design, the production and the operation of vehicles. Particularly the primary important aggregates like engine, gear, drive train, chasis and auxiliary equipment are explained, but also all technical equipment, which make the operation safer and easier. Additionally the interior equipment is examined, which shall provide a preferably comfortable, optimum ambience to the user.

In the module Automotive Engineering the focus is on passenger cars and commercial vehicles, which are designed for road applications.

Workload
The total work load for this module is about 270 Hours (9 Credits). The partition of the work load is carried out according to the credit points of the courses of the module. The work load for courses with 6 credit points is about 180 hours, for courses with 4.5 credit points about 135 hours, for courses with 3 credit points about 90 hours, and for courses with 1.5 credit points about 45 hours. The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam duration and the time that is required to achieve the objectives of the module as an average student with an average performance.

Recommendation
Knowledge of the content of the courses *Engineering Mechanics I* [2161238] and *Engineering Mechanics II* [1262276] is helpful.

Learning type
The teaching and learning procedures (lecture, lab course, workshop) are described for each course of the module separately.

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

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

Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	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 CR	Koch
T-MACH-111585	Hydrogen and reFuels - Energy Conversion in Combustion Engines	4 CR	Kubach

Competence Certificate
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

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

Responsible: Dr.-Ing. Heiko Kubach
Julia Reichel

Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	4

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

Competence Certificate
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
It is only possible to choose this module in combination with the module *Combustion Engines I*. The module is passed only after the final partial exam of *Combustion Engines I* is additionally passed.

The course *Combustion Engines II* [2134131] has to be attended.

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

Learning type
Lecture, Tutorial

M 5.10 Module: eBusiness and Service Management [M-WIWI-101434]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	12

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-111307	Digital Services: Foundations	4,5 CR	Satzger, Vössing
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-113746	Enterprise Systems for Financial Accounting & Controlling	4,5 CR	Fleig, Mädche
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-107506	Platform Economy	4,5 CR	Weinhardt
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

Competence Certificate
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 students

- understand the strategic and operative design of information and information products,
- analyze the role of information on markets,
- evaluate case studies regarding information products,
- develop solutions in teams.

Content
This module gives an overview of the mutual dependencies of strategic management and information systems. The central role of information is exemplified by the structuring concept of the information life cycle.

The single phases of this life cycle from generation over allocation until dissemination and use of the information are analyzed from a business and microeconomic perspective, applying classical and new theories. The state of the art of economic theory on aspects of the information life cycle are presented. The lecture is complemented by exercise courses. The courses "Platform Economy", "eFinance: Information systems in finance" and "eServices" constitute three different application domains in which the basic principles of the Internet Economy are deepened. In the core lecture "Platform Economy" the focus is set on markets between two parties that act through an intermediary on an Internet platform. Topics discussed are network effects, peer-to-peer markets, blockchains and marketdesign. The course is held in English and teaches parts of the syllabus with the support of a case study in which students analyze a platform.

The course "eFinance: information systems for securities trading" provides theoretically profound and also practical-oriented background about the functioning of international financial markets. The focus is placed on the economic and technical design of markets as information processing systems.

In "eServices" the increasing impact of electronic services compared to the traditional services is outlined. The Information- und Communication Technologies enable the provision of services, which are mainly characterized by interactivity and individuality. This course provides basic knowledge about the development and management of ICT-based servies.

The theoretic fundamentals of Information systems can be enriched by a practical experience in Special Topics in Information Engineering and Management. Any practical Seminar at the IM can be chosen for the course Special Topics in Information systems.

Annotation

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

The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

5.11 Module: Economic Policy I [M-WIWI-101668]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	10

Mandatory			
T-WIWI-103213	Basic Principles of Economic Policy	4,5 CR	Ott
Compulsory Elective Courses (Election: 1 item)			
T-WIWI-114178	HR-Management 2: Organization, Fairness & Leadership	4,5 CR	Nieken
T-WIWI-109121	Macroeconomic Theory	4,5 CR	Brumm
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

Competence Certificate
The module examination takes place in the form of examinations (§4(2),1 SPO) of the selected partial module performance. The examination is carried out separately for each partial module and is described there. It is possible to repeat examinations at any regular examination date.

The grades of the partial module correspond to the grades of the passed examinations. The overall grade of the module is formed from the grades of the partial performances weighted with LP.

Prerequisites
The course "Introduction to Economic Policy" is mandatory in the module.

Competence Goal
Students shall be given the ability to

- understand and deepen basic concepts of micro- and macroeconomic theories
- apply those theories to economic policy issues
- understand government interventions in the market and their legitimation from the perspective of economic welfare
- learn how theory-based policy recommendations are derived

Content

- Intervention in the market: micro-economic perspective
- Intervention in the market: macroeconomic perspective
- Institutional economic aspects
- Economic policy and welfare economics
- Carriers of economic policy: political-economic aspects

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

Recommendation
Basic knowledge of micro- and macroeconomics is strongly recommended, as taught in the courses Economics I [2610012], and Economics II [2600014].

M 5.12 Module: Economic Theory [M-WIWI-101501]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	3	3

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Brumm, Mitusch
T-WIWI-102876	Auction & Mechanism Design	4,5 CR	Szech
T-WIWI-102892	Economics and Behavior	4,5 CR	Szech
T-WIWI-102850	Introduction to Game Theory	4,5 CR	Puppe, Reiß
T-WIWI-102844	Industrial Organization	4,5 CR	Reiß
T-WIWI-109121	Macroeconomic Theory	4,5 CR	Brumm
T-WIWI-102610	Welfare Economics	4,5 CR	Puppe

Competence Certificate
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
Students

- master concepts that are central to (micro-)economic theory and are familiar with their real-world applications,
- will be able to interpret and critically assess microeconomic models,
- attain in-depth knowledge of the theory of strategic decision making and of general equilibrium models,
- can apply methods from welfare economics to analyze issues like distributional fairness and equality of opportunity.

Content
The module covers central concepts in microeconomic theory as well as their applications. This includes an in-depth introduction to the modelling language and the equilibrium concepts (Nash equilibrium, sub-game-perfect Nash equilibrium, etc.) of non-cooperative game theory ("Introduction to Game Theory") as well as its applications to problems of imperfect competition and industrial organization ("Industrieökonomie") and the design of auctions and (incentive-)mechanisms ("Auction & Mechanism Design").

A further focus of the module is on the development of a micro-founded general equilibrium model in order to examine key macroconomic issues such as public dept and labor market as well as monetary policies ("Macroeconomic Theory"). Students may also delve deeper into the basics of behavioral economics and experimental design ("Economics & Behavior") as well as into questions of equality of opportunity and the fairness and efficiency of economic allocations ("Wohlfahrtstheorie").

Annotation
Please note that the course T-WIWI-102609 "Advanced Topics in Economic Theory" is currently not available.

Workload
The total workload for this module is approximately 270 hours (9 credit points). The distribution is done according to the credit points of the courses of the module. The workload for courses with 4.5 credit points is approx. 135 hours. The total number of hours per course is calculated from the time required for attending lectures and exercises, as well as examination times and the time required for an average student to achieve the learning objectives of the module.

Recommendation
None

5.13 Module: eFinance [M-WIWI-101402]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	3	9

Mandatory			
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
Supplementary Courses (Election: at least 4,5 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-112694	FinTech	4,5 CR	Thimme
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg

Competence Certificate
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 *eFinance: Information Systems for Securities Trading* [2540454] is compulsory and must be examined.

Competence Goal
The students

- are able to understand and analyse the value creation chain in stock broking,
- are able to adequatly identify, design and use methods and systems to solve problems in finance,
- are able to evaluate and criticize investment decisions by traders,
- are able to apply theoretical methods of econometrics,
- learn to elaborate solutions in a team.

Content
The module "eFinance" addresses current problems in the finance sector. It is investigated the role of information and knowledge in the finance sector and how information systems can solve or extenuate them. Speakers from practice will contribute to lectures with their broad knowledge. Core courses of the module deal with the background of banks and insurance companies and the electronic commerce of stocks in global finance markets. In addtion the course Derivatives offers an insight into future and forward contracts as well as the assesment of options. Exchanges and International Finance are also alternatives which provide a suplementary understanding for capital markets.
Information management topics are the focus of the lecture "eFinance: Information Systems for Securities Trading". For the functioning of the international finance markets, it is necessary that there is an efficient information flow. Also, the regulatory frameworks play an important role. In this context, the role and the functioning of (electronic) stock markets, online brokers and other finance intermediaries and their platforms are presented. Not only IT concepts of German finance intermediaries are presented, but also international system approaches will be compared. The lecture is supplemented by speakers from the practice (and excursions, if possible) coming from the Deutsche Börse and the Stuttgart Stock Exchange.

Annotation
The current seminar courses for this semester, which are complementary to this module, are listed on following webpage: the http://www.iism.kit.edu/im/lehre

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 5.14 Module: Electives in Informatics [M-WIWI-101426]

Responsible: Dr.-Ing. Tobias Käfer
Prof. Dr. Andreas Oberweis
Prof. Dr. Ali Sunyaev
Prof. Dr. Melanie Volkamer

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Informatics)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	3	15

Compulsory Elective Area (Election: between 1 and 2 items)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	Käfer
T-WIWI-114156	Applied Informatics – Cybersecurity	4,5 CR	Volkamer
T-WIWI-110341	Applied Informatics – Database Systems	4,5 CR	Oberweis
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-113957	Applied Informatics – Mobile Computing	4,5 CR	Oberweis
T-WIWI-110338	Applied Informatics – Modelling	4,5 CR	Oberweis
T-WIWI-110343	Applied Informatics – Software Engineering	4,5 CR	Oberweis
T-WIWI-110711	Supplement Applied Informatics	4,5 CR	Professorenschaft des Instituts AIFB
Advanced Labs (Election: at most 1 item)			
T-WIWI-111127	Advanced Lab Blockchain Hackathon (Bachelor)	4,5 CR	Sunyaev
T-WIWI-111124	Advanced Lab Sociotechnical Information Systems Development (Bachelor)	4,5 CR	Sunyaev
T-WIWI-110541	Advanced Lab Informatics (Bachelor)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-114177	Advanced Lab Programming 3	4,5 CR	Oberweis
T-WIWI-112915	Advanced Lab Realization of Innovative Services (Bachelor)	4,5 CR	Oberweis
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer

Competence Certificate
The assessment is carried out as two 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

- knows and has mastered methods and systems for core topics and core application areas of computer science,
- can choose these methods and system situation adequately and can furthermore design and employ them for problem solving,
- is able to independently find strategic and creative answers in the finding of solutions to well defined, concrete, and abstract problems.

Content

The elective module conveys advanced knowledge in the area of applied computer science. This includes, for example, the efficient design and optimization of technical systems, the design and management of database applications or the systematic development of large software systems. Moreover, modeling of complex systems, the use of computer science methods to support knowledge management, and the design and implementation of service-oriented architectures are discussed in this module.

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.

5.15 Module: Electric Energy Systems and Power Generation [M-ETIT-106821]

Responsible: Prof. Dr.-Ing. Marc Hiller
Dr.-Ing. Bernd Hoferer
Prof. Dr.-Ing. Thomas Leibfried

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	1

Mandatory			
T-ETIT-101924	Power Generation	3 CR	Hoferer
T-ETIT-112850	Electric Energy Systems	6 CR	Hiller, Leibfried

Competence Certificate

Electric Energy Systems:
Success control takes place in the form of a written examination lasting 120 minutes.

Power Generation:
Success control takes place in the form of an overall oral examination (approx. 20 minutes) on the selected course.

Prerequisites

none

Competence Goal

Electric Energy Systems:
Students learn about the main types of electrical machines. They can explain how they work and are able to calculate the operating behavior of electrical machines on the basis of simple models and using the electrical engineering basics they have already learned in the field of alternating current theory.

In addition, students learn about the most important self-controlled power converter circuits for energy and drive applications. This also includes the basic properties of the most important power semiconductors, whereby students are able to describe their behavior using characteristic curves and simple models.

Students will be able to analyze network feedback and the effect of power converters on the electrical machine. They can also recognize the components in energy transmission and drive systems and describe their function. Furthermore, they can calculate the behavior of the system components by coupling the models of the power converter, grid and machine.

Students will also be able to assess the role that power electronics will play in a sustainable energy supply and which technologies are crucial for a sustainable conversion and expansion of the electrical energy supply.

Students learn about the structure of the electrical energy supply network in Europe and especially in Germany. They know the laws of high-voltage direct current and high-voltage three-phase current transmission and can name the respective advantages and disadvantages and know the respective characteristics of active and reactive power transmission and the resulting technical consequences. Students will be familiar with the grid operating equipment, its structure and its mode of operation in the grid and will be able to carry out calculations with regard to the parameters important for grid operation. They will be able to name and calculate important design guidelines and operating characteristics of grid equipment. Using transformers as an example, they can carry out a basic design.

Power Generation:
Students are able to recognize energy technology problems and develop solutions. They have gained an understanding of the physical and theoretical relationships in energy technology. They are also able to describe, analyze and explain the developed solutions in a scientific format.

Content
Electric Energy Systems:

Part Hiller:
In this basic lecture, the section on drive technology and power electronics begins by explaining the mode of operation and operating behavior of the most important electrical machines. The focus is on rotary field machines (asynchronous machines, electrically and permanently excited synchronous machines, synchronous reluctance machines).

The most important power semiconductor components and their basic function are then presented. Building on this, the essential power converter circuits for applications in energy and drive technology (including electromobility) are presented. Their function and operating behavior are described.

In addition, the mode of operation and areas of application of electrical machines and power electronic circuits for grid and drive applications are explained in more detail using practical examples.

Part Leibfried:
The lecture begins with an introduction to the structure of the electrical power supply system and the basics of power calculation in the three-phase system. Furthermore, the basic laws for the transmission of electrical energy with direct and alternating current (high-voltage direct current transmission, HGÜ) and high-voltage three-phase current transmission, HDÜ) are dealt with. Another large chapter deals with electrical grid equipment such as generators, transformers, current and voltage transformers, capacitive and inductive compensators as well as overhead lines and cables.

Power Generation:
Basic lecture on the generation of electrical energy. From the conversion of the earth's primary energy resources in coal-fired power plants and in nuclear power plants to the use of renewable energies, the lecture covers the entire spectrum of generation. The lecture provides an overview of the physical principles, the technical and economic aspects and the development potential of generating electrical energy from both conventional and renewable sources.

Module grade calculation
The module grade is calculated from the average value of the written and oral examinations weighted according to CP.

Annotation
"Erzeugung elektrischer Energie" will take place again in summer term 2026.

Workload
Electric Energy Systems:

- Attendance time in VL and Ü (4 SWS a 15 h): 4 * 15 h = 60 h
- Preparation/follow-up of the lecture: 14 * 2 h = 28 h
- Preparation/follow-up of the exercise: 14 * 2 h = 28 h
- Exam preparation: = 60 h
- Examination time: = 2 h
- **Total: 178 h = 6 LP**

Power Generation:

- Attendance time: 30 h
- Self-study time: 60 h
- **Total 90 h = 3 LP**

M 5.16 Module: Electrical Engineering [M-ETIT-101155]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Engineering Sciences (mandatory)

Credits	Grading scale	Recurrence	Duration	Level	Version
3	Grade to a tenth	Each winter term	1 term	3	1

Mandatory			
T-ETIT-100533	Electrical Engineering for Business Engineers, Part I	3 CR	Menesklou

Competence Certificate
The assessment takes place in the form of a written examination lasting 2 hours.

Competence Goal
The student knows and understands basic terms of electrical engineering and should be able to carry out simple calculations of DC and AC circuits.

Content
Supporting the lecture, assignments to the curriculum are distributed. These are solved into additional (voluntary) tutorials.

Module grade calculation
The module grade is the grade of the written exam.

Workload
See German version.

5.17 Module: Emphasis in Fundamentals of Engineering [M-MACH-101261]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	2

Specialization in Fundamentals of Engineering (Election: at least 9 credits)			
T-ETIT-100534	Electrical Engineering for Business Engineers, Part II	5 CR	Menesklou
T-MACH-102079	Material Science II for Business Engineers	5 CR	Wagner
T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics	5 CR	Fidlin

Competence Certificate
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 examinations take place at the beginning of the recess period. 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 removed from the average of the partial examinations, with at least two partial exams need to be.

Competence Goal
Students acquire and deepen skills in engineering fundamentals and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.

Annotation
Starting winter term 2016/1017 the course "Introduction to Engineering Mechanics II : Dynamics" [2162276] will be held in winter term.

Workload
See German version.

5.18 Module: Emphasis Materials Science [M-MACH-101262]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	4

Specialization Materials Science (Election: at least 9 credits)			
T-MACH-102141	Constitution and Properties of Wearresistant Materials	4 CR	Ulrich
T-MACH-105179	Functional Ceramics	4 CR	Botros
T-MACH-100287	Introduction to Ceramics	6 CR	Schell
T-MACH-102102	Physical Basics of Laser Technology	5 CR	Schneider
T-MACH-102137	Polymer Engineering I	4 CR	Liebig
T-MACH-102138	Polymer Engineering II	4 CR	Liebig
T-MACH-102157	High Performance Powder Metallurgy Materials	4 CR	Schell
T-MACH-112106	Fatigue of Materials	4 CR	Guth
T-MACH-102170	Structural and Phase Analysis	4 CR	Wagner
T-MACH-100531	Systematic Materials Selection	4 CR	Dietrich, Schulze
T-MACH-102139	Failure of Structural Materials: Fatigue and Creep	4 CR	Gruber, Gumbsch
T-MACH-102140	Failure of Structural Materials: Deformation and Fracture	4 CR	Gumbsch, Weygand
T-MACH-102079	Material Science II for Business Engineers	5 CR	Wagner

Competence Certificate
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 examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

Prerequisites
None

Competence Goal
Students acquire and deepen skills in fundamentals of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.

Module grade calculation
The overall grade of the module is removed from the average of the partial examinations, with at least two partial exams need to be.

Workload
The module requires an average workload of 270 hours.

Learning type
Lecture, Tutorial.

5.19 Module: Energy Economics [M-WIWI-101464]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	4

Mandatory			
T-WIWI-102746	Introduction to Energy Economics	5,5 CR	Fichtner
Supplementary Courses (Election: 3,5 credits)			
T-WIWI-102607	Energy Policy	3,5 CR	Wietschel
T-WIWI-100806	Renewable Energy-Resources, Technologies and Economics	3,5 CR	Jochem

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) about the lecture *Introduction into Energy Economics* [2581010] and one optional lecture of the 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
The lecture *Introduction into Energy Economics* [2581010] has to be examined.

Competence Goal
The student

- is able to understand interdependencies in energy economics and to evaluate ecological impacts in energy supply,
- is able to assess the different energy carriers and their characteristics,
- knows the energy political framework conditions,
- gains knowledge about new market-based conditions and the cost and potentials of renewable energies in particular.

Content
Introduction to Energy Economics: Characterisation (reserves, suppliers, cost, technologies) of different energy carriers (coal, gas, oil, electricity, heat etc.)

Renewable Energy - Resources, Technology and Economics: Characterisation of different renewable energy carriers (wind, solar, hydro, geothermal etc.)

Energy Policy: Management of energy flows, energy-political targets and instruments (emission trading etc.)

Annotation
Additional study courses (E.g. from other universities) can be transferred to the grade of the module on special request at the institute.

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.

Recommendation
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 5.20 Module: Engineering Mechanics [M-MACH-101259]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-MACH-102208	Introduction to Engineering Mechanics I: Statics and Strength of Materials	3 CR	Fidlin

Competence Certificate
The assessment consists of a written examination taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.

Permitted utilities: non-programmable calculator, literature

Prerequisites
None

Competence Goal
Professional competences:

Students will

- know and understand the basic elements of statics;
- be able to carry out simple static calculations on their own;
- know the basic concepts of strength theory: stress, strain and their relationship within the framework of elementary elasticity theory;
- know the most common strength hypotheses;
- be able to calculate independently rods, shafts and beams;
- know the classical cases of stability loss in compressed beams.

Interdisciplinary competences:

Students are familiar with analytical procedures and problem-oriented thinking. They are aware of the complexity of engineering problems and are able to identify and focus on the key issues within them. Students are able to use their acquired knowledge theoretical analysis of practically relevant engineering problems and to develop approaches to their solution.

Content
Statics: force • moment • general equilibrium conditions • center of gravity • inner forces in structure • plane frameworks • adhesion

Annotation
Starting summer 2016 the course "Introduction to Engineering Mechanics I : Statics and Strength of Materials" [2162238] will be held in summer term.

Workload
The total workload for this module is approximately 90 hours

Learning type
Lecture and exercises

M 5.21 Module: Essentials of Finance [M-WIWI-101435]

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

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German	3	3

Mandatory			
T-WIWI-102605	Financial Management	4,5 CR	Ruckes
T-WIWI-102604	Investments	4,5 CR	Uhrig-Homburg

Competence Certificate
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
None

Competence Goal
The student

- has fundamental skills in modern finance
- has fundamental skills to support investment decisions on stock, bond and derivative markets
- applies concrete models to assess investment decisions on financial markets as well as corporate investment and financing decisions.

Content
The module *Essentials of Finance* deals with fundamental issues in modern finance. The courses discuss fundamentals of the valuation of stocks. A further focus of this module is on modern portfolio theory and analytical methods of capital budgeting and corporate finance.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

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

Responsible: Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Once	1 term	3	5

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

Competence Certificate

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 5.23 Module: Financial Data Science [M-WIWI-105610]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	English	3	2

Mandatory			
T-WIWI-111238	Financial Data Science	9 CR	Ulrich

Competence Certificate
The module examination is structured as an alternative assessment.

Competence Goal
The primary objective of this course is to introduce students to data-driven financial analysis and equip them with a broad set of machine learning techniques for capital markets. The program begins with practical MBA-style case studies on fundamental finance concepts, ensuring that all participants—regardless of prior finance knowledge—establish a strong foundational understanding. In parallel, students develop essential Python programming and data handling skills (e.g., with Pandas, Statsmodels, and scikit-learn).

Building on these fundamentals, the course covers key topics such as forecasting equity and option returns, option pricing (e.g., the Black-Scholes model), and advanced portfolio construction techniques, including distributionally robust optimization and end-to-end reinforcement learning. By integrating financial theory with sophisticated data science methods, students learn to address complex challenges in risk management and empirical asset pricing. Upon completion, they will be able to apply state-of-the-art machine learning approaches to real-world financial data and meet the demands of a rapidly evolving, data-centric financial industry.

Content
This course offers a blend of financial fundamentals and modern data analysis. The content is structured as follows:

- Introduction to Finance
- Introduction to valuation concepts and portfolio theory
- Risk premiums and the CAPM
- Case studies for the practical application of financial theories
- Python Basics and Data Processing
- Efficient data management and cleaning
- Regression analyses and constrained optimization
- Introduction to essential libraries (e.g., NumPy, Pandas, PyTorch)
- Machine Learning in Finance
- Linear vs. non-linear prediction models
- Neural networks, random forests, and other ML methods
- Feature selection and out-of-sample performance
- Options and Volatility Analysis
- Construction and analysis of implied volatility structures
- ML-based option pricing and risk premium models
- Systematic vs. idiosyncratic risks
- Advanced ML Applications
- Deep learning for equity and option return forecasts
- Statistical arbitrage and end-to-end portfolio optimization
- Distributionally robust optimization
- Practical Examples and Case Studies
- Use of modern ML libraries (PyTorch, TensorFlow)
- Real-world datasets and empirical financial analysis
- Discussion of challenges (e.g., big data, computational effort)

Workload

The total workload for this module is approximately 270 hours (equivalent to 9 credit points). This workload includes:

1. Independent study of financial fundamentals (e.g., valuation, CAPM, portfolio theory) and preparation for case studies.
2. Programming exercises in Python (e.g., regression analyses, data cleaning, constrained optimization).
3. Weekly assignments and in-depth questions on the topics covered in class.
4. Preparation and follow-up of lectures, particularly using lecture notes, online videos, and recommended reading materials.
5. Project and case study work applying the learned material to real-world data.
6. Final exam preparation, revisiting essential concepts and practical programming skills.

M 5.24 Module: Financial Economics [M-WIWI-103120]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	English	3	2

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102878	Computational Risk and Asset Management	4,5 CR	Ulrich
T-WIWI-106194	Macro-Finance	4,5 CR	Ulrich

Competence Certificate
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 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 apply statistical methods to estimate expected returns, risk and risk densities of different investment instruments. They will know how to apply maximum likelihood and expectation maximization algorithms to estimate linear and non-linear asset pricing models from the fixed-income, equity or option pricing literature. Besides a conceptual understanding, students will implement the estimation algorithms using modern software and learn about current innovations in the macro-finance literature, aiming to price bonds, equity and option markets with explicitly accounting for fundamental economic and monetary policy related risks under no-arbitrage.

Content
See respective lecture

Annotation
See respective lecture

Workload
The total workload for this module is approximately 270 hours. For further information, see respective lecture.

5.25 Module: Financing and Accounting [M-WIWI-105769]

Responsible: Prof. Dr. Martin Ruckes
Dr. Jan-Oliver Strych
Prof. Dr. Marcus Wouters

Organisation: KIT Department of Economics and Management

Part of: Business Administration (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	3	3

Mandatory			
T-WIWI-112820	Introduction to Finance and Accounting	5 CR	Luedecke, Ruckes, Strych, Uhrig-Homburg, Wouters

Competence Certificate
The module examination is in written form. The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Competence Goal
The student

- has basic knowledge in financial assessment of important business decisions and the functioning of financial markets,
- has an understanding of problems, interrelationships and solutions of internal accounting of companies,
- knows the structures and functions of external accounting,
- has an overview of important components of the annual financial statements of companies and is able to assess them economically.

With the knowledge acquired in the three basic business administration modules, the prerequisites are created in the area of business administration to expand this knowledge in the specialization program.

Content
The fundamentals for the financial analysis of important business decisions are taught. In addition, the fundamentals of internal and external accounting are laid and an introduction is given to accounting and the annual financial statements.

Workload
Total workload required for 5 credit points: approx. 150 hours

5.26 Module: Foundations of Informatics [M-WIWI-101417]

Responsible: Dr.-Ing. Tobias Käfer
Prof. Dr. Sanja Lazarova-Molnar

Organisation: KIT Department of Economics and Management

Part of: Informatics (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
10	Grade to a tenth	Each term	2 terms	German/English	3	1

Mandatory			
T-WIWI-102749	Foundations of Informatics I	5 CR	Käfer
T-WIWI-102707	Foundations of Informatics II	5 CR	Lazarova-Molnar

Competence Certificate

The assessment is carried out as partial exams (according to Section 4(2), 1 and 3 of the examination regulation) of the individual courses of this module.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. For a successful module assessment both partial exams have to be passed.

- Foundations of Informatics I: Written exam in the first week of the recess period (60 min)
- Foundations of Informatics II: Written exam in the first week of the recess period (90 min). It is possible to gain 0,3-0.4 additional grading points for a passed exam by successful completion of a bonus exam.

When both partial exams are passed, the overall grade of the module is the average of the grades for each course weighted by the credit points and truncated after the first decimal.

Prerequisites

None

Competence Goal

The student

- knows the main principles, methods and systems of computer science,
- can use this knowledge for applications in advanced computer science courses and other areas for situation-adequate problem solving,
- is capable of finding strategic and creative responses in the search for solutions to well defined, concrete, and abstract problems.

The student can deepen the learned concepts, methods, and systems of computer science in advanced computer science lectures.

Content

This module conveys knowledge about modeling, logic, algorithms, sorting and searching algorithms, complexity theory, problem specifications, and data structures. From the field of theoretical computer science, formal models of automata, languages and algorithms are presented and applied to the architecture of computer systems.

Workload

The total workload for this module is approximately 300 hours.

Recommendation

It is strongly recommended to attend the courses of the core program in the following sequence: *Introduction to Programming with Java*, *Foundations of Informatics I*, *Foundations of Informatics II*

5.27 Module: Foundations of Marketing [M-WIWI-101424]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	9

Mandatory			
T-WIWI-102805	Managing the Marketing Mix	4,5 CR	Klarmann
Supplementary Courses (Election: at least 4,5 credits)			
T-WIWI-111367	B2B Sales Management	4,5 CR	Klarmann
T-WIWI-112156	Brand Management	4,5 CR	Kupfer
T-WIWI-114292	Consumer Psychology	4,5 CR	Scheibehenne

Competence Certificate
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 *Marketing Mix* is compulsory and must be examined.

Competence Goal
The aim of this module is to prepare students for a job in marketing or sales. Especially in technically oriented companies, employees who have a certain technical background as industrial engineers or business informatics specialists are often fit for this purpose.
Students

- are familiar with the most important concepts, procedures and theories of the four instruments of the marketing mix (product management, price management, communication management and sales management)
- have the knowledge to make decisions regarding current and future products (product innovations, e.g. by using conjoint analysis)
- know how customers perceive brands and how this perception can be influenced by the company
  understand how customers react to prices (e.g. using price-sales functions)
- can determine prices on the basis of conceptual and quantitative considerations
  know the basics of price differentiation
- are familiar with various communication instruments (e.g. TV advertising) and can design them accurately
- make communication decisions systematically (e.g. by means of media planning)
- can segment the market and position the product
- know how to assess the importance and satisfaction of customers.

Additionally when taking the course "B2B Sales Management":

- can shape the relationship with customers and sales partners and know the basics of sales organization as well as essential sales channel decisions
- know about specifics of marketing in B2B
- are able to identify different B2B business types and their peculiarities in marketing and sales
- are able to prioritize customers and calculate B2B customer lifetime value
- are able to determine value-based prices and prepare and conduct B2B sales presentations.

Additionally when taking the course "Consumer Behavior":

- know about the influences of social factors, neuronal processes and cognitive resources on consumer behavior
- know about the influences of evolutionary factors, emotions, individual differences and motivation on consumer behavior.

Content

The core course of the module is “Marketing Mix”. This course is compulsory and must be examined. “Marketing Mix” contains instruments and methods that enable you to goal-oriented decisions in the operative marketing management (product management, pricing, promotion and sales management). In the "B2B Sales Management" course, we impart knowledge about marketing and sales in environments in which companies themselves distribute and market (often technically highly complex) products to other companies ("business-to-business"). In the "Consumer Behavior" course, we provide an understanding of situational, biological, cognitive, and evolutionary factors that influence consumer behavior. This understanding is provided from an interdisciplinary perspective, incorporating relevant theories and empirical research findings from psychology, cognitive science, biology, and economics.

Annotation

The courses "Services Marketing and B2B Marketing" and "International Marketing" were offered for the last time in the winter semester 2020/21 and will be replaced by the course "B2B Sales Management" from the winter semester 2021/22 on. The course "Marketing Mix" will continue to be offered as normal in the summer semester 2021 and will also be retained in the long term.
For further information please contact the Marketing & Sales Research Group (marketing.iism.kit.edu).

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 5.28 Module: Fundamentals of Construction [M-BGU-101004]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	2

Mandatory			
T-BGU-101691	Construction Technology	6 CR	Haghsheno
T-BGU-101675	Project Management	3 CR	Haghsheno

Prerequisites
none

Competence Goal
The student

- is familiar with all substantial domains of construction
- knows and understands substantial construction methods and construction machines
- masters basic construction calculations
- knows and understands the fundamentals of project management in civil engineering
- can apply his / her knowledge in a goal-oriented manner to accomplish a construction project efficiently

Annotation
We encourage students to deepen their knowledge in construction by building additional customized modules from the courses offered by TMB. Please consult with the tutors of this module. Further information is available at www.tmb.kit.edu.

Recommendation
None

M 5.29 Module: Fundamentals of Digital Service Systems [M-WIWI-102752]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	7

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-111307	Digital Services: Foundations	4,5 CR	Satzger, Vössing
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-110888	Practical Seminar: Digital Services	4,5 CR	Satzger

Competence Certificate
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 services from different perspectives and the concept of value creation in service networks
- know about the concepts, methods and tools for the design, modelling, development and management of digital services and are able to use them
- understand the basic characteristics and effects of integrated information system as a an integral element of digital services
- gain experience in group work as well as in the analysis of case studies and the professional presentation of research results
- practice skills in the English language in preparation of jobs in an international environment

Content
Global economy is increasingly determined by services: in industrialized countries nearly 70% of gross value added is achieved in the tertiary sector. Unfortunately, for the design, development and the management of services traditional concepts focused on goods are often insufficient or inappropriate. Besides, the rapid technical advance in the information and communication technology sector pushesthe economic importance of digital services even further thus changing the competition environment. ICT-based interaction and individualization open up completely new dimensions of shared value between clients and providers, dynamic and scalable “service value networks” replace established value chains, digital services are provided globally crossing geographical boundaries. This module establishes a basis for further specialization in service innovation, service economics, service design, service modelling, service analytics as well as the transformation and coordination of service networks.

Annotation
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.

Recommendation
None

M 5.30 Module: Handling Characteristics of Motor Vehicles [M-MACH-101264]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	7

Vehicle Properties (Election: at least 9 credits)			
T-MACH-105152	Handling Characteristics of Motor Vehicles I	3 CR	Unrau
T-MACH-105153	Handling Characteristics of Motor Vehicles II	3 CR	Unrau
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gießler

Competence Certificate
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 and understands the characteristics of vehicles, owing to the construction and design tokens,
- knows and understands especially the factors being relevant for comfort and acoustics
- is capable of fundamentally evaluating and rating handling characteristics.

Content
See courses.

Workload
The total work load for this module is about 270 Hours (9 Credits). The partition of the work load is carried out according to the credit points of the courses of the module. The work load for courses with 4.5 credit points is about 135 hours, and for courses with 3 credit points about 90 hours. The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam duration and the time that is required to achieve the objectives of the module as an average student with an average performance.

Recommendation
Knowledge of the content of the courses *Engineering Mechanics I* [2161238], *Engineering Mechanics II* [2162276] and *Basics of Automotive Engineering I* [2113805], *Basics of Automotive Engineering II* [2114835] is helpful.

M 5.31 Module: HR Management & Digital Workplace [M-WIWI-105928]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Petra Nieken

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	3	2

Elective Offer (Election:)			
T-WIWI-113745	HR-Management 1: HR Strategies in the Age of AI	4,5 CR	Nieken
T-WIWI-111858	Topics in Human Resource Management	3 CR	Nieken
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-111914	Practical Seminar: Interactive Systems	4,5 CR	Mädche

Competence Certificate
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 future of work
- understands the impact of digitalization and new information and communication technology on the work life and HR decisions
- knows how to apply scientific research methods and understands the underlying problems

Content
The module „HR Management & Digital Workplace" offers an interdisciplinary approach and brings together knowledge about Human Resource Management, Leadership and Digitalization. The module specifically focuses on topics related to the future of work in organizations. The topics range from interactive systems at the digital workplace and human-centered design, to recruiting, training and development, as well as (digital) leadership. All courses in the module foster active participation and allow students to learn state-of-the-art concepts and methods and apply them to real-world challenges.

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

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

M 5.32 Module: Industrial Production I [M-WIWI-101437]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	3	4

Mandatory			
T-WIWI-102606	Fundamentals of Production Management	5,5 CR	Schultmann
Supplementary Courses (Election: 3,5 credits)			
T-WIWI-102870	Logistics and Supply Chain Management	3,5 CR	Schultmann
T-WIWI-102820	Production Economics and Sustainability	3,5 CR	Schultmann, Volk

Competence Certificate
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course "Fundamentals of Production Management" [2581950] 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 "Fundamentals of Production Management" [2581950] and one additional activity have to be chosen.

Competence Goal

- Students shall be aware of the important role of industrial production and logistics for production management.
- Students shall use relevant concepts of production management and logistics in an adequate manner.
- Students shall be able to reflect on decision principles in firms and their circumstances in the light of the production management aspects studied.
- Students shall be proficient in describing essential tasks, difficulties and solutions to problems in production management and logistics
- Students shall be able to describe relevant approaches of modeling production and logistic systems.
- Students shall be aware of the important role of material and energy-flows in production systems.
- Students shall be proficient in using exemplary methods for solving selected problems.

Content
This module is designed to introduce students into the wide area of industrial production and logistics management. It focuses on strategic production management under the aspect of sustainability. The courses use interdisciplinary approaches of systems, also theory to describe the central tasks of industrial production management and logistics. Herein, attention is drawn upon strategic corporate planning, research and development as well as site selection. Students will obtain knowledge in solving internal and external transport and storage problems with respect to supply chain management and disposal logistics.

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.

5.33 Module: Information Systems & Digital Business [M-WIWI-105981]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	3	3

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-111307	Digital Services: Foundations	4,5 CR	Satzger, Vössing
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-113746	Enterprise Systems for Financial Accounting & Controlling	4,5 CR	Fleig, Mädche
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-107506	Platform Economy	4,5 CR	Weinhardt
Complementary Offer (Election: at most 1 item)			
T-WIWI-110888	Practical Seminar: Digital Services	4,5 CR	Satzger
T-WIWI-111914	Practical Seminar: Interactive Systems	4,5 CR	Mädche
T-WIWI-112154	Practical Seminar: Platform Economy	4,5 CR	Weinhardt

Competence Certificate
The module examination takes place in the form of partial examinations via courses of the module amounting to a total of at least 9 LP.
The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

Competence Goal
Students

- understand the basic concepts of interactive systems as well as the economic foundations and key components of platforms
- explore the theoretical grounding of interactive systems leveraging theories from reference disciplines such as psychology
- understand business models, network effects of digital platforms and get to know different market forms and market mechanisms
- gain experience in group work as well as in the analysis of case studies and the professional presentation of research results

Content

The "Information Systems & Digital Business" modules of the research groups of Prof. Dr. Alexander Mädche (Information Systems & Service Design), Prof. Dr. Gerhard Satzger (Digital Service Innovation) and Prof. Dr. Christof Weinhardt (Information & Market Engineering), offer a comprehensive overview on important topics of digitalization – blending aspects of digital interaction, digital services and the platform economy. Courses in this module cover the aspects of interaction between humans and information systems as well as the economic foundations of platform businesses:

Foundations of Interactive Systems:

Advanced information and communication technologies (ICT) make interactive systems ever-present in the users' private and business life. They are an integral part of E-Commerce portals or social networking sites as well as at the workplace, e.g. in the form of collaboration portals or analytical dashboards. Furthermore, with the ever-increasing capabilities of ICT, the design of human-computer interaction is becoming increasingly important. The aim of this module is to introduce the foundations, related theories, key concepts, and design principles as well as current practice of contemporary interactive systems. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

Platform Economy:

Apple, Alphabet, Amazon, Microsoft, and Facebook; five of the most valuable companies worldwide create large portions of their profits by employing a digital platform model. This module teaches the key design considerations of digital platforms: their foundations in economic theory, their core components and design aspects, the adequate selection of market mechanisms for achieving certain goals, and the role of user behavior in the context of digital platforms. The theoretic foundations are enriched by discussions of several real-world examples, e.g. from the finance sector. Thus, the students are enabled to a) analyze given platforms and make recommendations for improvements and b) independently design new platforms for given use cases.

Annotation

The module can no longer be taken as of winter semester 2022/2023.

Workload

Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). 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 5.34 Module: Integrated Production Planning [M-MACH-101272]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German	3	3

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

Competence Certificate
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

Learning type
Lecture, exercise, excursion

5.35 Module: Internship [M-WIWI-101419]

Responsible: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: Internship

Credits	Grading scale	Recurrence	Duration	Level	Version
10	pass/fail	Once	1 term	3	2

Mandatory			
T-WIWI-102611	Internship	10 CR	Studiendekan des KIT-Studienganges

Competence Certificate
The assessment is carried out by the evidence of completed full-time internships of at least 12 weeks with at least 20 working hours per week and a presentation of the internship in the form of a written report on the activities. The internship is not graded.

1. Information on evidence of completed full-time internships:

The internship is proofed by the certificate of the intern's office. The certificate has to be formally correct with official corporate letterhead and handwritten countersigned by a responsible employee of the company.

The certificate must at least contain the following information:

* Company / Location
* Duration: from ... to ...
* Hours of work (weakly)
* Working interruption, indicating the vacation and sick days
* Department
* Headwords to the activitis

2. Information on to the presentation:

The internship report should be at least one page (typewritten, not handwritten) for each Location. It must be countersigned by a representative of the intern's office.

Prerequisites
None

Competence Goal

- has general insight into the essential processes in a company,
- is in a position to identify operation correlations and has the knowledge and skills to facilitate a fast understanding of the processes in the company,
- in addition to practical professional experience and competences, also has key competences such as own initiative, ability to work in a team and communication skills as well as ability to integrate into corporate hierarchies and procedures,
- has the experience to accomplish complex IT and business tasks under realistic conditions within the framework of the relevant legal aspects and while applying the total acquired knowledge (interlaced thinking),
- has an idea of the professional development potential in the economy through pursuit of study-related activities,
- knows the technical and professional requirements in the individually targeted future occupation and can take this knowledge into account for the future planning of his/her studies and career,
- can assess and estimate own technical and professional strengths and weaknesses through his/her evaluation of the company.

Content

The internship may be done in economic, business and/or technical companies. At best, it is done on activities which are located at the intersection of the two fields - getting to know the specific requirements of Industrial Engineering and Management.

A commercial internship provides an insight into business or administrative processes of business transactions. Therefor departments such as controlling, organizing, marketing and planning appear particularly suitable.

Work experiences in the departments of engineering, work preparation and provision of material or IT cover more technical aspects of the internship. But work experiences in an engineering firm go with a technical internship.

It remains the companies and interns left, which stations and areas the intern will eventually go through. But the focus should always be in accordance with operational realities of the company.

Annotation

Internships, that were completed even before studying may be recognized, if the criteria for recognition are met. After recognition of the compulsory internship, there can be taken a semester off for a voluntary, student-related internship.

Regarding to the election of the company, in which the internship is completed, there are no specific rules. With a view to the future professional career, it is recommended to absolve the internship in a larger, possibly international company.

Vacation days are not figured into the internship.

Only three sick leave days may incurred at all. Any additional sick days are not figured into the internship.

A relevant vocational education of at least two years is accepted as a performance equivalent to the internship.

Workload

The total workload for this module is approximately 300 hours.

5.36 Module: Introduction to Economics [M-WIWI-101398]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: Economics (mandatory)

Credits	Grading scale	Recurrence	Duration	Level	Version
10	Grade to a tenth	Each term	2 terms	3	1

Mandatory			
T-WIWI-102708	Economics I: Microeconomics	5 CR	Puppe, Reiß
T-WIWI-102709	Economics II: Macroeconomics	5 CR	Wigger

Competence Certificate
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. The assessment procedures of each course of this module is defined for each course separately.

Competence Goal
The student

- knows and understands basic economic problems,
- understands economic policy in globalized markets,
- is able to develop elementary solution concepts.

The lectures of this module have different focuses: In Economics I, economic problems are seen as decision problems, Economics II treats the dynamics of economic processes.

Content
The basic concepts, methods and models of micro- and macroeconomics are treated. The course *Economics I: Microeconomics [2600012]* deals with micro-economic decision theory, questions of market theory and problems of imperfect competition and with basic principles of game theory and welfare economics. *Economics II: Macroeconomics [2600014]* discusses economic organization models and national accounts as well as the question of international trade and monetary policy. Furthermore, the complex growth, boom and economic speculations are dealed with.

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.

Annotation
Notice: The lecture *Economics I: Microeconomics* [2600012] is part of the preliminary examination concerning § 8(1) of the examination regulation in the study programs Industrial Engineering and Management B.Sc. and Economics Engineering B.Sc.. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Workload
See German version.

M 5.37 Module: Introduction to Natural Hazards and Risk Analysis [M-WIWI-104838]

Responsible: apl. Prof. Dr. Michael Kunz
Organisation: KIT Department of Economics and Management
Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	4

Compulsory Elective Courses (Election: at least 9 credits)			
T-BGU-101500	Introduction to Engineering Geology	5 CR	Blum
T-BGU-103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite	3 CR	Wursthorn
T-BGU-101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	3 CR	Wursthorn
T-BGU-101637	Systems of Remote Sensing, Prerequisite	1 CR	Cermak, Hinz, Weidner
T-BGU-101638	Procedures of Remote Sensing, Prerequisite	1 CR	Weidner
T-BGU-101636	Remote Sensing, Exam	4 CR	Cermak, Hinz, Weidner
T-BGU-103542	Procedures of Remote Sensing	3 CR	Weidner
T-PHYS-103525	Geological Hazards and Risk	8 CR	Schäfer
T-BGU-101693	Hydrology	4 CR	Zehe
T-PHYS-101092	Climatology	1 CR	Ginete Werner Pinto
T-BGU-101814	Project in Applied Remote Sensing	1 CR	Hinz, Weidner
T-PHYS-105594	Exam on Climatology	5 CR	Ginete Werner Pinto
T-BGU-101667	Hydraulic Engineering and Water Management	4 CR	Rodrigues Pereira da Franca

Competence Certificate
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
There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations".

Competence Goal
The student possesses

- knowledge of various extreme events (meteorological, hydrological, geophysical) and their characteristics and causes
- an improved understanding of natural disasters, their causes and effects from an interdisciplinary perspective
- knowledge of methods of early warning and/or prediction of extreme natural events, as well as possible prevention and precautionary measures.

Content
The courses in this module primarily deal with scientific and engineering aspects of extreme events and natural disasters. The overarching aim of the module is to gain a better understanding of risk as a complex interaction of different mechanisms and processes. Contributions from meteorology, geophysics and hydrology enable an interdisciplinary understanding of extreme events and disasters. The teaching of methodological knowledge (e.g. meteorological, hydrological or geophysical measurement methods) is of great importance. These also include methods of hazard analysis and forecasting and/or early warning with the aim of significantly reducing the exposure and vulnerability of people, critical infrastructure and technical or biological systems and thus the impact of extreme events.

Annotation

As a precaution, we would like to point out that the lecture belonging to the "Climatology" [T-PHYS-101092] has the number 4051111 and is read by Mr. Pinto. The lecture of the same name by Mr. Hogewind (6111031) does not belong to this course and is not creditable in this module.

Information on the course "Geological Hazards and Risk":

Language: English

Content:

- Earthquake Hazards
  - Short introduction to seismology and seismometry (occurrence of tectonic earthquakes, types of seismic waves, magnitude, intensity, source physics)
  - Induced seismicity
  - Engineering seismology, Recurrence intervals, Gutenberg-Richter, PGA, PGV, spectral acceleration, hazard maps
  - Earthquake statistics
  - Liquefaction
- Tsunami Hazards
- Landslide Hazards
- Hazards from Sinkholes
- Volcanic Hazards
  - Short introduction to physical volcanology
  - Types of volcanic hazards
- The Concept of Risk, Damage and Loss
- Data Analysis and the use of GIS in Risk analysis
- Risk Modelling - Scenario Analysis
- Risk Reduction and Risk Management
- Analysis Feedback and Prospects in the Risk Modelling Industry

Learning outcomes:

The students understand basic concepts of hazard and risk. They can explain in detail different aspects of earthquake hazard, volcanic hazard as well as other geological hazards, can compare and evaluate those hazards. The have fundamental knowledge of risk reduction and risk management. They know methods of risk modelling and are able to apply them.

Examination: Active and regular attendance of lecture and practicals. Project work (graded).

Workload:

60 h: active attendance during lectures and exercises
90 h: review, preparation and weekly assignments
90 h: project work

Workload

The total workload for this module is approximately 270 hours.

Recommendation

The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

M 5.38 Module: Introduction to Operations Research [M-WIWI-101418]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: Operations Research (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	2 terms	German	3	2

Mandatory			
T-WIWI-102758	Introduction to Operations Research I and II	9 CR	Nickel, Rebennack, Stein

Competence Certificate
The assessment of the module is carried out by a written examination (120 minutes).
In each term (usually in March and August), one examination is held for both courses.

Prerequisites
None

Competence Goal
The student

- names and describes basic notions of the essential topics in Operations Research (Linear programming, graphs and networks, integer and combinatorial optimization, nonlinear programming, dynamic programming and stochastic models),
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Content
This module treats the following topics: linear programming, network models, integer programming, nonlinear programming, dynamic programming, queuing theory, heuristic models.

This module forms the basis of a series of advanced lectures with a focus on both theoretical and practical aspects of Operations Research.

Module grade calculation
The overall grade of the module is the grade of the written examination.

Workload
The total workload for this module is approx. 270 hours (attendance time: 85 hours, other time for preparation and follow-up as well as exam preparation: 185 hours, 9 credit points).

The total workload of 9 credit points is divided into approx. 3.5 credit points in the first semester and 5.5 credit points in the second semester.

The total number of hours per course is calculated from the time required to attend lectures and tutorials, 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 5.39 Module: Introduction to Programming [M-WIWI-101581]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: Informatics (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	3	1

Mandatory			
T-WIWI-102735	Introduction to Programming with Java	5 CR	Zöllner

Competence Certificate
The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation.
The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Competence Goal

- Knowledge of the fundamental principles, methods and systems of informatics.
- Students acquire the ability to independently solve algorithmic problems in the programming language Java, which is predominant in the field of business applications.
- This enables them to find strategic and creative answers in the search for solutions to precisely defined, concrete and abstract problems.

Content
With an introduction to systematic programming, the module provides essential practical foundations for all advanced computer science lectures. Based on considerations on the structured and systematic design of algorithms, the most important constructs of modern higher programming languages and programming methods are explained and illustrated using examples. One focus is on teaching the concepts of object-oriented programming. Java is used as the programming language. Knowledge of this language is assumed in the advanced computer science lectures.

Workload
Total workload for 5 credit points: approx. 150 hours

Attendance time: 45 hours

Preparation and follow-up of the course: 67.5 hours

Exam and exam preparation: 37.5 hours

M 5.40 Module: Introduction to Statistics [M-WIWI-101432]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: Statistics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
10	Grade to a tenth	Each term	2 terms	German	3	2

Mandatory			
T-WIWI-102737	Statistics I	5 CR	Grothe, Schienle
T-WIWI-102738	Statistics II	5 CR	Grothe, Schienle

Competence Certificate
The assessment of this module consists of two written examinations according to Section 4(2), 1 of the examination regulation (one for each of the courses Statistics I and II).

The overall grade of the module is the average of the grades of these two written examinations.

Prerequisites
Notice: The lecture *Statistics I* [25008/25009] is part of the preliminary examination concerning Section 8(1) of the examination regulation. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Competence Goal
The student

- knows and understands the basic concepts of statistical data analysis and applies them independently to limited objects of investigation,
- knows and understands the basic definitions and statements of probability theory and applies them independently,
- transfers the theoretical foundations of statistical data analysis and probability theory to the issues of parametric estimation and test theory.

Content
The module contains the fundamental methods and scopes of Statistics.

A. Descriptive Statistics: univariate und bivariate analysis

B. Probability Theory: probability space, conditional and product probabilities, transformation of probabilities, parameters of location and dispersion, most importand discrete and continuous distributions, covariance and correlation, limit distributions

C. Theory of estimation and testing: suffiency of statistics, point estimation (optimality, ML-method), internal estimations, linear regression

Module grade calculation
The overall grade of the module is the average of the grades of these two written examinations.

Workload
The total workload for this module is approx. 300 hours (10 credits). The distribution is based on the credit points of the courses of the module.

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

Recommendation
It is strongly recommended to complete the course *Statistics I* [25008/25009] before the course *Statistics II* [25020/25021].

The lecture is accompanied by an exercise and a tutorial as well as a computer practical course, which are recommended.

5.41 Module: Leadership & Sustainable HR-Management [M-WIWI-106860]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	4

Mandatory			
T-WIWI-113745	HR-Management 1: HR Strategies in the Age of AI	4,5 CR	Nieken
Elective Offer (Election:)			
T-WIWI-114178	HR-Management 2: Organization, Fairness & Leadership	4,5 CR	Nieken
T-WIWI-111858	Topics in Human Resource Management	3 CR	Nieken

Competence Certificate
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.

Competence Goal
The student

- understands and analyzes relevant processes, methods, and instruments in HR management and leadership, evaluating their usefulness,
- analyzes various processes and assesses their strengths and weaknesses, particularly regarding the use of AI in the workplace and sustainability aspects,
- understands the current challenges in HR management and leadership, considering their alignment with corporate strategy,
- evaluates the strengths and weaknesses of existing structures and regulations based on systematic criteria,
- possesses knowledge of the applicability and challenges of different scientific research methods.

Content
The module provides comprehensive knowledge in the areas of sustainable HR management, leadership, fair working conditions, and diversity and inclusion. Students engage deeply with the future of work. Topics range from classic HR themes such as recruiting and employee retention to AI in the workplace, fair working conditions, and sustainability.

Drawing on microeconomic and behavioral economic approaches, we analyze various processes and instruments, evaluating their alignment with corporate strategy. All courses within the module encourage active participation and empower students to learn cutting-edge concepts and methods, applying them to real-world challenges

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

Recommendation
Completion of the core module "Management and Marketing" is recommended.
There is no fixed order for the courses of this module.

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

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	English	3	2

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

Competence Certificate
The assessment consists of a 120 minutes written examination (according to §4(2), 1 of the examination regulation).

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

Recommendation
none

Learning type
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 5.43 Module: Machine Learning and Data Science [M-WIWI-105482]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	3	1

Mandatory			
T-WIWI-111028	Introduction to Machine Learning	4,5 CR	Geyer-Schulz, Nazemi
T-WIWI-111029	Introduction to Neural Networks and Genetic Algorithms	4,5 CR	Geyer-Schulz

Competence Certificate
The module examination is carried out in the form of partial examinations of the selected courses of the module, with which in total the minimum requirement of credit points is fulfilled. The kind of examination is described in detail for each course of this module.

Prerequisites
None

Competence Goal
The student

- knows the main families of machine learning methods, their basic principles, assumptions and restrictions.
- can use these methods to solve data analysis problems, to support decision making or for process automation in companies and use the solutions interpreted and evaluated accordingly.
- can compare and evaluate the performance of solutions.

Content
The module mainly focuses on methods from statistical learning (linear and logistic learning, regression, tree methods, SVMs, and shrinkage estimators) and from the field of neural and genetic procedures were presented. Furthermore, data transformations and -representations (e.g. dimension reduction, clustering, imputation in case of missing data) and visualization techniques and appropriate inference, diagnosis and validation techniques are presented.

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

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

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	4	5

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

Competence Certificate
Oral exam (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

Learning type
Lecture, exercise, excursio

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

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	English	3	3

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

Competence Certificate
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.

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.

Annotation
The following courses are part of this module:

- The course Management Accounting 1, which is offered in every sommer semester
- The course Management Accounting 2, which is offered in every winter semester

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.

5.46 Module: Management and Marketing [M-WIWI-105768]

Responsible: Prof. Dr. Martin Klarmann
Prof. Dr. Hagen Lindstädt
Prof. Dr. Petra Nieken
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of: Business Administration (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-WIWI-111594	Management and Marketing	5 CR	Klarmann, Lindstädt, Nieken, Terzidis

Competence Certificate
The module examination is in written form on the two courses "Managemet" and "Marketing". The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Competence Goal
The student

- has basic knowledge of central issues in business administration,
- has an understanding of problems, interrelationships and solutions in strategic management,
- is able to analyze and evaluate central areas of activity, functions and decisions in a company operating in a market economy,
- has an overview of important marketing-relevant questions and well-founded approaches to their solution.

With the knowledge acquired in the three basic business administration modules, the prerequisites are created in the area of business administration to expand this knowledge in the specialization program.

Content
An understanding of the basic functions of managing businesses is provided. In addition, the basics of marketing are taught.

Workload
Total workload required for 5 credit points: approx. 150 hours

M 5.47 Module: Manufacturing Technology [M-MACH-101276]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	3	6

Mandatory			
T-MACH-102105	Manufacturing Technology	9 CR	Schulze

Competence Certificate
Written Exam (180 min)

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 lecture "Manufacturing Technology".

Annotation
The lecture Manufactoring Technology will be offered for the last time in WS 2024/2025 (the lecture videos will remain online). The exam will be offered for the last time in SS 2025 for first-time writers and for the last time in WS 2025/2026 for repeaters.

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

Learning type
Lectures, exercise, excursion

M 5.48 Module: Materials Science [M-MACH-101260]

Responsible: Dr.-Ing. Susanne Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (mandatory)

Credits	Grading scale	Recurrence	Duration	Level	Version
3	Grade to a tenth	Each winter term	1 term	3	1

Mandatory			
T-MACH-102078	Materials Science I	3 CR	Wagner

Competence Certificate
The assessment of the module is carried out by a written examination (150 min) about the lecture*Material ScienceI*[2125760] (according to Section 4(2), 1 of the examination regulation).

The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.

The grade of the module corresponds to the grade of this examination.

Prerequisites
None.

Competence Goal
Students are able to specify the basics of materials science and engineering and can apply it to simple problems in various technical areas.

As major part of the module, the students know the correlation between atomic structure and bonding of solids and the macroscopic properties such as mechanical behavior or electrical conductivity. They have basic knowledge with respect to materials characterization. The students are able to analyze phase diagrams with up to two components and can derive simple correlations among composition, processing, microstructure evolution and materials properties.

Content
After an introduction to the atomic structure and interatomic bonding, elementary concepts of crystallography are given. Different types of crystal structures are explained and various types of imperfections in solids. Then, the mechanical behaviour and the physical properties of various types of materials (metals, polymers, ceramics) are discussed. The thermodynamic principles of solidification and the basic types of phase diagrams are given to understand to iron-carbon phase diagram and the manifold microstructures of steel and cast iron.

Workload
The total workload for this module is approximately 90 hours.

M 5.49 Module: Mathematics 1 [M-MATH-105754]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
10	Grade to a tenth	Each winter term	1 term	German	3	1

Mandatory			
T-MATH-111492	Mathematics I - Midterm Exam	5 CR	Hug, Last, Nestmann, Winter
T-MATH-111493	Mathematics I - Final Exam	5 CR	Hug, Last, Nestmann, Winter

Competence Certificate
The assessment consists of two written exams of 90 min each (in accordance with §4(2), 1 of the examination regulations). The first (midterm) exam takes place after half of the course, the second (final) exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are not allowed.

Resit exams for both exams are offered in the first weeks of the subsequent semester. Both resit exams will take place on the same day.

Candidates who have not passed the corresponding midterm or final exam, as well as those who have not yet taken a first attempt, will be eligible for the resit exams.

Oral re-examinations (in accordance with $9(1) of the examination regulations) for the midterm or final exam take place as individual examinations.

Both the midterm and final exams must be passed individually.

Prerequisites
none

Competence Goal
Students

- are confident with basic terms and definitions of mathematical language (propositions, sets, number systems, mappings, etc.),
- have a basic knowledge of differentiable calculus for functions of a single variable,
- know basic concepts of matrix theory,
- have a basic knowledge of integral calculus in a single variable.

Content
The course Mathematics 1 is the first part of the three semester basic training in higher mathematics. Topics are

- Propositional logic and basic set theory,
- Combinatorics and principles of counting,
- Number systems and basic arithmetics,
- Convergence of sequences and series,
- Continuous functions,
- Differentiable functions,
- Power series and special functions,
- Taylor's theorem,
- Riemann integral,
- n-dimensional vector spaces,
- Systems of linear equations,
- Scalar product, length and angle,
- Linear mappings and matrices,

Module grade calculation
The examination mark for Mathematics 1 is the average of the marks obtained in the midterm exam and final exam.

Workload
Work load: 300 hours (10 ETCS)

Classes: 150 hours

Preparation of courses and examinations: 150 hours

Recommendation
There are no prerequisites. It is strongly recommended to attend the three maths courses in the order Mathematics 1, Mathematics 2, Mathematics 3.

Literature
There are no Prerequisites. We strongly recommend to attend the three maths courses in the order Mathematics 1, Mathematics 2, Mathematics 3.

5.50 Module: Mathematics 2 [M-MATH-105756]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each summer term	1 term	German	3	1

Mandatory			
T-MATH-111495	Mathematics II - Midterm Exam	3,5 CR	Hug, Last, Nestmann, Winter
T-MATH-111496	Mathematics II - Final Exam	3,5 CR	Hug, Last, Nestmann, Winter

Competence Certificate
The assessment consists of two written exams of 75 min each (in accordance with §4(2), 1 of the examination regulations). The first exam (**midterm exam**) takes place after half of the course, the second exam (**final exam**) takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are not allowed.

Resit exams for both exams are offered in the first weeks of the subsequent semester. Both resit exams will take place on the same day.

Eligible for the resit exams are all candidates who either have not passed the corresponding midterm or final exam, or have not yet taken a first attempt.

Oral re-examinations (in accordance with $9(1) of the examination regulations) for the midterm or final exam take place as individual examinations.

Both the midterm and final exam must be passed individually.

Competence Goal
Students

- have a basic knowledge of determinants and eigenvalue theory,
- have a basic knowledge of multivariate differential calculus,
- have a basic knowledge of integrals of functions in several variables

Content
The course Mathematics 2 is the second part of the three semester basic training in higher mathematics. Topics are

- determinants,
- eigenvalue theory,
- multivariate calculus,
- multiple integrals,
- normed vector spaces and Banach's fixed point theorem.

Module grade calculation
The examination mark for Mathematics 2 is the average of the marks obtained in the midterm exam and final exam.

Workload
Work load: 210 hours (7 ETCS)

Classes: 120 hours

Preparation of courses and examinations: 90 hours

Recommendation
There are no prerequisites. It is strongly recommended to attend the three maths courses in the order Mathematics 1, Mathematics 2, Mathematics 3.

M 5.51 Module: Mathematics 3 [M-MATH-105757]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	Grade to a tenth	Each winter term	1 term	German	3	1

Mandatory			
T-MATH-111498	Mathematics III - Final Exam	4 CR	Hug, Last, Nestmann, Winter

Competence Certificate
The assessment consists of a written exam of 75 min (in accordance with §4(2), 1 of the examination regulations). The exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are allowed.

A resit exam is offered in the first weeks of the subsequent semester.

Candidates who have not passed the exam, as well as those who have not yet taken a first attempt, will be eligible for the resit exam.

Oral re-examinations (in accordance with §8(2) of the examination regulations) for the written exam take place as individual examinations.

Competence Goal
Students

- are confident with important concepts in the theory of normed vector spaces,
- have some basic knowledge of ordinary differential equations,
- have some basic knowledge of Fourier analysis.

Content
The course Mathematics 3 is the third part of the three semester basic training in higher mathematics. Topics are

- normed spaces and Banach's fixed point theorem (if not treated in Mathematics 2),
- ordinary differential equations,
- linear differential equations,
- Fourier analysis,
- integral transformations.

Module grade calculation
The module grade is the grade of the written exam.

Workload
Work load: 120 hours (4 ETCS)

Classes: 60 hours

Preparation of courses and examinations: 60 hours

Recommendation
There are no prerequisites. It is strongly recommended to attend the three maths courses in the order Mathematics 1, Mathematics 2, Mathematics 3.

M 5.52 Module: Measurement, Control, and Manufacturing Measurement Technology [M-ETIT-106581]

Responsible: Prof. Dr.-Ing. Michael Heizmann
Prof. Dr.-Ing. Sören Hohmann

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German	3	1

Mandatory			
T-ETIT-112852	Measurement and Control Technology	6 CR	Heizmann, Hohmann
T-ETIT-106057	Manufacturing Measurement Technology	3 CR	Heizmann

Competence Certificate
MRT:

The success control takes place in the form of a written examination of 120 minutes.

FMT:

The success control takes place in the form of a written examination of 90 minutes. If there are less than 20 examinees, an oral examination of approx. 20 minutes can be taken as an alternative. The module grade is the grade of the written or oral examination.

Prerequisites
none

Competence Goal
MRT:

- Students have a sound knowledge of the theoretical fundamentals of measurement technology, including scaling of measured quantities, the SI system of units, model building for measurement systems, description and treatment of systematic and stochastic measurement deviations, obtaining and linearizing measurement characteristics and propagation of measurement uncertainties.
- Students master the procedure for the basic design of measurement systems, taking into account the above knowledge.
- Students are able to analyze tasks in measurement technology, synthesize possible solutions for measurement systems and assess the properties of the solution obtained.
- The aim is to teach the basics of control engineering, therefore students are able to recognize and work on basic control engineering problems. They know the relevant technical terms.
- Students are able to formally describe real processes and to derive requirements for control structures in the time and image domain for fixed value and sequential control systems.
- Students are able to analyze the dynamics of systems using graphical and algebraic methods.
- Students will be able to name controller design methods for single-loop, single-variable systems. They will be able to design perfect closed-loop and open-loop control systems.
- They can perform design steps using the Nyquist criterion and the Wurzelortz curve.
- Students can name structures for disturbance compensation, of multi-loop control loops and two degrees of freedom structures and perform design steps for them.
- Students can digitize closed-loop and open-loop controls designed in the image domain using fast sampling design.
- Students are familiar with computer-aided design procedures and can carry out substeps in them.

FMT:

- Students have sound knowledge of fundamentals, methods and procedures for measuring and testing in industrial manufacturing.
- Students are able to evaluate different measuring principles, methods and devices with regard to their prerequisites, characteristics, areas of application and results.

Students are able to analyze production measurement tasks, derive the resulting requirements for a suitable metrological implementation, find suitable metrological implementations and point out the resulting properties of the measurement result....

Content
MRT:

- Description of measured quantities
    - Metric quantities and their properties
    - SI system of units
- Structure of measuring systems
- Measurement deviations
    - Systematic and stochastic deviations
- Curve fitting
    - Interpolation
    - Approximation
- Characteristic curves and their errors
    - Linearization of characteristic curves
    - Treatment of disturbance variables
- Uncertainty propagation
    - Error propagation
    - Guide to the Expression of Uncertainty in Measurement (GUM)
- Basic concepts of control engineering
    - Control loops
    - Control structures
    - Embedding in automation structures
- Description of systems in time and image domain
    - State space representation
    - Derivation of an I/O representation
    - Signal flow diagrams and control loop elements
    - Realization of controllers (analog and digital)
- Analysis of control loops in time and image domain
    - Stationary accuracy
    - Stability
    - Dynamics (bandwidth)
    - Robustness
- Design of single loop control loops
    - Perfect control
    - Design with the Nyquist criterion
    - Root locus curve
    - Heuristics
- Design of extended control loop structures
    - disturbance compensation
    - Meshing
    - Two degrees of freedom structure

FMT:

Manufacturing metrology plays an essential role in ensuring efficient industrial manufacturing. To a certain extent, it represents the sensory organs for quality assurance and automation technology and encompasses all activities associated with measurement and testing.

Based on the methodological fundamentals, which are the subject of the compulsory lecture "Measurement Technology", the lecture teaches procedures and implementations for measurement and testing in industrial practice. The focus is on geometric properties; most of the concepts presented can also be applied to other properties. Sensor systems for the measurement of geometric properties are presented and discussed with their characteristic properties.

The contents include in detail:

- Fundamentals of FMT
    - Basic terms, definitions
    - Dimensional standards
    - Measurement uncertainties
- Measurement technology in operation and in the measuring room
    - Coordinate metrology
    - Form and position metrology
    - Surface and contour metrology
    - Comparators
    - Micro and nano metrology
    - Measuring rooms
- Production-oriented metrology
    - Measuring equipment and gauges
    - Measuring devices
    - Measuring in the machine
    - Visual inspection

    - Statistical process control (SPC)
- Optical/non-contact measuring methods
    - Integratable optical sensors
    - Stand-alone optical measurement systems
    - Optical 2.5D coordinate measuring technology
    - Optical 3D coordinate metrology
    - Computed tomography
    - System integration and standardization
- Gauge management
    - Significance and correlations
    - Controlled inspection processes
- Inspection planning

Module grade calculation
The module grade is the average of both examination grades weighted by credit points.

Workload
MRT:

Total: approx. 180h, of which

1. Attendance time in lectures and exercises: 60h
2. Preparation and follow-up of the lectures and exercises: 60 hours
3. Exam preparation and presence in the same: 60h

FMT:

Total: approx. 90h, of which

1. attendance time in lectures: 23h
2. preparation of lectures: 23h
3. exam preparation and presence in the exam: 44h

Recommendation
MRT:

Knowledge of "Signale und Systeme" is helpful.

FMT:

Knowledge of stochastics and fundamentals of measurement techniques is helpful.

M 5.53 Module: Mechanical Design A [M-MACH-106527]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Electrical Engineering and Information Technology
KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	3	3

Mandatory			
T-MACH-112984	Mechanical Design A	7 CR	Düser, Matthiesen
T-MACH-112981	Mechanical Design A, Workshop	2 CR	Düser, Matthiesen

Competence Certificate
See individual courses

Prerequisites
None

Competence Goal
In mechanical design, students acquire skills in analysis and synthesis using examples. These include both individual machine elements such as bearings or springs and more complicated systems such as gears or couplings. After completing the machine design theory, the students are able to apply the contents learned to other technical systems - even those not known from the lecture - by transferring the principles of action and basic functions learned from examples to other contexts. This enables students to independently analyze unknown technical systems and synthesize suitable systems for given problems.

Content
MD A

- Springs
- Technical Systems
- Bearings
- Sealings
- Component Joints
- Gears

Module grade calculation
The module grade ist the grade of the written exam.

Annotation
None

Workload
MKL A: Total workload: 270 h, thereof attendance 75 h, divided into lecture + exercise: 4 SWS -> 60 h as well as workshop: 1 SWS -> 15 h; self-study 195 h

Recommendation
None

Learning type
Lectures, exercises and semester-long workshops as well as project work

Literature
Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

Base for
None

5.54 Module: Mechatronic Product Design [M-MACH-106236]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	3	1

Mandatory			
T-MACH-112647	Mechatronical Systems and Products (mach/etit/wiwi)	4 CR	Hohmann, Matthiesen
T-MACH-112648	Workshop Mechatronical Systems and Products (mach/etit/wiwi)	5 CR	Hohmann, Matthiesen

Competence Certificate
Success is monitored within the framework of an written examination (60 minutes) and an alternative academic achievement

Prerequisites
None

Competence Goal
The students

- are able to describe the difficulties of interdisciplinary projects.
- are able to coordinate processes, structures, responsibilities and interfaces within a project
- know different solutions for mechanic/electric problems
- know the elements of the treated product development processes, are able to describe different views onto them and execute them
- know the model based systems engineering approaches
- know the basic principles of virtual design and are able to apply the methods of virtual system design
- are able to identify the differences between virtuality and reality
- are able to recognize the advantages of early validation
- Students are able to understand and apply model description with Bond graphs and generalized system elements
- Students are able to synthesize and analyze multi-domain models
- Students are able to apply parameter identification methods

Content
The lecture provides the theoretic basics, which will be applied and enhanced in development project during the semester. The project will take part in small groups, where the students have to organize and distribute the tasks on their own. In the project work - the workshop Mechatronic Systems and Products - they work on a development task in teams. This involves various development phases, from the development of technical solution concepts to the development and validation of virtual prototypes and physical functional prototypes.

Module grade calculation
The module grade is composed in equal parts of the grades of the module's sub-services.

Annotation
All relevant content (scripts, exercise sheets, etc.) for the course can be obtained via the eLearning platform ILIAS. To participate in the course, please complete the survey " Anmeldung und Gruppeneinteilung " in ILIAS before the start of the semester.

Workload
1. Time of presence lecture: 17 * 1.5 h= 25,5 h

2. Prepare/follow-up lecture: 17 * 1.5 h= 25,5 h

3. Time of presence exercise + workshop: 4 * 1,5h + 12 * 7h = 90 h

4. Prepare/follow-up exercise: 4 * 1.5h = 6 h

5. Exam preparation and time of presence: 33 h
Total: 180 h = 6 LP

Recommendation
It is recommended not to take this module with other time-consuming workshops, such as MD, at the same time.

Learning type
Lecture, exercise and project work

Literature
Janschek, Klaus (2010): Systementwurf mechatronischer Systeme. Methoden - Modelle - Konzepte. Berlin, Heidelberg: Springer.

Weilkiens, Tim (2008): Systems engineering mit SysML/UML. Modellierung, Analyse, Design. 2., aktualisierte u. erw. Aufl. Heidelberg: Dpunkt-Verl.

M 5.55 Module: Methodical Foundations of OR [M-WIWI-101414]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Research (Specialisation Program Operations Research)
Compulsory Elective Modules (Operations Research)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	3	10

Compulsory Elective Courses (Election: at least 1 item as well as between 4,5 and 9 credits)			
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-103638	Global Optimization I and II	9 CR	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CR	Stein
Supplementary Courses (Election:)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102727	Global Optimization II	4,5 CR	Stein
T-WIWI-102725	Nonlinear Optimization II	4,5 CR	Stein
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel

Competence Certificate
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 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 *Nonlinear Optimization I* [2550111] and *Global Optimization I* [2550134] has to be examined.

Competence Goal
The student

- names and describes basic notions for optimization methods, in particular from nonlinear and from global optimization,
- 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.

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous decision variables. The lectures on nonlinear programming deal with local solution concepts, whereas the lectures on global optimization treat approaches for global solutions.

Annotation
The planned lectures and courses for the next three years are announced online (http://www.ior.kit.edu).

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 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.

Recommendation
The courses Introduction to Operations Research I and II are helpful.

M 5.56 Module: Microsystem Technology [M-MACH-101287]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	6

Mikrosystemtechnik (Election: at least 9 credits)			
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CR	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CR	Guber
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	4 CR	Last
T-MACH-101910	Microactuators	3 CR	Kohl
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-ETIT-101907	Optoelectronic Components	4 CR	Randel
T-MACH-100530	Physics for Engineers	6 CR	Dienwiebel, Gumbsch, Nesterov-Müller, Weygand
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-111807	Introduction to Bionics	3 CR	Hölscher
T-MACH-114100	Introduction to Microsystem Technology I	3 CR	Badilita, Korvink
T-MACH-114101	Introduction to Microsystem Technology II	3 CR	Badilita, Korvink

Competence Certificate
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
construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

Content
The module offers courses in microsystem technology. Knowledge is imparted in various fields like basics in construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

Workload
270 hours

5.57 Module: Mobile Machines [M-MACH-101267]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each winter term	2 terms	4	5

Mandatory			
T-MACH-105168	Mobile Machines	8 CR	Geimer
Mobile Machines (Election: at least 1 credit)			
T-MACH-105307	Drive Train of Mobile Machines	4 CR	Geimer
T-MACH-105311	Design and Development of Mobile Machines	4 CR	Geimer
T-MACH-108887	Design and Development of Mobile Machines - Advance	0 CR	Geimer, Siebert
T-MACH-102093	Fluid Power Systems	5 CR	Geimer
T-MACH-111389	Fundamentals in the Development of Commercial Vehicles	3 CR	Weber
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer
T-MACH-108888	Simulation of Coupled Systems - Advance	0 CR	Geimer
T-MACH-111821	Control of Mobile Machines	4 CR	Becker, Geimer
T-MACH-111820	Control of Mobile Machines – Prerequisites	0 CR	Becker, Geimer

Competence Certificate
The assessment is carried out as a general oral exam (duration approx. 60 mins) (according to Section 4(2), 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 examination is offered every semester. Re-examinations are offered at every ordinary examination date.

The overall grade of the module is the grade of the oral examination.

The assessment may be carried out as partial oral exams (according to Section 4(2), 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.In this case 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.

The assessment procedures are described for each course of the module seperately.

Prerequisites
Successful passing of the corresponding modules of the basic program.

Competence Goal
The student

- knows and understands the basic structure of the machines
- masters the basic skills to develop the selected machines

Content
In the module of *Mobile Machines* [WI4INGMB15] the students will learn the structure of the machines and deepen the knowledge of the subject for developing the machines. After conclusion the module the student will know the latest developments in mobile machines and is able to evaluate the concepts and the trends of developments. The module is practically orientated and supported by industry partners.

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

Recommendation
Knowledge of Fluid Power Systems are helpful, otherwise it is recommended to take the course *Fluid Power Systems* [2114093].

5.58 Module: Mobility and Infrastructure [M-BGU-101067]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German	3	2

Mandatory			
T-BGU-101791	Mobility and Infrastructure	9 CR	Vortisch

Prerequisites
none

Annotation
none

Recommendation
For students from the KIT-Department of Economics and Management it is recommended to take part in the excercises.

5.59 Module: Module Bachelor's Thesis [M-WIWI-101601]

Responsible: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: Bachelor's Thesis

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each term	1 term	German	3	6

Mandatory			
T-WIWI-103067	Bachelor's Thesis	12 CR	Studiendekan des KIT-Studienganges

Competence Certificate
The Bachelor's thesis is a written piece of work that demonstrates that the student is capable of dealing with 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 the KIT Department of Economics and Management

The regular processing time is 6 months. Upon justified request by the student, the examination board can extend the processing time by a maximum of one month. If the Bachelor's thesis is not completed and submitted to the examiner by the deadline, it will be graded as "insufficient" unless the student is not responsible for this failure (e.g. maternity leave).

The Examination Board determines the languages in which the Bachelor's thesis can be written. At the student's request, the examiner may authorize the Bachelor's thesis to be written in a language other than German. The topic can only be returned once and only within the first month of the completion period. A new topic must be submitted and issued within four weeks.

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 Bachelor's thesis.

Prerequisites
Prerequisites for admission to the Bachelor Thesis: minimum of 120 credits must be earned. All module examinations of the basic program must be passed.

At the request of the student, the examination committee decides on exceptions to these regulations.

It is recommended to begin the Bachelor Thesis in the 5th or 6th Semester.
A written confirmation of the examiner about supervising the Bachelor's Thesis is required.
Please pay regard to the institute specific rules for supervising a Bachelor Thesis.
The Bachelor Thesis has to contain 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 given, the Bachelor Thesis will not be accepted.

Competence Goal
The student can independently work on a relevant topic in accordance with scientific criteria within the specified time frame.

He/she is in a position to research, analyze the information, abstract and identify basic principles and regulations from less structured information.

He/she reviews the task ahead, can select scientific methods and techniques and apply them to solve a problem or identify further potential. 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 clearly structure a research paper and communicate in writing using the technical terminology.

Content
The Bachelor Thesis is the first major scientific work. The topic of the Bachelor Thesis will be chosen by the student themselves and adjusted with the examinor. The topic has to be related to Industrial Engineering and Management and has to refer to subject-specific or interdisciplinary problems.

Workload
The preparation and presentation of the Bachelor's thesis is expected to take a total of approx. 360 hours. 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.

5.60 Module: Optimization under Uncertainty [M-WIWI-103278]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: Operations Research (Specialisation Program Operations Research)
Compulsory Elective Modules (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	4

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106545	Optimization under Uncertainty	4,5 CR	Rebennack
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel

Competence Certificate
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 *Introduction to Stochastic Optimization*and *Optimization approaches under uncertainty*has to be taken.

Competence Goal
The student

- denominates and describes basic notions for optimization methods under uncertainty, in particular from stochastic optimization,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems under uncertainty 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, in particular of
- stochastic optimization problems.

Content
The module focuses on modeling and analyzing mathematical optimization problems where certain data is not fully present at the time of decision-making. The lectures on the introduction to stochastic optimization deal with methods to integrate distribution information into the mathematical model. The lectures on the optimization approaches under uncertainty offer alternative approaches such as robust optimization.

Annotation
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 of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

Recommendation
Knowledge from the lectures "Introduction to Operations Research I" and "Introduction to Operations Research II" are helpful.

5.61 Module: Preliminary Exam [M-WIWI-100950]

Organisation: University
Part of: Preliminary Exam

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
0	pass/fail	Each term	2 terms	German	3	1

Mandatory			
T-WIWI-102708	Economics I: Microeconomics	5 CR	Puppe, Reiß
T-WIWI-102737	Statistics I	5 CR	Grothe, Schienle

Modelled deadline
This module must be passed until the end of the **3. term**.

Prerequisites
none

M 5.62 Module: Production Engineering [M-MACH-106590]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	3

Production Engineering (Election: at least 9 credits)			
T-MACH-113647	Digitalization from Product Concept to Production	4 CR	Wawerla
T-MACH-113832	Global Production	5 CR	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-112115	Artificial Intelligence in Production	5 CR	Fleischer
T-MACH-105783	Learning Factory “Global Production“	6 CR	Lanza
T-MACH-108878	Laboratory Production Metrology	5 CR	Lanza, Stamer
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-110984	Production Technology for E-Mobility	4 CR	Fleischer
T-MACH-110960	Project Internship Additive Manufacturing: Development and Production of an Additive Component	4 CR	Zanger
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-113031	Rapid Industrialization of Immature Products using the Example of Electric Mobility	4 CR	Bauer
T-MACH-112121	Seminar Application of Artificial Intelligence in Production	4 CR	Fleischer
T-MACH-105185	Control Technology	4 CR	Gönnheimer
T-MACH-113372	Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation	4 CR	Benfer, Lanza
T-MACH-105177	Metal Forming	4 CR	Herlan
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber

Competence Certificate
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.

Learning type
Lectures, seminars, workshops, excursions

5.63 Module: Production, Logistics and Information Systems [M-WIWI-105770]

Responsible: Prof. Dr. Wolf Fichtner
Prof. Dr. Andreas Geyer-Schulz
Prof. Dr. Alexander Mädche
Prof. Dr. Stefan Nickel
Prof. Dr. Frank Schultmann
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-WIWI-111602	Production, Logistics and Information Systems	5 CR	Fichtner, Geyer-Schulz, Mädche, Nickel, Schultmann, Weinhardt

Competence Certificate
The module examination (90 min) is in written form. The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Competence Goal
The student

- has basic knowledge of the interaction of information technologies, people and organizational structures,
- is familiar with the structures of information systems,
- masters the essential concepts, theories and methods of production management,
- has an understanding of problems, interrelationships and solutions of logistics processes of enterprises.

With the knowledge acquired in the three basic modules BWL, the prerequisites are created in the area of BWL to expand this knowledge in the specialization program.

Content
The basics of business informatics are taught. In addition, the area of production management and logistics is introduced.

Workload
Total workload required for 5 credit points: approx. 150 hours

5.64 Module: Public and Civil Law [M-INFO-105084]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	2 terms	3	2

Mandatory			
T-INFO-103339	Civil Law for Beginners	5 CR	Matz
T-INFO-110300	Public Law I & II	6 CR	N.N.

Competence Certificate

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 in 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

Workload

See German version.

5.65 Module: Public Finance [M-WIWI-101403]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	7

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102877	Introduction to Public Finance	4,5 CR	Wigger
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102739	Public Revenues	4,5 CR	Wigger

Competence Certificate
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 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.

Competence Goal
The student

- has advanced knowledge of the theory and policy of taxation and public debt.
- understand the scope, structure and forms of government borrowing.
- is familiar with the structure of German and international tax law
- is able to interpret and motivate fiscal policy issues.

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. Special fields of Public Finance are public revenues, i.e. taxes and public debt, public expenditures for publicly provided goods, and welfare programs.

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

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.

Recommendation
It is recommended to attend the course 2560129 after having completed the course 2560120.

M 5.66 Module: Rail System Technology [M-MACH-101274]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	5

Mandatory			
T-MACH-102143	Rail System Technology	9 CR	Cichon

Competence Certificate
written examination in German language
Duration: 120 minutes
No tools or reference materials may be used during the exam 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

Annotation

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

Learning type

Lectures

5.67 Module: Seminar Module [M-WIWI-101816]

Responsible: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	Grade to a tenth	Each term	1 term	German	3	6

Compulsory Elective Courses (Election: 3 credits)			
T-WIWI-103486	Seminar in Business Administration (Bachelor)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103485	Seminar in Informatics (Bachelor)	3 CR	Professorenschaft des Instituts AIFB
T-WIWI-108763	Seminar in Engineering Science Master (approval)	3 CR	Fachvertreter ingenieurwissenschaftlicher Fakultäten
T-MATH-102265	Seminar in Mathematics (Bachelor)	3 CR	Last, Nestmann, Winter
T-WIWI-103488	Seminar in Operations Research (Bachelor)	3 CR	Nickel, Rebennack, Stein
T-INFO-101997	Seminar: Legal Studies I	3 CR	N.N.
T-WIWI-103489	Seminar in Statistics (Bachelor)	3 CR	Grothe, Schienle
T-WIWI-103487	Seminar in Economics (Bachelor)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-MACH-102135	Conveying Technology and Logistics	3 CR	Furmans
T-MACH-109062	Seminar Production Technology	3 CR	Fleischer, Lanza, Schulze
T-MACH-108737	Seminar Data-Mining in Production	3 CR	Lanza

Competence Certificate
SPO 2015: The modul examination consists of **one** seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.

SPO 2007: 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). As key qualification one of the following courses must be chosen: Academic Learning HoC (2-3 credits), Key Qualifikations ZAK (1-3 credits), Elective „Educational development for student teachers“ (2-3 credits) or language courses SpZ. A detailed description of every singled assessment is given in the specific course characerization.

Prerequisites
All modules of the basic program should be completed. For further information see German version.

Competence Goal

- Students are able to independently deal with a defined problem in a specialized field based on scientific criteria.
- They are able to research, analyze the information, abstract and derive basic principles and regularities from unstructured information.
- They can solve the problems in a structured manner using their interdisciplinary know-how.
- They know how to validate the obtained results.
- Finally, they are able to logically and systematically present the 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.

Annotation

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

See German version.

5.68 Module: Signals and Systems [M-ETIT-106372]

Responsible: Dr.-Ing. Mathias Kluwe
Prof. Dr.-Ing. Sander Wahls

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	3	2

Mandatory			
T-ETIT-112860	Signals and Systems	7 CR	Kluwe, Wahls
T-ETIT-112861	Signals and Systems - Workshop	2 CR	Wahls

Competence Certificate
The assessment of success takes place in the form of a written examination lasting 180 minutes. In addition, the completion of the written work in the workshop is a prerequisite for passing the module.

Prerequisites
none

Competence Goal

- Students are familiar with the elementary properties of signals and systems in the time domain and can analyze existing signals and systems with regard to these properties.
- They are familiar with the Fourier, Laplace and Z transforms with their definitions and calculation rules and can apply these to given signals and systems.
- Students are able to describe given signals and systems using the resulting transforms and analyze their respective properties in the frequency domain.
- They determine e.g. continuous-time low-pass filters that fulfill given specifications.
- They are able to design anti-aliasing and interpolation filters for A/D and D/A conversion.
- Students are able to realize given continuous-time systems digitally.

Content

- Introduction, complex numbers, continuous-time signals, signal space $L\infty$
- Signal spaces L1 and L2 (Lebesgue integral, Hilbert space)
- Continuous-time systems in the time domain (linearity, time invariance, stability, convolution representation)
- Fourier series
- Fourier transform I (derivation & existence, pairs)
- Fourier transform II (properties, description of time-continuous systems)
- Meaning of phase (group delay, all-pass, minimum phase)
- Low-pass filter (Butterworth, Chebyshev)
- Uncertainty principle (mean time/frequency/duration/bandwidth)
- Complex analysis I (basics of complex functions, differentiation, holomorphic functions, Cauchy Riemann differential equations, curve integrals)
- Complex Analysis II (Cauchy integral theorem, Laurent expansions, isolated singularities, meromorphic functions, residue theorem)
- Hilbert transform (Bedrosian/envelope, Kramers-Kronig, phase gain)
- Two-sided Laplace transform and systems with rational transfer function
- Bode plots
- Discrete-time signals and spaces, sampling theorem, interpolation filters, aliasing
- Discrete Fourier series and transformation
- Z-transform and discrete-time systems
- Discrete-time processing of continuous-time signals (anti-aliasing filters with oversampling and undersampling)
- One-sided Laplace transform (def. incl. some properties and calculation rules) c
- Solution of ordinary differential equations, back transformation via partial fraction decomposition
- Alternatives of the Laplace inverse transform (convolution, complex inverse formula)
- One-sided z-transformation
- Solving difference equations with the z-transform

Module grade calculation
The module grade is the grade of the written exam.

Workload
Total approx. 240h, of which

Attendance time in lectures and exercises: 75h

Preparation/follow-up of the lectures and exercises: 130h

3. Exam preparation and presence in the same: 40h

Preparation time for the workshop: 5h

Presence time in the workshop: 15h

Preparation of the protocol for the workshop: 5h

Total: 270 LP = 9 LP

M 5.69 Module: Sociology/Empirical Social Research [M-GEISTSOZ-101167]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	3	2

Mandatory			
T-GEISTSOZ-109047	Analalysis of Social Structurs (WiWi)	3 CR	Nollmann
T-GEISTSOZ-109048	Social Science A (WiWi)	3 CR	Nollmann
T-GEISTSOZ-109049	Social Science B (WiWi)	3 CR	Nollmann

Competence Goal
The student

- Gains theoretical and methodical knowledge of social processes and structures
- Is able to apply acquired knowledge practically
- Is able to present work results in a precise and clear way

Content
This module offers students the possibility to get to know research problems and to answer these theoretically as well as empirically. For example: Who does earn how much in his job and why? How do subcultures emerge? Why are boys' grades in school always worse than those of girls? Do divorces have negative influences on the development of children? How does mass consumption influence the individual? Is there a world society emerging? In addition, this module contains courses on sociological methods that are essential to answer such questions scientifically.

The lecture on social structure analysis gives an overview of large social structures such as the education system, labour market, institutions, demography, etc. for Germany and in international comparison. The content of the social research seminars is determined individually by the lecturers. Students are free to choose one seminar each for Social Research A/B.

M 5.70 Module: Statistics and Econometrics [M-WIWI-101599]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)
Compulsory Elective Modules (Statistics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	6

Mandatory			
T-WIWI-102736	Economics III: Introduction in Econometrics	5 CR	Schienle
Supplementary Courses (Election: between 1 and 2 items)			
T-WIWI-103063	Analysis of Multivariate Data	4,5 CR	Grothe
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-110939	Financial Econometrics II	4,5 CR	Schienle
T-WIWI-112153	Microeconometrics	4,5 CR	Krüger
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller

Competence Certificate
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
The course "Economics III: Introduction in Econometrics“ is compulsory and must be examined. In case the course „Economics III: Introduction in Econometrics“ has already been examined within the module „Applied Microeconomics“, the course „Economics III: Introduction in Econometrics“ is not compulsory.

Competence Goal
The student

- shows an advanced understanding of Econometric techniques and statistical model building.
- is able to develop Econometric models for applied problems based on available data
- is able to apply techniques and models with statistical software, to interpret results and to judge on different approaches with appropriate statistical criteria.

Content
The courses provide a solid Econometric and statistical foundation of techiques necessary to conduct valid regression, time series and multivariate analysis.

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

M 5.71 Module: Statistics and Econometrics II [M-WIWI-105414]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)
Compulsory Elective Modules (Statistics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	5

Compulsory Elective Courses (Election:)			
T-WIWI-103063	Analysis of Multivariate Data	4,5 CR	Grothe
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-110939	Financial Econometrics II	4,5 CR	Schienle
T-WIWI-112153	Microeconometrics	4,5 CR	Krüger
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller

Competence Certificate
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.

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 following module must have been started: Statistics and Econometrics [M-WIWI-101599].

Competence Goal
The student

- shows an advanced understanding of Econometric techniques and statistical model building.
- is able to develop advanced Econometric models for applied problems based on available data
- is able to apply techniques and models efficiently with statistical software, to interpret results and to judge on different approaches with appropriate statistical criteria.

Content
The courses provide foundations of advanced Econometric and statistical techiques for regression, time series and multivariate analysis.

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

M 5.72 Module: Strategy and Organization [M-WIWI-101425]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	6

Strategy and Organization (Election: at least 9 credits)			
T-WIWI-102630	Managing Organizations	3,5 CR	Lindstädt
T-WIWI-102871	Problem Solving, Communication and Leadership	2 CR	Lindstädt
T-WIWI-113090	Strategic Management	3,5 CR	Lindstädt

Competence Certificate
Erfolgreicher Abschluss aller fachlich entsprechenden Module aus dem Grundlagenprogramm.

Competence Goal

- The student can prepare strategic decisions along the ideal-typical strategy process and classify them strategically.
- He/she evaluates the strengths and weaknesses of existing organizational structures and regulations using systematic criteria and can review the management of organizational change.
- The student can effectively carry out decision-making by structuring problems and communicating solutions, taking into account the situation and the personalities involved.
- Through intensive exposure to a variety of practice-relevant case studies, students learn to apply and discuss theoretical course content to real-life situations.

Content
The module has a practical and action-oriented structure. Students become familiar with central frameworks of strategic management along the ideal-typical strategy process. An overview of fundamental models will be given, and an action-oriented integration performance will be achieved through the transfer of theory to practical issues. In addition, students learn concepts for the design of organizational structures, regulation of organizational processes as well as control of organizational changes. This enables a well-founded assessment of existing organizational structures and regulations. Furthermore, participants are enabled to recognize, structure, analyze and effectively communicate problems. In addition, central leadership concepts are taught that address the influence of the situation, the leadership personality and the characteristics of those being led.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 5.73 Module: Supply Chain Management [M-WIWI-101421]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	11

Mandatory			
T-WIWI-107506	Platform Economy	4,5 CR	Weinhardt
Supplementary Courses (Election: 1 item)			
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel

Competence Certificate
This module is only available in the elective field. In the specialization program Business Administration, the election is not permitted.

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
The courseT-WIWI-107506 "Platform Economy"has to be taken.

Competence Goal
The students

- are able to understand and evaluate the control of cross-company supply chains based on a strategic and operative view,
- are able to analyse the coordination problems within the supply chains,
- are able to identify and integrate adequate information system infrastructures to support the supply chains,
- are able to apply theoretical methods from the operations research and the information management,
- learn to elaborate solutions in a team

Content
The module "Supply Chain Management" gives an overview of the mutual dependencies of information systems and of supply chains spanning several enterprises. The specifics of supply chains and their information needs set new requirements for the operational information management. In the core lecture "Platform Economy" the focus is set on markets between two parties that act through an intermediary on an Internet platform. Topics discussed are network effects, peer-to-peer markets, blockchains and market design. The course is held in English and teaches parts of the syllabus with the support of a case study in which students analyze a platform.

The module is completed by an elective course addressing appropriate optimization methods for the Supply Chain Management and for modern logistic approaches.

Annotation
The planned lectures in the next terms can be found on the websites of the respective institutes IISM, IFL and IOR.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 5.74 Module: Team Project Management and Technology [M-WIWI-105440]

Responsible: Prof. Dr. Martin Klarmann
Prof. Dr. Alexander Mädche

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Team Project)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	1

Mandatory			
T-WIWI-110968	Team Project Management and Technology	9 CR	Klarmann, Mädche

Competence Certificate
Alternative exam assessment. The basis for grading is the documents produced, the presentations during the course of the project, the artifact to be produced (e.g. algorithm, method, model, software, component) and the final presentation.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-WIWI-105447 - Team Project Management and Technology (BUS/ENG) must not have been started.

Competence Goal
After successful completion of the team project, the students can:

- select and apply the methods, techniques and tools required for problem solving
- systematically analyze a given problem in an interdisciplinary team and develop and evaluate an artifact-centered solution
- constructively solve challenges and conflicts that arise in teamwork.

Content
The team project "Management and Technology" aims to prepare students for working in heterogeneously composed teams.
A team of 4-5 students will work on defined interdisciplinary questions at the interface of economics and MINT subjects. The result of the projects should typically not only be a presentation or a report, but an artifact, e.g. a method, an algorithm, a model, a software or a component.
The team projects already implement the concept of research-oriented teaching in the Bachelor's degree and aim to build up problem-solving competence in the students.

Workload
The total of 270 working hours (9 credit points) per team member (4-5 members per team) are divided into the following tasks:

- communication:
    - Team meetings: 30 h (2h per week, 15 weeks),
    - Electronic exchange: 20 h,
    - Final presentation: 10
- Documentation and development:
    - Analysis and design: 70 h,
    - Development: 90 h,
    - Tests and quality assurance: 50 h

5.75 Module: Team Project Management and Technology (BUS/ENG) [M-WIWI-105447]

Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (Business Administration oder Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	1

Mandatory			
T-WIWI-110977	Team Project Management and Technology (BUS/ENG)	9 CR	Klarmann, Mädche

Competence Certificate
Alternative exam assessment. The basis for grading is the documents produced, the presentations during the course of the project, the artifact to be produced (e.g. algorithm, method, model, software, component) and the final presentation.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-WIWI-105440 - Team Project Management and Technology must not have been started.

Competence Goal
After successful completion of the team project, the students can:

- select and apply the methods, techniques and tools required for problem solving
- systematically analyze a given problem in an interdisciplinary team and develop and evaluate an artifact-centered solution
- constructively solve challenges and conflicts that arise in teamwork.

Content
The team project "Management and Technology" is carried out by a business administration or engineering institute. It aims to prepare students for working in heterogeneously composed teams.
A team of 4-5 students will work on defined interdisciplinary questions at the interface of economics and MINT subjects. The result of the projects should typically not only be a presentation or a report, but an artifact, e.g. a method, an algorithm, a model, a software or a component.
The team projects already implement the concept of research-oriented teaching in the Bachelor's degree and aim to build up problem-solving competence in the students.

Workload
The total of 270 working hours (9 credit points) per team member (4-5 members per team) are divided into the following tasks:

- communication:
  - Team meetings: 30 h (2h per week, 15 weeks),
  - Electronic exchange: 20 h,
  - Final presentation: 10
- Documentation and development:
  - Analysis and design: 70 h,
  - Development: 90 h,
  - Tests and quality assurance: 50 h

5.76 Module: Technical Logistics [M-MACH-101279]

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

Part of: Compulsory Elective Modules (Business Administration oder Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	3	4

Mandatory			
T-MACH-109919	Basics of Technical Logistics I	4 CR	Mittwollen
T-MACH-109920	Basics of Technical Logistics II	6 CR	Furmans

Competence Certificate
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 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.

T-MACH-109920 "Basics of Technical Logistics II" is based on T-MACH-109919 "Basics of Technical Logistics I". The contents are taught one after the other in one course in the winter semester. The individual exams are taken on one day at the end of the semester.

Prerequisites
none

Competence Goal
The student

- acquires well-founded knowledge on the main topics of technical logistics
- gets an overview of different applications of technical logistics in practice,
- acquires expertise and understanding about functionality of material handling systems.

Content
The module *Technical Logistics* provides in-depth basics on the main topics of technical logistics. The module focuses on technical characteristics of material handling technology. To gain a deeper understanding, the course is accompanied by exercises.

Workload
270 hours

Learning type
Lecture

M 5.77 Module: Topics in Finance I [M-WIWI-101465]

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

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	11

Compulsory Elective Courses (Election:)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-107505	Financial Accounting for Global Firms	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-112694	FinTech	4,5 CR	Thimme
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg

Competence Certificate
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 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
It is only possible to choose this module in combination with the module *Essentials in Finance*. The module is passed only after the final partial exam of *Essentials in Finance* is additionally passed.

In addition to that it is possible to choose the module *Topics in Finance II*.

Competence Goal
The student

- has advanced skills in modern finance
- is able to apply these skills in practice in the fields of finance and accounting, financial markets and banking

Content
The module *Topics in Finance I* is based on the module *Essentials of Finance*. The courses deal with advanced issues concerning the fields of finance and accounting, financial markets and banking from a theoretical and practical point of view.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 5.78 Module: Topics in Finance II [M-WIWI-101423]

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

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	10

Election notes

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This module will not count towards the degree until the module *Essentials in Finance* has also been successfully completed. The Essentials *in Finance* module may not be booked out as an additional examination.

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Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-107505	Financial Accounting for Global Firms	4,5 CR	Luedecke
T-WIWI-112694	FinTech	4,5 CR	Thimme
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg

Competence Certificate

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 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

It is only possible to choose this module in combination with the module *Essentials in Finance*. The module is passed only after the final partial exam of *Essentials in Finance* is additionally passed.

In addition to that it is possible to choose the module *Topics in Finance I*.

Competence Goal

The student

- has advanced skills in modern finance
- is able to apply these skills in practice in the fields of finance and accounting, financial markets and banking

Content

The module *Topics in Finance II* is based on the module *Essentials of Finance*. The courses deal with advanced issues concerning the fields of finance and accounting, financial markets and banking from a theoretical and practical point of view.

Annotation

The course T-WIWI-102790 "Special Taxation" will no longer be offered in the module as of winter semester 2018/1019.

Workload

The total workload for this module is approximately 270 hours.

M 5.79 Module: Vehicle Development [M-MACH-101265]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	9

Vehicle Development (Election: at least 9 credits)			
T-MACH-102207	Tires and Wheel Development for Passenger Cars	3 CR	Leister
T-MACH-111389	Fundamentals in the Development of Commercial Vehicles	3 CR	Weber
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gießler
T-MACH-110796	Python Algorithms for Vehicle Technology	4 CR	Rhode
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer
T-MACH-108888	Simulation of Coupled Systems - Advance *This item will not influence the grade calculation of this parent.*	0 CR	Geimer
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber
T-MACH-112126	Data-Driven Algorithms in Vehicle Technology	4 CR	Scheubner
T-MACH-114075	Principles of Whole Vehicle Engineering	1,5 CR	Harrer
T-MACH-114095	Principles of Whole Vehicle Engineering	1,5 CR	Harrer

Competence Certificate
The assessment is carried out as partial exams.

The partial exams consists of a written exam (90 to 120 minutes) or an oral exam (duration 30 to 40 minutes).

Prerequisites
None

Competence Goal
The student

- knows and understands the procedures in automobile development,
- knows and understands the technical specifications at the development procedures,
- is aware of notable boundaries like legislation.

Content
By taking the module Vehicle Development the students get to know the methods and processes applied in the automobile industry. They learn the technical particularities which have to be considered during the vehicle development and it is shown how the numerous single components cooperate in a harmoniously balanced complete vehicle. There is also paid attention on special boundary conditions like legal requirements.

Workload
The total work load for this module is about 270 Hours (9 Credits). The partition of the work load is carried out according to the credit points of the courses of the module. The work load for courses with 6 credit points is about 180 hours, for courses with 4.5 credit points about 135 hours, for courses with 3 credit points about 90 hours, and for courses with 1.5 credit points about 45 hours. The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam duration and the time that is required to achieve the objectives of the module as an average student with an average performance.

Recommendation
Knowledge of the content of the courses *Engineering Mechanics I* [2161238], *Engineering Mechanics II* [2162276] and *Basics of Automotive Engineering I* [2113805], *Basics of Automotive Engineering II* [2114835] is helpful.

Learning type
The teaching and learning procedures (lecture, lab course, workshop) are described for each course of the module separately.

6 Courses

T 6.1 Course: Advanced Lab Blockchain Hackathon (Bachelor) [T-WIWI-111127]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Competence Certificate
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.

Prerequisites
None

Workload
135 hours

T 6.2 Course: Advanced Lab Informatics (Bachelor) [T-WIWI-110541]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 24/25	2512204	Lab Realisation of innovative services (Bachelor)	3 SWS	Practical course / 🔀	Toussaint, Schiefer, Schüler
WT 24/25	2512400	Practical Course Sociotechnical Information Systems Development (Bachelor)	3 SWS	Practical course / 🖥	Sunyaev, Goram, Leiser
WT 24/25	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course / 🔀	Volkamer, Strufe, Berens, Morisco, Fallahi, Ballreich, Hennig, Länge, Mossano
WT 24/25	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course / 🔀	Volkamer, Strufe, Berens, Fallahi, Morisco, Ballreich, Hennig, Länge, Mossano
ST 2025	2512204	Lab Realisation of innovative services (Bachelor)	3 SWS	Practical course / 🗣	Schiefer, Toussaint, Ullrich
ST 2025	2512554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course / 🔀	Volkamer, Strufe, Berens, Mossano, Hennig, Veit, Länge, Fallahi
Exams					
WT 24/25	7900047	Advanced Lab Realization of Innovative Services (Bachelor)			Oberweis
WT 24/25	7900080	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)			Sunyaev
WT 24/25	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.

Prerequisites
None

Annotation
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 events related to this course:

V	**Lab Realisation of innovative services (Bachelor)** 2512204, WS 24/25, 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	**Praktikum Security, Usability and Society (Bachelor)** 2512554, WS 24/25, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

English:

The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have already been assigned.

Application deadline 25.10.2024
Assignment 30.10.2024
Confirmation deadline 03.11.2024

Important dates:

Kick-off: 23.10.2024, 09:00 AM CET in Big Blue Button - Link and Kronenplatz 5.20, 3A-11.1

Report & code feedback deadline: 26.01.2025, 23:59 CET
Feedback on Report & code: 10.02.2025, 23:59 CET
Final report + code deadline: 17.02.2025, 23:59 CET

Presentation draft deadline: 23.02.2025, 23:59 CET
Feedback on presentation draft: 28.02.2025, 23:59 CET
Final presentation deadline: 07.03.2025, 23:59 CET

Presentation day: 11.03.2025, 09:00 CET

Topics:

Privacy Friendly Apps

In this area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php . Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: NoPhish App Rework
Number of students: 2 Ba/Ma
Description: The NoPhish app was one of the first measures from the NoPhish concept. The app has been around for a long time and has not been updated since then. Accordingly, the task of the project is to make the app functional for the current Android version. The app is also to be optimized so that updates, e.g. new chapters, can be added easily.

Designing Security User studies

These topics are related to how to set up and conduct user studies of various types. Online studies, interviews and lab studies are possible. At the end of the semester, the students present a report / paper and a talk in which they present their methodologies and the results of small pre-studies.

Title: IT-Security and Privacy Studies in the health sector
Number of students: 1 Ba/Ma
Description: Cyberattacks in the healthcare sector are on the rise and medical facilities are increasingly becoming the target of hacker attacks. This often affects sensitive patient data or, in the event of a cyberattack, patient care. The German Federal Office for Information Security (BSI) reports that “[t]he security situation of the IT infrastructure of medical practices in Germany [...] has hardly been studied to date.” The aim of the work is to find out which scientific studies already exist in the field of IT security and privacy and which best practices can be derived from these studies, e.g. on the subject of recruitment, study design or consideration of special needs.

Title: Understanding Privacy and Security Risk Awareness Among Sports Science Students at KIT
Number of students: 1 Ba/Ma
Description: Privacy and Security Awareness in Data Handling: The key issue is that many sports science students may not fully understand the privacy and security risks involved in handling sensitive data. As students increasingly deal with personal and research-related information, gaps in their awareness of data protection, such as risks of data breaches or misuse, can lead to significant vulnerabilities. The aim of the task is to design a survey that assesses their current understanding of these risks, helping to identify areas where further education or guidance is needed.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyze the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Visualization of Eye Gaze Patterns during Authentication Tasks
Number of students: 1 Ba/Ma
Description: In this project, students will analyze and visualize eye gaze data collected during two specific authentication tasks: the Dot Task and the Slider Task. The primary objective is to represent subjects' eye movements visually, enhancing the understanding of gaze patterns during the authentication process. *Dot Task Visualization:* For the Dot Task, participants were instructed to focus on a sequence of dots displayed on a screen. The dataset includes the positions of these dots and the corresponding gaze locations of the subjects. The student's task is to create a dynamic visualization that not only represents these positions accurately but also illustrates the sequence in which the dots were focused on by the subjects. *Slider Task Visualization:* The Slider Task involved presenting participants with a series of images, for which both the images' locations on the screen and the subjects' gaze locations are recorded. The challenge is to develop a heatmap visualization based on this data, effectively demonstrating the concentration and dispersion of gaze points across different images.

Title: Compare BSI Phishing Game with the NoPhish Game
Number of students: 1 Ba
Description: The NoPhish app, one of the first implementations of the NoPhish concept, is a form of serious game. The BSI has also developed a game in the field of phishing. Both "games" use different approaches to impart knowledge from the same context. The aim is to evaluate the two games in terms of similarities and differences.

Title: Chatbots for Literature Reviews
Number of students: 1 Ba
Description: Chatbots are becoming increasingly popular and are already being used in various areas. But in what form can these bots be used for science? The variety of chatbots also raises the question of whether there are chatbots that are better suited to a scientific context. The aim is to identify a selection of chatbots and evaluate them in terms of their effectiveness for future literature research. To this end, the results of the chatbots will be compared with the ACM database in order to check their effectiveness for finding literature for a specific period of time.

Title: Phishing Advice from Organizations (English Only)
Number of students: 1 Ba/Ma
Description: Many companies distribute information on how to recognize phishing via various channels such as e-mails, e.g. Amazon or Telekom. The question arises as to how helpful these tips are in reality. Are they too specific to the context of the company or so abstractly formulated that they are of no real help to users? The aim of the work is to collect various hints and then compare them with the hints of the NoPhish concept in order to find differences and similarities between the hints and the concept.

Title: How do website owners become aware that their website was hacked?
Number of students: 1 Ba/Ma
Description: We identified website owners that were affected by a hack on their website and sent them a notification. During the course of the notification process, we also identified several websites who seemingly remediated the hack before our notification. We now wanted to find out, how those website owners got aware of the hack. If they were notified by a third party, we would also like to know how and by whom they were notified and what their feelings were with respect to the notification.

Title: Cognitive Walkthrough for applying, installing, and using an S/MIME certificate at KIT
Number of students: 1-2 Ba/Ma
Description: The main application of S/MIME is the encryption and signing of e-mail messages. The KIT offers all members the opportunity to have S/MIME certificates issued and has recently started using a new process of the European research network GÉANT for this purpose. The aim of this work is to carry out a cognitive walkthrough with members of the KIT to apply for, set up and use S/MIME certificates and to identify problem areas and obstacles.

Title: Anti-phishing information presented in medias and anti-phishing channels (English only)
Number of students: 1 Ba
Description: Several different channels exists to disseminate information about phishing, be it recent major campaigns or more specific recommendations. Some of these are through social networks accounts, others are specific webpages created "ad hoc" by certain organizations (e.g., Action Fraud in the UK, the BSI). The goal of this topic is to conduct a media review of several channels, collect the data, and compare it with results from a previous iteration of this same topic.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V **Praktikum Security, Usability and Society (Master)**
2512555, WS 24/25, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content

English:

The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

Application deadline 25.10.2024
Assignment 30.10.2024
Confirmation deadline 03.11.2024

Important dates:

Kick-off: 23.10.2024, 09:00 AM CET in Big Blue Button - Link and Kronenplatz 5.20, 3A-11.1

Report & code feedback deadline: 26.01.2025, 23:59 CET
Feedback on Report & code: 10.02.2025, 23:59 CET
Final report + code deadline: 17.02.2025, 23:59 CET

Presentation draft deadline: 23.02.2025, 23:59 CET
Feedback on presentation draft: 28.02.2025, 23:59 CET
Final presentation deadline: 07.03.2025, 23:59 CET

Presentation day: 11.03.2025, 09:00 CET

Topics:

Privacy Friendly Apps

In this area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php . Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: NoPhish App Rework
Number of students: 2 Ba/Ma
Description: The NoPhish app was one of the first measures from the NoPhish concept. The app has been around for a long time and has not been updated since then. Accordingly, the task of the project is to make the app functional for the current Android version. The app is also to be optimized so that updates, e.g. new chapters, can be added easily.

Designing Security User studies

These topics are related to how to set up and conduct user studies of various types. Online studies, interviews and lab studies are possible. At the end of the semester, the students present a report / paper and a talk in which they present their methodologies and the results of small pre-studies.

Title: Usability of Password Managers in Virtual Reality
Number of students: 2 Ma
Description: The pre-dominant form of authentication in Virtual Reality (VR) are passwords. Passwords create a burden for users in the VR environment because of special input methods and the virtual keyboard [Stephenson, S. et al (2022). SoK: Authentication in Augmented and Virtual Reality]. Password Managers (PMs) can support the user with handling this problem [Mayer, P. et al. (2022). Why Users (Don't) Use Password Managers at a Large Educational Institution]. They offer auto-filling features, store credentials in an overview or generate complex and secure passwords. Especially in the VR context, where typing a password is slow and complex, PMs can be beneficial. We want to explore the different PMs in VR and test the usability to find challenges and possible solutions.

Title: IT-Security and Privacy Studies in the health sector
Number of students: 1 Ba/Ma
Description: Cyberattacks in the healthcare sector are on the rise and medical facilities are increasingly becoming the target of hacker attacks. This often affects sensitive patient data or, in the event of a cyberattack, patient care. The German Federal Office for Information Security (BSI) reports that “[t]he security situation of the IT infrastructure of medical practices in Germany [...] has hardly been studied to date.” The aim of the work is to find out which scientific studies already exist in the field of IT security and privacy and which best practices can be derived from these studies, e.g. on the subject of recruitment, study design or consideration of special needs.

Title: Understanding Privacy and Security Risk Awareness Among Sports Science Students at KIT
Number of students: 1 Ba/Ma
Description: Privacy and Security Awareness in Data Handling: The key issue is that many sports science students may not fully understand the privacy and security risks involved in handling sensitive data. As students increasingly deal with personal and research-related information, gaps in their awareness of data protection, such as risks of data breaches or misuse, can lead to significant vulnerabilities. The aim of the task is to design a survey that assesses their current understanding of these risks, helping to identify areas where further education or guidance is needed.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyze the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Visualization of Eye Gaze Patterns during Authentication Tasks
Number of students: 1 Ba/Ma
Description: In this project, students will analyze and visualize eye gaze data collected during two specific authentication tasks: the Dot Task and the Slider Task. The primary objective is to represent subjects' eye movements visually, enhancing the understanding of gaze patterns during the authentication process. *Dot Task Visualization:* For the Dot Task, participants were instructed to focus on a sequence of dots displayed on a screen. The dataset includes the positions of these dots and the corresponding gaze locations of the subjects. The student's task is to create a dynamic visualization that not only represents these positions accurately but also illustrates the sequence in which the dots were focused on by the subjects. *Slider Task Visualization:* The Slider Task involved presenting participants with a series of images, for which both the images' locations on the screen and the subjects' gaze locations are recorded. The challenge is to develop a heatmap visualization based on this data, effectively demonstrating the concentration and dispersion of gaze points across different images.

Title: Phishing Advice from Organizations (English Only)
Number of students: 1 Ba/Ma
Description: Many companies distribute information on how to recognize phishing via various channels such as e-mails, e.g. Amazon or Telekom. The question arises as to how helpful these tips are in reality. Are they too specific to the context of the company or so abstractly formulated that they are of no real help to users? The aim of the work is to collect various hints and then compare them with the hints of the NoPhish concept in order to find differences and similarities between the hints and the concept.

Title: How do website owners become aware that their website was hacked?
Number of students: 1 Ba/Ma
Description: We identified website owners that were affected by a hack on their website and sent them a notification. During the course of the notification process, we also identified several websites who seemingly remediated the hack before our notification. We now wanted to find out, how those website owners got aware of the hack. If they were notified by a third party, we would also like to know how and by whom they were notified and what their feelings were with respect to the notification.

Title: Cognitive Walkthrough for applying, installing, and using an S/MIME certificate at KIT
Number of students: 1-2 Ba/Ma
Description: The main application of S/MIME is the encryption and signing of e-mail messages. The KIT offers all members the opportunity to have S/MIME certificates issued and has recently started using a new process of the European research network GÉANT for this purpose. The aim of this work is to carry out a cognitive walkthrough with members of the KIT to apply for, set up and use S/MIME certificates and to identify problem areas and obstacles.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V **Lab Realisation of innovative services (Bachelor)**
2512204, SS 2025, 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 vor Praktikumsbeginn im Wiwi-Portal
https://portal.wiwi.kit.edu/ys

V **Practical lab Security, Usability and Society (Bachelor)**
2512554, SS 2025, 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 6.3 Course: Advanced Lab Programming 3 [T-WIWI-114177]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Competence Certificate
The assessment of this course are practical work, presentations and a written thesis according to §4(2), 3 of the examination regulation. Practical work, presentations and a written thesis are weighted according to the course.

Prerequisites
None

Workload
135 hours

T 6.4 Course: Advanced Lab Realization of Innovative Services (Bachelor) [T-WIWI-112915]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 24/25	2512204	Lab Realisation of innovative services (Bachelor)	3 SWS	Practical course / Blended	Toussaint, Schiefer, Schüler
ST 2025	2512204	Lab Realisation of innovative services (Bachelor)	3 SWS	Practical course / On-Site	Schiefer, Toussaint, Ullrich
Exams					
WT 24/25	7900047	Advanced Lab Realization of Innovative Services (Bachelor)			Oberweis

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
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.

Annotation
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 events related to this course:

V Lab Realisation of innovative services (Bachelor)
2512204, WS 24/25, 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 (Bachelor)
2512204, SS 2025, 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 vor Praktikumsbeginn im Wiwi-Portal
https://portal.wiwi.kit.edu/ys

6.5 Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	see Annotations	2

Events					
WT 24/25	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Morisco, Fallahi, Ballreich, Hennig, Länge, Mossano
WT 24/25	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Fallahi, Morisco, Ballreich, Hennig, Länge, Mossano
ST 2025	2512554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Mossano, Hennig, Veit, Länge, Fallahi
ST 2025	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Mossano, Hennig, Veit, Länge
Exams					
WT 24/25	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
WT 24/25	7900307	Advanced Lab Security, Usability and Society (Master)			Volkamer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

Annotation
The course will not be offered in the summer semester 2023.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Praktikum Security, Usability and Society (Bachelor)

2512554, WS 24/25, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
English:

The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have already been assigned.

Application deadline 25.10.2024
Assignment 30.10.2024
Confirmation deadline 03.11.2024

Important dates:

Kick-off: 23.10.2024, 09:00 AM CET in Big Blue Button - Link and Kronenplatz 5.20, 3A-11.1

Report & code feedback deadline: 26.01.2025, 23:59 CET
Feedback on Report & code: 10.02.2025, 23:59 CET
Final report + code deadline: 17.02.2025, 23:59 CET

Presentation draft deadline: 23.02.2025, 23:59 CET
Feedback on presentation draft: 28.02.2025, 23:59 CET
Final presentation deadline: 07.03.2025, 23:59 CET

Presentation day: 11.03.2025, 09:00 CET

Topics:

Privacy Friendly Apps

In this area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php . Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: NoPhish App Rework
Number of students: 2 Ba/Ma
Description: The NoPhish app was one of the first measures from the NoPhish concept. The app has been around for a long time and has not been updated since then. Accordingly, the task of the project is to make the app functional for the current Android version. The app is also to be optimized so that updates, e.g. new chapters, can be added easily.

Designing Security User studies

These topics are related to how to set up and conduct user studies of various types. Online studies, interviews and lab studies are possible. At the end of the semester, the students present a report / paper and a talk in which they present their methodologies and the results of small pre-studies.

Title: IT-Security and Privacy Studies in the health sector
Number of students: 1 Ba/Ma
Description: Cyberattacks in the healthcare sector are on the rise and medical facilities are increasingly becoming the target of hacker attacks. This often affects sensitive patient data or, in the event of a cyberattack, patient care. The German Federal Office for Information Security (BSI) reports that “[t]he security situation of the IT infrastructure of medical practices in Germany [...] has hardly been studied to date.” The aim of the work is to find out which scientific studies already exist in the field of IT security and privacy and which best practices can be derived from these studies, e.g. on the subject of recruitment, study design or consideration of special needs.

Title: Understanding Privacy and Security Risk Awareness Among Sports Science Students at KIT
Number of students: 1 Ba/Ma
Description: Privacy and Security Awareness in Data Handling: The key issue is that many sports science students may not fully understand the privacy and security risks involved in handling sensitive data. As students increasingly deal with personal and research-related information, gaps in their awareness of data protection, such as risks of data breaches or misuse, can lead to significant vulnerabilities. The aim of the task is to design a survey that assesses their current understanding of these risks, helping to identify areas where further education or guidance is needed.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyze the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Visualization of Eye Gaze Patterns during Authentication Tasks
Number of students: 1 Ba/Ma
Description: In this project, students will analyze and visualize eye gaze data collected during two specific authentication tasks: the Dot Task and the Slider Task. The primary objective is to represent subjects' eye movements visually, enhancing the understanding of gaze patterns during the authentication process. *Dot Task Visualization:* For the Dot Task, participants were instructed to focus on a sequence of dots displayed on a screen. The dataset includes the positions of these dots and the corresponding gaze locations of the subjects. The student's task is to create a dynamic visualization that not only represents these positions accurately but also illustrates the sequence in which the dots were focused on by the subjects. *Slider Task Visualization:* The Slider Task involved presenting participants with a series of images, for which both the images' locations on the screen and the subjects' gaze locations are recorded. The challenge is to develop a heatmap visualization based on this data, effectively demonstrating the concentration and dispersion of gaze points across different images.

Title: Compare BSI Phishing Game with the NoPhish Game
Number of students: 1 Ba
Description: The NoPhish app, one of the first implementations of the NoPhish concept, is a form of serious game. The BSI has also developed a game in the field of phishing. Both "games" use different approaches to impart knowledge from the same context. The aim is to evaluate the two games in terms of similarities and differences.

Title: Chatbots for Literature Reviews
Number of students: 1 Ba
Description: Chatbots are becoming increasingly popular and are already being used in various areas. But in what form can these bots be used for science? The variety of chatbots also raises the question of whether there are chatbots that are better suited to a scientific context. The aim is to identify a selection of chatbots and evaluate them in terms of their effectiveness for future literature research. To this end, the results of the chatbots will be compared with the ACM database in order to check their effectiveness for finding literature for a specific period of time.

Title: Phishing Advice from Organizations (English Only)
Number of students: 1 Ba/Ma
Description: Many companies distribute information on how to recognize phishing via various channels such as e-mails, e.g. Amazon or Telekom. The question arises as to how helpful these tips are in reality. Are they too specific to the context of the company or so abstractly formulated that they are of no real help to users? The aim of the work is to collect various hints and then compare them with the hints of the NoPhish concept in order to find differences and similarities between the hints and the concept.

Title: How do website owners become aware that their website was hacked?
Number of students: 1 Ba/Ma
Description: We identified website owners that were affected by a hack on their website and sent them a notification. During the course of the notification process, we also identified several websites who seemingly remediated the hack before our notification. We now wanted to find out, how those website owners got aware of the hack. If they were notified by a third party, we would also like to know how and by whom they were notified and what their feelings were with respect to the notification.

Title: Cognitive Walkthrough for applying, installing, and using an S/MIME certificate at KIT
Number of students: 1-2 Ba/Ma
Description: The main application of S/MIME is the encryption and signing of e-mail messages. The KIT offers all members the opportunity to have S/MIME certificates issued and has recently started using a new process of the European research network GÉANT for this purpose. The aim of this work is to carry out a cognitive walkthrough with members of the KIT to apply for, set up and use S/MIME certificates and to identify problem areas and obstacles.

Title: Anti-phishing information presented in medias and anti-phishing channels (English only)
Number of students: 1 Ba
Description: Several different channels exists to disseminate information about phishing, be it recent major campaigns or more specific recommendations. Some of these are through social networks accounts, others are specific webpages created "ad hoc" by certain organizations (e.g., Action Fraud in the UK, the BSI). The goal of this topic is to conduct a media review of several channels, collect the data, and compare it with results from a previous iteration of this same topic.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V	**Praktikum Security, Usability and Society (Master)** 2512555, WS 24/25, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

English:

The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

Application deadline 25.10.2024
Assignment 30.10.2024
Confirmation deadline 03.11.2024

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Final presentation deadline: 07.03.2025, 23:59 CET

Presentation day: 11.03.2025, 09:00 CET

Topics:

Privacy Friendly Apps

In this area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php . Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: NoPhish App Rework
Number of students: 2 Ba/Ma
Description: The NoPhish app was one of the first measures from the NoPhish concept. The app has been around for a long time and has not been updated since then. Accordingly, the task of the project is to make the app functional for the current Android version. The app is also to be optimized so that updates, e.g. new chapters, can be added easily.

Designing Security User studies

These topics are related to how to set up and conduct user studies of various types. Online studies, interviews and lab studies are possible. At the end of the semester, the students present a report / paper and a talk in which they present their methodologies and the results of small pre-studies.

Title: Usability of Password Managers in Virtual Reality
Number of students: 2 Ma
Description: The pre-dominant form of authentication in Virtual Reality (VR) are passwords. Passwords create a burden for users in the VR environment because of special input methods and the virtual keyboard [Stephenson, S. et al (2022). SoK: Authentication in Augmented and Virtual Reality]. Password Managers (PMs) can support the user with handling this problem [Mayer, P. et al. (2022). Why Users (Don't) Use Password Managers at a Large Educational Institution]. They offer auto-filling features, store credentials in an overview or generate complex and secure passwords. Especially in the VR context, where typing a password is slow and complex, PMs can be beneficial. We want to explore the different PMs in VR and test the usability to find challenges and possible solutions.

Title: IT-Security and Privacy Studies in the health sector
Number of students: 1 Ba/Ma
Description: Cyberattacks in the healthcare sector are on the rise and medical facilities are increasingly becoming the target of hacker attacks. This often affects sensitive patient data or, in the event of a cyberattack, patient care. The German Federal Office for Information Security (BSI) reports that “[t]he security situation of the IT infrastructure of medical practices in Germany [...] has hardly been studied to date.” The aim of the work is to find out which scientific studies already exist in the field of IT security and privacy and which best practices can be derived from these studies, e.g. on the subject of recruitment, study design or consideration of special needs.

Title: Understanding Privacy and Security Risk Awareness Among Sports Science Students at KIT
Number of students: 1 Ba/Ma
Description: Privacy and Security Awareness in Data Handling: The key issue is that many sports science students may not fully understand the privacy and security risks involved in handling sensitive data. As students increasingly deal with personal and research-related information, gaps in their awareness of data protection, such as risks of data breaches or misuse, can lead to significant vulnerabilities. The aim of the task is to design a survey that assesses their current understanding of these risks, helping to identify areas where further education or guidance is needed.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyze the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Visualization of Eye Gaze Patterns during Authentication Tasks
Number of students: 1 Ba/Ma
Description: In this project, students will analyze and visualize eye gaze data collected during two specific authentication tasks: the Dot Task and the Slider Task. The primary objective is to represent subjects' eye movements visually, enhancing the understanding of gaze patterns during the authentication process. *Dot Task Visualization:* For the Dot Task, participants were instructed to focus on a sequence of dots displayed on a screen. The dataset includes the positions of these dots and the corresponding gaze locations of the subjects. The student's task is to create a dynamic visualization that not only represents these positions accurately but also illustrates the sequence in which the dots were focused on by the subjects. *Slider Task Visualization:* The Slider Task involved presenting participants with a series of images, for which both the images' locations on the screen and the subjects' gaze locations are recorded. The challenge is to develop a heatmap visualization based on this data, effectively demonstrating the concentration and dispersion of gaze points across different images.

Title: Phishing Advice from Organizations (English Only)
Number of students: 1 Ba/Ma
Description: Many companies distribute information on how to recognize phishing via various channels such as e-mails, e.g. Amazon or Telekom. The question arises as to how helpful these tips are in reality. Are they too specific to the context of the company or so abstractly formulated that they are of no real help to users? The aim of the work is to collect various hints and then compare them with the hints of the NoPhish concept in order to find differences and similarities between the hints and the concept.

Title: How do website owners become aware that their website was hacked?
Number of students: 1 Ba/Ma
Description: We identified website owners that were affected by a hack on their website and sent them a notification. During the course of the notification process, we also identified several websites who seemingly remediated the hack before our notification. We now wanted to find out, how those website owners got aware of the hack. If they were notified by a third party, we would also like to know how and by whom they were notified and what their feelings were with respect to the notification.

Title: Cognitive Walkthrough for applying, installing, and using an S/MIME certificate at KIT
Number of students: 1-2 Ba/Ma
Description: The main application of S/MIME is the encryption and signing of e-mail messages. The KIT offers all members the opportunity to have S/MIME certificates issued and has recently started using a new process of the European research network GÉANT for this purpose. The aim of this work is to carry out a cognitive walkthrough with members of the KIT to apply for, set up and use S/MIME certificates and to identify problem areas and obstacles.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V Practical lab Security, Usability and Society (Bachelor)

2512554, SS 2025, 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 2025, 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 6.6 Course: Advanced Lab Sociotechnical Information Systems Development (Bachelor) [T-WIWI-111124]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 24/25	2512400	Practical Course Sociotechnical Information Systems Development (Bachelor)	3 SWS	Practical course /	Sunyaev, Goram, Leiser
Exams					
WT 24/25	7900080	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
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.

Prerequisites
None

Workload
135 hours

T 6.7 Course: Advanced Programming - Application of Business Software [T-WIWI-102748]

Responsible: Prof. Dr. Stefan Klink
Prof. Dr. Andreas Oberweis

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2511026	Advanced Programming - Application of Business Software	2 SWS	Lecture / 🗣	Klink
WT 24/25	2511027	Exercises Advanced Programming - Application of Business Software	1 SWS	Practice / 🗣	Ullrich
WT 24/25	2511028	Computer lab Advanced Programming - Application of Business Software	2 SWS	Practice / 🗣	Schreiber, Ullrich
Exams					
WT 24/25	7900019	Advanced Programming - Application of Business Software			Oberweis
ST 2025	7900049	Advanced Programming - Application of Business Software			Klink

Legend: Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The success control takes place in the form of a written examination. The duration of the exam is 60 minutes. The examination is offered every semester and can be repeated at any regular examination date.
The prerequisite for taking the exam is successful participation in a computer lab during the lecture in the winter semester. Attendance is compulsory for individual dates of the computer lab. More detailed information on registration to the computer lab and exercise sessions will be announced in the first lecture and on the lecture homepage on ILIAS.
Admission to take the exam can only be acquired in the winter semester and is valid indefinitely.

Prerequisites
This course cannot be taken together with *Advanced Programming - Java Network Programming.*

Recommendation
Knowledge of the course "Foundations of Informatics I und II" are helpful.

Workload
150 hours

Below you will find excerpts from events related to this course:

V **Advanced Programming - Application of Business Software** — **Lecture (V) On-Site**
2511026, WS 24/25, 2 SWS, Language: German, Open in study portal

Content

Business information systems enable, support, and accelerate new forms of business processes and forms of organisation. They are the central infrastucture of the economy in the age of eBusiness. Thus, basic knowledge is given in lectures, in excersises and in the computer lab which deals with installation, configuration and parameterization of busines information systems. The course communicates profund knowledge in following topics:

- Analysis of cooperation scenarios and business process scenarios
- Selection of modelling methods according to defined criteria
- Implementation of business process modells and cooperation modells with the help of standard software
- Identification and assessment of challenges during the installation of information systems
- Economical evaluation of business information systems.

This course cannot be taken together with *Advanced Programming - Java Network Programming* [2511020].

Learning objectives:

Students

- explain basic concepts and principles of enterprise information systems,
- describe the components of enterprise information systems,
- assess economical aspects of such systems,
- asseapply standard software for modelling busines processes and for analysing them to given criteria.

Recommendations:

Knowledge of the courses "Grundlagen der Informatik I und II" are helpful.

Notes:

- No registration is required for the lecture
- An registration is required for the exercises for participation in the Computer Lab and the subsequent exam admission
- The registration phase for the exercises starts in the first week after lecture begin and ends with the first exercise session
- Important informations regarding the registration, exact dates and deadlines will be communicated on the lecture website (ILIAS)

Workload:

- Lecture 30h
- Exercise course 15h
- Review and preparation of lectures 23h
- Review and preparation of exercises 10h
- Computer Lab 30h
- Exam preparation 26h
- Exam 1h
- Total 135h
- Exercise courses are done by student tutors

Literature

- Schönthaler, Vossen, Oberweis, Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.
- Hasenkamp, Stahlknecht: Einführung in die Wirtschaftsinformatik. Springer 2012.
- Hansen, Neumann: Wirtschaftsinformatik I. Grundlagen betrieblicher Informationsverarbeitung. UTB 2009.
- Mertens et al.: Grundzüge der Wirtschaftsinformatik. Springer 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 6.8 Course: Advanced Programming - Java Network Programming [T-WIWI-102747]

Responsible: Prof. Dr. Dietmar Ratz
Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	5

Events					
ST 2025	2511020	Advanced Programming - Java Network Programming	2 SWS	Lecture / 🗣	Ratz
ST 2025	2511021	Tutorium zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	1 SWS	Tutorial (/ 🧩	Ratz, Stegmaier, Mütsch
ST 2025	2511023	Rechnerpraktikum zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	2 SWS	/ 🧩	Ratz, Stegmaier, Mütsch
Exams					
WT 24/25	7900020	Advanced Programming - Java Network Programming			Ratz
ST 2025	7900041	Advanced Programming - Java Network Programming			Ratz

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
At the end of the lecture period, a written examination (90 min.) is offered (according to §4(2), 1 SPO), for which - through successful participation in the exercises during the semester - admission must be obtained. The exact details will be announced in the lecture. The examination is offered every semester and can be repeated at any regular examination date.

A bonus can be earned through successful participation in the exercises. 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). Details will be announced in the lecture

Prerequisites
This course cannot be taken together with*Advanced Programming - Application of Business Software*[2511026].

Annotation
The registration for the participation in the computer lab (precondition for the exam participation) already takes place in the first lecture week!

Workload
135 hours

Below you will find excerpts from events related to this course:

V Advanced Programming - Java Network Programming
2511020, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

In the lecture, the exercises and computer labs to this course the practical handling with the programming language Java dominating within the range of economical applications is obtained. The basis for this is the current language standard. The knowledge from the lecture Introduction to Programming with Java will be deepened and extended. This is done, among other things, by addressing commercially relevant topics such as object-oriented modeling and programming, class hierarchy and inheritance, threads, applications and applets, AWT and Swing components for graphical user interfaces, exception and event processing, lambda expressions, input/output via streams, applications in networks, Internet communication, client and server programming, remote method invocation, servlets, Java Server Pages and Enterprise Java Beans.

This course cannot be taken together with *Advanced Programming - Application of Business Software* [2540886/2590886].

Learning objectives:

- Students learn the practical use of the object-oriented programming language Java and are enabled to design and implement component-based Internet applications using the latest technologies and tools.
- The ability to select and design these methods and systems appropriate to the situation and to use them for solving problems is imparted.
- Students are empowered to find strategic and creative answers in the search for solutions to well-defined, concrete and abstract problems.

Workload:

The total workload for this course is approximately 150 hours.

Organizational issues

Die Anmeldung zur Teilnahme am Rechnerpraktikum (Vorbedingung zur Klausurteilnahme) findet bereits in der ersten Vorlesungswoche statt!

Literature

Ratz, D. Schulmeister-Zimolong, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 8. Aktualisierte und erweiterte Auflage, Hanser 2018.

Weiterführende Literatur:

- S. Zakhour, S. Hommel, J. Royal. Das Java Tutorial. Addison Wesley 2007
- W. Eberling, J. Lessner. Enterprise JavaBeans 3. Hanser Verlag 2007.
- R. Oechsle. Parallele und verteilte Anwendungen. 2. Auflage. Hanser Verlag 2007.
- Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 6.9 Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsible: Prof. Dr. Johannes Brumm
Prof. Dr. Kay Mitusch

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2025	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture / 🗣	Mitusch, Brumm
ST 2025	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice / 🗣	Pegorari, Corbo, Mitusch, Brumm

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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

Recommendation
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.

Below you will find excerpts from events related to this course:

V Advanced Topics in Economic Theory
2520527, SS 2025, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Die Veranstaltung wird in englischer Sprache angeboten:

The course is based on the excellent textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

T 6.10 Course: Analalysis of Social Structurs (WiWi) [T-GEISTSOZ-109047]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 24/25	5011007	Analysis of Social Structures	2 SWS	Practice / 🖥	Nollmann
Exams					
WT 24/25	7400029	Analalysis of Social Structurs (WiWi)			Nollmann

Legend: 🖥 Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

T 6.11 Course: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

Responsible: Dr.-Ing. Marcus Gohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2134150	Gas, lubricating oil and operating media analysis in drive train development	2 SWS	Lecture / 🗣	Gohl
Exams					
WT 24/25	76-T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines			Gohl, Koch
ST 2025	76--T-Mach-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines			Gohl

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral examination, duration approx. 25 min, no aids

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Gas, lubricating oil and operating media analysis in drive train development

2134150, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.

T 6.12 Course: Analysis of Multivariate Data [T-WIWI-103063]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics
M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2025	2550550		2 SWS	Lecture / 🗣	Grothe
ST 2025	2550551		2 SWS	Practice / 🗣	Grothe, Liu
Exams					
WT 24/25	7900297	Analysis of Multivariate Data			Grothe
ST 2025	7900033	Analysis of Multivariate Data			Grothe

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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

Recommendation
Attendance of the courses Statistics 1 [2600008] and Statistics 2 [2610020] is recommended.

Annotation
The lecture is not offered regularly. The courses planned for three years in advance can be found online.

Workload
135 hours

Below you will find excerpts from events related to this course:

V 2550550, SS 2025, 2 SWS, Open in study portal — **Lecture (V) On-Site**

Literature
Skript zur Vorlesung

T 6.13 Course: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

Responsible: Jürgen Pfeil
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2134134	Analysis tools for combustion diagnostics	2 SWS	Lecture / 🗣	Pfeil
Exams					
WT 24/25	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Koch
ST 2025	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Koch

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Analysis tools for combustion diagnostics
2134134, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Skript, erhältlich in der Vorlesung

T 6.14 Course: Applied Informatics – Applications of Artificial Intelligence [T-WIWI-110340]

Responsible: Dr.-Ing. Tobias Käfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2511314	Applied Informatics - Applications of Artificial Intelligence	2 SWS	Lecture / 🔀	Käfer, Kinder
WT 24/25	2511315	Exercises to Applied Informatics - Applications of Artificial Intelligence	1 SWS	Practice / 🗣	Käfer, Qu , Kinder
Exams					
WT 24/25	79AIFB_AKI_C1	Applied Informatics – Applications of Artificial Intelligence			Käfer
ST 2025	79AIFB_AKI_C1	Applied Informatics - Applications of AI (Registration until 21.07.2025)			Käfer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Examination (60 min) according to §4, Abs. 2, 1 of the examination regulations or oral examination of 20 minutes according to §4, Abs. 2, 2 of the examination regulations. The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Recommendation
Basics in logic, e.g. from lecture Foundations of Informatics 1 are important.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Applied Informatics - Applications of Artificial Intelligence

2511314, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The lecture provides insights into the fundamentals of artificial intelligence. Basic methods of artificial intelligence and their applications in industry are presented.

Applications of the AI is a sub-area of computer science dealing with the automation of intelligent behavior. In general, it is a question of mapping human intelligence. Methods of artificial intelligence are presented in various areas such as, for example, question answering systems, speech recognition and image recognition.

The lecture gives an introduction to the basic concepts of artificial intelligence. Essential theoretical foundations, methods and their applications are presented and explained.

This lecture aims to provide students with a basic knowledge and understanding of the structure, analysis and application of selected methods and technologies on artificial intelligence. The topics include, among others, knowledge modeling, machine learning, text mining, uninformed search, and intelligent agents.

Learning objectives:

The students

- consider current research topics in the field of artificial intelligence and in particular learn about the topics of knowledge modeling, machine learning, text mining and uninformed search.
- interdisciplinary thinking.
- technological approaches to current problems.

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

V **Exercises to Applied Informatics - Applications of Artificial Intelligence** — **Practice (Ü)** **On-Site**
2511315, WS 24/25, 1 SWS, Language: German, Open in study portal

Content
The exercises are oriented on the lecture applications of AI.

Multiple exercises are held that capture the topics, held in the lecture Applications of AI and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

This lecture aims to provide students with a basic knowledge and understanding of the structure, analysis and application of selected methods and technologies on artificial intelligence. The topics include, among others, knowledge modeling, machine learning, text mining, uninformed search, and intelligent agents.

Learning objectives:

The students

- consider current research topics in the field of artificial intelligence and in particular learn about the topics of knowledge modeling, machine learning, text mining and uninformed search.
- interdisciplinary thinking.
- technological approaches to current problems.

T 6.15 Course: Applied Informatics – Cybersecurity [T-WIWI-114156]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2511550	Applied Informatics – Cybersecurity	2 SWS	Lecture / 🗣	Volkamer
ST 2025	2511551	Exercise Applied Informatics – Cybersecurity	1 SWS	Practice / 🗣	Volkamer, Berens, Ballreich
Exams					
ST 2025	79AIFB_CS_A1	Applied Informatics – Cybersecurity (Registration until 21.07.2025)			Volkamer

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course 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, for which admission must be obtained through successful participation in the exercise during the semester.

The exam takes place every semester and can be repeated at every regular examination date.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-108387 - Information Security must not have been started.

Annotation
Competence Goal

The student

- can explain and apply the basics of information security
- knows appropriate measures to achieve different protection goals and can implement these measures
- can assess the quality of organizational protective measures, i.e. among other things
- knows what has to be taken intoaccount when using the individual measures
- understands the differences between information security in the enterprise and in the private context
- knows the areas of application of a variety of relevant standards and knows their weaknesses
- knows and can explain the problems of information security which may arise from human-machine interaction
- can assess messages about detected security problems in a critical way
- can structure a software project in the field of information security and explain and present results in oral and written form
- can use the techniques of Human Centred Security and Privacy by Design to create user-friendly software.

Content

- Basics and concepts of information security
- Understanding the protection objectives of information security and various attack models (including associated assumptions)
- introduction of measures to achieve the respective protection goals, taking into account different attack models
- Note: In contrast to the IT Security lecture, measures such as encryption algorithms are treated only abstractly, i.e. the idea of the measure, assumptions to the attacker and the deployment environment.
- Presentation and analysis of problems of information security arising from human-machine interaction and presentation of the Human Centered Security by Design approach.
- Introduction into organizational protective measures and standards to be observed for companies.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Applied Informatics – Cybersecurity

2511550, SS 2025, 2 SWS, Open in study portal

Lecture (V)
On-Site

Content

- Basics and concepts of information security
- Understanding the protection objectives of information security and various attack models (including associated assumptions)
- introduction of measures to achieve the respective protection goals, taking into account different attack models
- Note: In contrast to the IT Security lecture, measures such as encryption algorithms are treated only abstractly, i. e. the idea of the measure, assumptions to the attacker and the deployment environment.
- Presentation and analysis of problems of information security arising from human-machine interaction and presentation of the Human Centered Security by Design approach.
- Introduction into organisational protective measures and standards to be observed for companies

Learing objectives:

The student

- can explain the basics of information security
- knows suitable measures to achieve different protection goals
- can assess the quality of organisational protective measures, i. e. among other things knows what has to be taken into account when using the individual measures
- understands the differences between information security in the organisational and in the private context
- knows the areas of application of different standards and knows their weaknesses
- knows and can explain the problems of information security that which arise from human-machine interaction
- is able to deal with messages concerning found security problems in a critical way.

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

Literature

- P. Gerber, M. Ghiglieri, B. Henhapl, O. Kulyk, K. Marky, P. Mayer, B. Reinheimer, and M. Volkamer, *Human Factors in Security*. Springer, Jan. 2018, pp. 83–98.
- C. Eckert, *IT-Sicherheit: Konzepte-Verfahren-Protokolle*. Walter de Gruyter, 2013

V Exercise Applied Informatics – Cybersecurity

2511551, SS 2025, 1 SWS, Open in study portal

Practice (Ü)
On-Site

Content

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

T 6.16 Course: Applied Informatics – Database Systems [T-WIWI-110341]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2025	2511200	Applied Informatics - Database Systems	2 SWS	Lecture / 🗣	Sommer
ST 2025	2511201	Exercises Applied Informatics - Database Systems	1 SWS	Practice / 🗣	Sommer
Exams					
WT 24/25	79AIFB_DBS_C5	Applied Informatics – Database Systems			Oberweis
ST 2025	79AIFB_DBS_B1	Applied Informatics - Database Systems (Registration until 21.07.2025)			Oberweis

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) in the first week after lecture period.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102660 - Database Systems must not have been started.

Annotation
Replaces from summer semester 2020 T-WIWI-102660 "Database Systems".

Workload
135 hours

Below you will find excerpts from events related to this course:

V Applied Informatics - Database Systems

2511200, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Database systems (DBS) play an important role in today's companies. Internal and external data is stored and processed in databases in every company. The proper management and organization of data helps to solve many problems, enables simultaneous queries from multiple users and is the organizational and operational base for the entire working procedures and processes of the company. The lecture leads in the area of the database theory, covers the basics of database languages and database systems, considers basic concepts of object-oriented and XML databases, conveys the principles of multi-user control of databases and physical data organization. In addition, it gives an overview of business problems often encountered in practice such as:

- Correctness of data (operational, semantic integrity)
- Restore of a consistent database state
- Synchronization of parallel transactions (phantom problem).

Learning objectives:

Students

- are familiar with the concepts and principles of data base models, languages and systems and their applications and explain it,
- design and model relational data bases on the basis of theoretical foundations,
- create queries for relational databases,
- know how to handle enhanced data base problems occurring in the enterprises.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Schlageter, Stucky. Datenbanksysteme: Konzepte und Modelle. Teubner 1983.
- S. M. Lang, P. C. Lockemann. Datenbankeinsatz. Springer-Verlag 1995.
- Jim Gray, Andreas Reuter. Transaction Processing: Concepts and Techniques. Morgan Kaufmann 1993.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

V **Exercises Applied Informatics - Database Systems**
2511201, SS 2025, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Content
Database systems (DBS) play an enormously important role in today's companies. The internal and external data is stored and processed in the database of the respective company. The correct management and organization of this data helps to solve numerous problems, enables simultaneous queries by several users and is the organizational and operational basis for the entire workflows and processes of the company.

The lecture introduces the field of database theory, covers the basics of database languages and database systems, teaches the principles of multi-user database control and physical data organization. In addition, it provides an overview of database problems often encountered in business practice, such as the correctness of data (operational, semantic integrity), the recovery of a consistent database state, and the synchronization of parallel transactions.

Literature
Schlageter / Stucky: Datenbanksysteme: Konzepte und Modelle, 2. Auflage, Teubner, Stuttgart, 1983 P. C. Lockemann / J. W. Schmidt (Hrsg.): Datenbank-Handbuch, Springer-Verlag, 1987 S. Cannan / G. Otten: SQL - The Standard Handbook, McGraw-Hill, 1993 Jim Gray / Andreas Reuter: Transaction Processing: Concepts and Techniques, Morgan Kaufmann, 1993 S. M. Lang / P. C. Lockemann: Datenbankeinsatz, Springer-Verlag, 1995 Ramez Elmasri / Shamkant B. Navathe: Fundamentals of Database Systems, Addison-Wesley, 1994 und 2000

6.17 Course: Applied Informatics – Mobile Computing [T-WIWI-113957]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2511226	Applied Informatics - Mobile Computing	2 SWS	Lecture / 🗣	Schiefer
ST 2025	2511227	Exercises Applied Informatics - Mobile Computing	1 SWS	Practice / 🗣	Schiefer, Forell, Fritsch
Exams					
ST 2025	7900225	Applied Informatics – Mobile Computing (Registration until 21.07.2025)			Oberweis

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is assessed in the form of a written (60 min) or oral examination.

Prerequisites
None

Workload
135 hours

Below you will find excerpts from events related to this course:

V Applied Informatics - Mobile Computing
2511226, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture covers the basics of mobile computing. These are interlinked with the economic background in Germany.

Contents are:

1. organizational matters
2. introduction & definitions
3. mobile devices
4. mobile radio technologies
5. mobile communications market
6. mobile applications
7. digital radio technologies
8. location & context

Note: The teaching units listed above each have a different scope.

Learning objectives:

If you are confronted with a question in your job which affects "Mobile Computing", you should be able to provide answers quickly and competently:

Market structures
technique
Possibilities for applications
lawsuits
issues

Workload:

The total workload for this course unit is approx. 135 hours (4.5 credit points).

Organizational issues
Vorlesung und Übung werden integriert angeboten.

Literature

- Jochen Schiller: Mobilkommunikation (2. Aufl. 2003)
  http://www.mi.fu-berlin.de/inf/groups/ag-tech/teaching/resources/ Mobile_Communications/course_Material/index.html
- Martin Sauter: Grundkurs Mobile Kommunikationssysteme (6. Aufl. 2015)
  http://link.springer.com/book/10.1007%2F978-3-658-08342-7
- Küpper, A.: Location-based Services. Fundamentals and Operation. Wiley & Sons, 2005.
- Roth, J.: Mobile Computing. Grundlagen, Technik, Konzepte. Dpunkt.verlag, 2. Auflage, 2005.
- Mansfeld, W.: Satellitenortung und Navigation:
  Grundlagen, Wirkungsweise und Anwendung globaler Satellitennavigationssysteme
- Dodel, H., Häupler, D.: Satellitennavigation

Einige relevante Informationen im Web

- Bundesnetzagentur http://www.bundesnetzagentur.de
  u.a. Jahresbericht und Marktbeobachtung
- VATM-Marktstudien
  http://www.vatm.de/vatm-marktstudien.html
- Verbände, bspw. BITKOM (bitkom.org), eco e.V. (eco.de)
- Presse, bspw. Teltarif, Heise, Golem, …
- Statistiken (Statista Lizenz des KIT)

T 6.18 Course: Applied Informatics – Modelling [T-WIWI-110338]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2511030	Applied Informatics - Modelling	2 SWS	Lecture / 🗣	Schiefer, Schüler
WT 24/25	2511031	Exercises to Applied Informatics - Modelling	1 SWS	Practice / 🗣	Schiefer, Schüler
Exams					
WT 24/25	79AIFB_AI1_C4	Applied Informatics – Modelling			Oberweis
ST 2025	79AIFB_AI1	Applied Informatics - Modelling (Registration until 21 July 2025)			Oberweis

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written examination (60 min) in the first week after lecture period (according to Section 4 (2),1 of the examination regulation).

Prerequisites
None

Workload
135 hours

Below you will find excerpts from events related to this course:

V Applied Informatics - Modelling

2511030, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

In the context of complex information systems, modelling is of central importance, e.g. – in the context of systems to be developed – for a better understanding of their functionality or in the context of existing systems for supporting maintenance and further development.

Modelling, in particular modelling of information systems, forms the core part of this lecture. The lecture is organized in two parts. The first part mainly covers the modelling of static aspectes, the second part covers the modelling of dynamic aspects of information systems.

The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets together with their respective analysis techniques will be introduced.

Learning objectives:

Students

- explain the strengths and weaknesses of various modeling approachesfor Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- modelling given situations in propositional and predicate logic and can interpret them,
- analyze various properties in propositional and predicate logic,
- create and evaluate a relational database schema and express queries in relational algebra.

Workload:

- Total effort: 120-135 hours
- Presence time: 45 hours
- Self study: 75-90 hours

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

Weiterführende Literatur:

- U. Kastens, H. Kleine Büning. Modellierung – Grundlagen und Formale Methoden. Carl Hanser Verlag, 2014
- J.L. Peterson. Petri Net Theory and Modeling of Systems, Prentice Hall, 1981.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag, 2000

V **Exercises to Applied Informatics - Modelling** — **Practice (Ü) On-Site**

2511031, WS 24/25, 1 SWS, Language: German, Open in study portal

Content

In the context of complex information systems, modelling is of central importance, e.g. – in the context of systems to be developed – for a better understanding of their functionality or in the context of existing systems for supporting maintenance and further development.

Modelling, in particular modelling of information systems, forms the core part of this lecture. The lecture is organized in two parts. The first part mainly covers the modelling of static aspectes, the second part covers the modelling of dynamic aspects of information systems.

The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets together with their respective analysis techniques will be introduced.

Learning objectives:

Students

- explain the strengths and weaknesses of various modeling approachesfor Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- modelling given situations in propositional and predicate logic and can interpret them,
- analyze various properties in propositional and predicate logic,
- create and evaluate a relational database schema and express queries in relational algebra.

Workload:

- Total effort: 120-135 hours
- Presence time: 45 hours
- Self study: 75-90 hours

Organizational issues

Bei Bedarf wird ein Tutorium online angeboten.

Literature

-
    - Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
    - R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
    - W. Reisig. Petrinetze, Springer-Verlag, 2010.

  Weiterführende Literatur:

    - U. Kastens, H. Kleine Büning. Modellierung – Grundlagen und Formale Methoden. Carl Hanser Verlag, 2014
    - J.L. Peterson. Petri Net Theory and Modeling of Systems, Prentice Hall, 1981.
    - U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag, 2000

T 6.19 Course: Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-110339]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	2

Events					
ST 2025	2511032	Applied Informatics - Internet Computing	2 SWS	Lecture / 🗣	Lins, Kannengießer, Schmidt-Kraepelin, Sturm, Thiebes
ST 2025	2511033	Übungen zu Angewandte Informatik - Internet Computing	1 SWS	Practice / 🧩	Lins, Kannengießer, Schmidt-Kraepelin, Sturm, Thiebes, Guse, Rank
Exams					
WT 24/25	79AIFB_AI-IC_B4	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services			Sunyaev
ST 2025	79AIFB_AI2	Applied Informatics - Internet Computing (Registration until 16.09.2025)			Sunyaev

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate

The examination will be offered for the last time in the summer semester 2025 for first-time students. The last examination opportunity (only for repeaters) is in the winter semester 2025/2026. The lecture"Applied Computer Science - Internet Computing" (Prof. Dr. A. Sunyaev) will be replaced by the new lecture "Applied Computer Science - Cybersecurity" (Prof. Dr. M. Volkamer).

Success is assessed in the form of a written examination (60 minutes) in accordance with §4(2),1 SPO.

Successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

A grade bonus can be earned for successful participation in the exercises by submitting correct solutions to 50% of the 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

Annotation

The lecture "Applied Computer Science - Internet Computing" (Prof. Dr. A. Sunyaev) will be held for the last time in the summer semester 2025 and will then be replaced by the new lecture "Applied Computer Science - Cyber Security" (Prof. Dr. M. Volkamer).

Workload

135 hours

Below you will find excerpts from events related to this course:

V Applied Informatics - Internet Computing

Lecture (V)
On-Site

2511032, SS 2025, 2 SWS, Language: German, Open in study portal

Content

The lecture Applied Computer Science - Internet Computing provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

Learning objectives:

The student learns about basic concepts and emerging technologies of distributed systems and internet computing. Practical topics will be deepened in lab classes.

Recommendations:

Knowledge of content of the module [WI1INFO].

Workload:

The total workload for this course is approximately 135-150 hours.

Literature

Wird in der Vorlesung bekannt gegeben

T 6.20 Course: Applied Informatics – Software Engineering [T-WIWI-110343]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	2

Exams			
WT 24/25	79AIFB_SE_B1	Applied Informatics – Software Engineering	Oberweis
ST 2025	79AIFB_SE_B3	Applied Informatics - Software Engineering (Registration until 21.07.2025)	Oberweis

Competence Certificate
The examination will be offered for the last time in the summer semester 2025 for first-time students. The last examination opportunity (only for repeaters) is in the winter semester 2025/2026. The assessment takes the form of a written examination (60 minutes) in accordance with §4(2), 1 SPO. It takes place in the first week after the lecture period.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-100809 - Software Engineering must not have been started.

Annotation
The lecture will no longer be offered from summer semester 2025. Parts of the lecture will be integrated into the new course "Applied Computer Science - Mobile Computing".

Workload
135 hours

T 6.21 Course: Artificial Intelligence in Production [T-MACH-112115]

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

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2149921	Artificial Intelligence in Production	2 SWS	Lecture / 🗣	Fleischer
Exams					
WT 24/25	76-T-MACH-112115	Artificial Intelligence in Production			Fleischer
ST 2025	76-T-MACH-112115	Artificial Intelligence in Production			Fleischer

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (90 min)

Prerequisites
none

Workload
150 hours

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Production

2149921, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 6.22 Course: Auction & Mechanism Design [T-WIWI-102876]

Responsible: Prof. Dr. Nora Szech
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2560550	Digitale Märkte und Mechanismen	2 SWS	Lecture / 🗣	Rosar
ST 2025	2560551	Übung zu Digitale Märkte und Mechanismen	1 SWS	Practice / 🗣	Rosar
Exams					
WT 24/25	7900007	Exam Digitale Märkte und Mechanismen (2)			Puppe
ST 2025	7900161	Exam Digitale Märkte und Mechanismen			Puppe

Legend: 🖥 Online, ✿ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.

A bonus can be earned through successful participation in the excercise. 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.

Prerequisites
None

Recommendation
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Annotation
The lecture will be held in English.

T 6.23 Course: Automation and Autonomy in Logistics [T-MACH-113566]

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

Part of: M-MACH-106995 - Automation and Material Flow in Logistics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each winter term	1 terms	2

Competence Certificate
Written exam, duration 60 minutes

Prerequisites
none

Recommendation
none

Workload
135 hours

T 6.24 Course: Automotive Engineering I [T-MACH-100092]

Responsible: Dr.-Ing. Martin Gießler
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Language	Version
Written examination	6	Grade to a third	Each winter term	1 terms		3

Events					
WT 24/25	2113805	Automotive Engineering I	4 SWS	Lecture / 🗣	Gießler
WT 24/25	2113809	Automotive Engineering I	4 SWS	Lecture / 🗣	Gießler
Exams					
WT 24/25	76-T-MACH-100092	Automotive Engineering			Gießler
ST 2025	76-T-MACH-100092	Automotive Engineering			Gießler

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination

Duration: 120 minutes

Auxiliary means: none

Prerequisites
The brick "T-MACH-102203 - Automotive Engineering I" is not started or finished. The bricks "T-MACH-100092 - Grundlagen der Fahrzeugtechnik I" and "T-MACH-102203 - Automotive Engineering I" can not be combined.

Workload
240 hours

Below you will find excerpts from events related to this course:

V Automotive Engineering I

2113805, WS 24/25, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performance, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5. Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues

Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Kann nicht mit der Veranstaltung [2113809] kombiniert werden.

Can not be combined with lecture [2113809].

Literature

1. Mitschke, M. / Wallentowitz, H.: Dynamik der Kraftfahrzeuge, Springer Vieweg, Wiesbaden 2014

2. Pischinger, S. / Seiffert, U.: Handbuch Kraftfahrzeugtechnik, Springer Vieweg, Wiesbaden 2016

3. Gauterin, F. / Unrau, H.-J. / Gnadler, R.: Scriptum zur Vorlesung "Grundlagen der Fahrzeugtechnik I", KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

V	**Automotive Engineering I** 2113809, WS 24/25, 4 SWS, Language: English, Open in study portal	**Lecture (V)** **On-Site**

Content

1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5.Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues

You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/, students from eucor universities send an e-mail to martina.kaiser@kit.edu

Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.

Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Literature

1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichister 2015

2. Onori, S. / Serrao, L: / Rizzoni, G.: Hybrid Electric Vehicles - Energy Management Strategies, Springer London, Heidelberg, New York, Dordrecht 2016

3. Reif, K.: Brakes, Brake Control and Driver Assistance Systems - Function, Regulation and Components, Springer Vieweg, Wiesbaden 2015

4. Gauterin, F. / Gießler, M. / Gnadler, R.: Scriptum zur Vorlesung 'Automotive Engineering I', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

T 6.25 Course: Automotive Engineering I [T-MACH-102203]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 24/25	2113809	Automotive Engineering I	4 SWS	Lecture / 🗣	Gießler
Exams					
WT 24/25	76-T-MACH-102203	Automotive Engineering I			Gießler
ST 2025	76-T-MACH-102203	Automotive Engineering I			Gießler

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination

Duration: 120 minutes

Auxiliary means: none

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100092 - Automotive Engineering I must not have been started.

Below you will find excerpts from events related to this course:

V Automotive Engineering I

2113809, WS 24/25, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5.Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues

You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/, students from eucor universities send an e-mail to martina.kaiser@kit.edu

Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.

Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Literature

1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichister 2015

2. Onori, S. / Serrao, L: / Rizzoni, G.: Hybrid Electric Vehicles - Energy Management Strategies, Springer London, Heidelberg, New York, Dordrecht 2016

3. Reif, K.: Brakes, Brake Control and Driver Assistance Systems - Function, Regulation and Components, Springer Vieweg, Wiesbaden 2015

4. Gauterin, F. / Gießler, M. / Gnadler, R.: Scriptum zur Vorlesung 'Automotive Engineering I', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

T 6.26 Course: Automotive Engineering II [T-MACH-102117]

Responsible: Dr.-Ing. Martin Gießler
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2025	2114835	Automotive Engineering II	2 SWS	Lecture / 🗣	Gießler
ST 2025	2114855	Automotive Engineering II	2 SWS	Lecture / 🗣	Gießler
Exams					
WT 24/25	76-T-MACH-102117	Automotive Engineering II			Gießler
WT 24/25	76T-MACH-102117-2	Automotive Engineering II			Gießler
ST 2025	76-T-MACH-102117	Automotive Engineering II			Gießler

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Automotive Engineering II

2114835, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, comparison of designs

Learning Objectives:

The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle bodywork and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

Organizational issues
Kann nicht mit der Veranstaltung [2114855] kombiniert werden.

Can not be combined with lecture [2114855]

Literature

1. Heißing, B. / Ersoy, M.: Fahrwerkhandbuch: Grundlagen, Fahrdynamik, Komponenten, Systeme, Mechatronik, Perspektiven, Springer Vieweg, Wiesbaden, 2013

2. Breuer, B. / Bill, K.-H.: Bremsenhandbuch: Grundlagen - Komponenten - Systeme - Fahrdynamik, Springer Vieweg, Wiesbaden, 2017

3. Unrau, H.-J. / Gnadler, R.: Scriptum zur Vorlesung 'Grundlagen der Fahrzeugtechnik II', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährliche Aktualisierung

V Automotive Engineering II

2114855, SS 2025, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, comparison of the designs

Learning Objectives:

The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

Literature
Elective literature:

1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichester 2015
2. Heißing, B. / Ersoy, M.: Chassis Handbook - fundamentals, driving dynamics, components, mechatronics, perspectives, Vieweg+Teubner, Wiesbaden 2011
3. Gießler, M. / Gnadler, R.: Script to the lecture "Automotive Engineering II", KIT, Institut of Vehicle System Technology, Karlsruhe, annual update

T 6.27 Course: B2B Sales Management [T-WIWI-111367]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2572187	B2B Sales Management	2 SWS	Lecture / 🗣	Klarmann
WT 24/25	2572188	Excercises B2B Sales Management	1 SWS	Practice / 🗣	Gerlach, Daumann
Exams					
WT 24/25	7900125	B2B Sales Management			Klarmann
ST 2025	7900021	B2B Sales Management			Klarmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of success takes place through the preparation and presentation of a sales presentation based on a case study (max 30 points) and a written exam with additional aids in the sense of an open book exam (max. 60 points). In total, a maximum of 90 points can be achieved in the course. Further details will be announced during the lecture.

Prerequisites
None.

Annotation
For further information, please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

Workload
135 hours

Below you will find excerpts from events related to this course:

V B2B Sales Management — **Lecture (V) On-Site**
2572187, WS 24/25, 2 SWS, Language: German, Open in study portal

Content

Content

The event is designed to teach you taking on marketing responsibility in a very special business environment. This involves companies that sell and market their (often technically highly complex) products themselves to other companies, which is referred to as "business-to-business" (B2B) marketing and sales. Since traditional communication instruments (e.g. advertising) often hardly work in this environment and many projects lead to a long-term cooperation between supplier and customer, (personal) sales play a special role in marketing. Therefore, this event introduces marketing in B2B markets on the one hand and deals with questions of sales and distribution on the other hand.

Topics with regard to B2B sales management are:

- Basic aspects of B2B sales and B2B purchasing
- Understanding of marketing challenges in specific B2B business types (commodities, systems, solutions)
- Value pricing and value-based selling
- Organizational buying behavior
- Basics of B2B customer relationship management (e.g. key account management, reference customer management)
- Sales process (lead generation, sales presentations, customer-oriented selling, closing)
- Sales automation

Learning objectives

Students

- Are familiar with marketing and sales peculiarities and challenges in B2B environments
- Are able to identify different B2B business types and their marketing characteristics
- Are familiar with central theories of organizational buying behavior
- Are familiar with central objectives of Customer Relationship Management in B2B environments and are able to implement them with appropriate tools
- Are able to prioritize customers and calculate B2B Customer Lifetime Value
- Know how B2B sales presentations work and have also gained practical experience in this area
- Are able to determine value-based prices

Workload

The total workload for this course is approximately 135.0 hours.
Attendance time: 35.0 hours
Self-study: 100.0 hours

Organization

A detailed schedule will be announced.

Literature

Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 6.28 Course: Bachelor's Thesis [T-WIWI-103067]

Responsible:	Studiendekan des KIT-Studienganges
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101601 - Module Bachelor's Thesis

Type	Credits	Grading scale	Version
Final Thesis	12	Grade to a third	1

Competence Certificate
see module description

Prerequisites
see module description

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline	6 months
Maximum extension period	1 months
Correction period	6 weeks

6.29 Course: Basic Principles of Economic Policy [T-WIWI-103213]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Events					
ST 2025	2560280	Basic Principles of Economic Policy	2 SWS	Lecture / 🗣	Ott
ST 2025	2560281	Exercises of Basic Principles of Economic Policy	1 SWS	Practice / 🗣	Zoroglu, Ghoniem
Exams					
WT 24/25	7900079	Basic Principles of Economic Policy			Ott
ST 2025	7900106	Basic Principles of Economic Policy			Ott

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2610012], and Economics II [2600014].

Annotation
Please note that the lecture will not be held in summer semester 2021. The exam is offered.

Description:

Theory of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:

Students learn:

- To apply basic concepts of micro- and macroeconomic theories to economic policy issues.
- to develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- to derive theory-based policy recommendations.

Learning content:

- Market interventions: microeconomic perspective
- Market interventions: macroeconomic perspective
- Institutional economic aspects
- Economic policy and welfare economics
- Economic policy makers: Political-economic aspects

Workload:

- Total effort at 4.5 LP: approx. 135 hours
- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Media:

See course announcement

References:

See course announcement

Below you will find excerpts from events related to this course:

V	**Basic Principles of Economic Policy** 2560280, SS 2025, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content
The lecture deals with theories of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:

Students shall be given the ability to

- apply basic concepts of micro- and macroeconomic theories to economic policy issues
- develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- derive theory-based policy recommendations

Recommendations:

Basic micro- and macroeconomic knowledge is required, especially as taught in the courses Economics I [2610012] and Economics II [2600014].

Workload:

Total effort at 4.5 LP is approx. 135 hours and consists of:

- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Assessment:

The examination takes place in the form of a written examination (60min) (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

Organizational issues
Zugehörige Veranstaltung: Übungen zur Einführung in die Wirtschaftspolitik [2560281]
Vorbereitungsmaterialien finden Sie im Ilias.

Literature

- Klump, Rainer (2013): Wirtschaftspolitik. Pearson Studium
- Baldwin, Richard und Charles Wyplosz (2019): The Economics of European Integration, 6. Edition, McGraw-Hill Education, London
- Foliensatz zur Vorlesung
- Übungsaufgaben

V **Exercises of Basic Principles of Economic Policy**
2560281, SS 2025, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Organizational issues
Zugehörige Veranstaltung: [2560280] Einführung in die Wirtschaftspolitik

Literature

- Klump, Rainer (2013): Wirtschaftspolitik. Pearson Studium
- Baldwin, Richard und Charles Wyplosz (2019): The Economics of European Integration, 6. Edition, McGraw-Hill Education, London
- Foliensatz zur Vorlesung
- Übungsaufgaben

T 6.30 Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

Responsible: Dr. Gerd Gutekunst
Prof. Dr. Berthold Wigger

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101403 - Public Finance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture / 🗣	Wigger, Gutekunst
Exams					
WT 24/25	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger
ST 2025	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5 h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
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 events related to this course:

V Basics of German Company Tax Law and Tax Planning
2560134, WS 24/25, 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 6.31 Course: Basics of Technical Logistics [T-MACH-113013]

Responsible: Dr.-Ing. Martin Mittwollen
Dr.-Ing. Jan Oellerich

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106995 - Automation and Material Flow in Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge of the basics of technical mechanics preconditioned.

Workload
135 hours

T 6.32 Course: Basics of Technical Logistics I [T-MACH-109919]

Responsible: Dr.-Ing. Martin Mittwollen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 24/25	2117095	Basics of Technical Logistics I	4 SWS	Lecture / Practice (/	Mittwollen
Exams					
WT 24/25	76-T-MACH-109001	Basics of Technical Logistics I			Mittwollen
WT 24/25	76-T-MACH-109919	Basics of Technical Logistics I			Mittwollen

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge of the basics of technical mechanics preconditioned.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Basics of Technical Logistics I

2117095, WS 24/25, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- effect model of conveyor machines
- elements for the change of position and orientation
- conveyor processes
- identification systems
- drives
- mechanical behaviour of conveyors
- structure and function of conveyor machines
- elements of intralogistics
- sample applications and calculations in addition to the lectures inside practical lectures

Students are able to:

- Describe processes and machines of technical logistics,
- Model the fundamental structures and the impacts of material handling machines with mathematical models,
- Refer to industrially used machines
- Model real machines applying knowledge from lessons and calculate their dimensions.

Organizational issues

Die Erfolgskontrolle erfolgt in Form einer schriftlichen oder mündlichen Prüfung (nach §4 (2), 1 bzw. 2SPO).

The assessment consists of a written or oral exam according to Section 4 (2), 1 or 2of the examination regulation.

Es wird Kenntnis der Grundlagen der Technischen Mechanik vorausgesetzt.

Basics knowledge of technical mechanics is preconditioned.

Ergänzungsblätter, Präsentationen,Tafel.

Supplementary sheets, presentations, blackboard.

Präsenz: 48Std

Nacharbeit: 132Std

presence: 48h

rework: 132h

Literature

Empfehlungen in der Vorlesung / Recommendations during lessons

T 6.33 Course: Basics of Technical Logistics II [T-MACH-109920]

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

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	2

Events					
WT 24/25	2117098	Basics of Technical Logistics II	3 SWS	Lecture / Practice (/ 🗣	Mittwollen
Exams					
WT 24/25	76-T-MACH-109002	Basics of Technical Logistics II			Mittwollen
WT 24/25	76-T-MACH-109920	Basics of Technical Logistics II			Mittwollen

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge of the basics of technical mechanics and out of "Basic of Technical Logstics I" (T-MACH-109919) preconditioned.

Workload
150 hours

T 6.34 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2025	2142883	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 24/25	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber
ST 2025	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam (75 Min.)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II
2142883, SS 2025, 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, 08.09.2025, 8 - 10 Uhr; 10.11 Hertz-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 6.35 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III [T-MACH-100968]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2025	2142879	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 24/25	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber
ST 2025	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam (75 Min.)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III

2142879, SS 2025, 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, 22.09.2025, 10:30 - 12:30 Uhr; 10.11 Hertz-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 6.36 Course: Boosting of Combustion Engines [T-MACH-105649]

Responsible: Dr.-Ing. Johannes Kech
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2134153	Boosting of Combustion Engines	2 SWS	/ 🗣	Kech

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, 20 min

Prerequisites
none

Workload
120 hours

T 6.37 Course: Brand Management [T-WIWI-112156]

Responsible: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2572190	Brand Management	2 SWS	Lecture / 🗣	Kupfer
WT 24/25	2572191	Brand Management Exercise	1 SWS	Practice / 🗣	Kupfer
Exams					
WT 24/25	7900158	Brand Management			Kupfer
ST 2025	7900047	Brand Management			Kupfer

Legend: Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of success will be done by the preparation and presentation of a case study as well as a written exam. Further details will be announced during the lecture.

Prerequisites
None

Recommendation
Students are highly encouraged to actively participate in class.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Brand Management
2572190, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn the theoretical foundations of brand management and its most important concepts. They learn both about the importance of brands for consumers as well as the importance of brands for firms. Special emphasis will be given to the development of brand strategies. Furthermore, students will learn how to evaluate and apply brand instruments. A tutorial offers the opportunity to apply the key learnings of the lecture using case studies.

The learning objectives are as follows:

- Getting to know the theoretical foundations of brand management
- Evaluating strategic branding options (e.g., relating to the development of the core of the brand and the brand architecture) and operative brand instruments (e.g., relating to the brand name and logo)
- 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

T 6.38 Course: Business Strategies of Banks [T-WIWI-102626]

Responsible: Prof. Dr. Wolfgang Müller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101423 - Topics in Finance II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Competence Certificate
The lecture will be offered for the last time in the winter semester 2021/22. The exam will take place for the last time in the summer semester 2022 (only for repeaters).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be offered for the last time in the winter semester 2021/22.

T 6.39 Course: Civil Law for Beginners [T-INFO-103339]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-105084 - Public and Civil Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	3

Events					
WT 24/25	2424012	Civil Law for Beginners	4 SWS	Lecture / 🗣	Matz
Exams					
WT 24/25	7500012	Civil Law for Beginners			Matz
ST 2025	7500041	Civil Law for Beginners			Matz

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

6.40 Course: Climatology [T-PHYS-101092]

Responsible: Prof. Dr. Joaquim José Ginete Werner Pinto
Organisation: KIT Department of Physics
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	4

Events					
ST 2025	4051111	Klimatologie	3 SWS	Lecture / 🗣	Ginete Werner Pinto
ST 2025	4051112	Übungen zu Klimatologie	1 SWS	Practice / 🗣	Ginete Werner Pinto, Ludwig, Christ, Dillerup

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

Workload
120 hours

T 6.41 Course: CO2-Neutral Combustion Engines and their Fuels I [T-MACH-111550]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	5	Grade to a third	Each winter term	1 terms	2

Events					
WT 24/25	2133113	CO2-neutral combustion engines and their fuels I	3 SWS	Lecture / Practice (/	Koch
Exams					
WT 24/25	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Kubach, Koch
ST 2025	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Koch, Kubach

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V CO2-neutral combustion engines and their fuels I
2133113, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Introduction, Presentation of IFKM
Working Principle
Characteristic Parameters
Engine Parts
Drive Train
Fuels
Gasoline Engines
Diesel Engines
Hydrogen Engines
Exhaust Gas Emissions

Organizational issues
Übungstermine Donnerstags nach Bekanntgabe in der Vorlesung

T 6.42 Course: CO2-Neutral Combustion Engines and their Fuels II [T-MACH-111560]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2134151	CO2-neutral combustion engines and their fuels II	3 SWS	Lecture / Practice (/	Koch
Exams					
WT 24/25	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Kubach, Koch
ST 2025	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Koch, Kubach

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral examination, duration: 25 minutes, no auxiliary means

Prerequisites
none

Recommendation
Fundamentals of Combustion Engines II helpful

Workload
150 hours

Below you will find excerpts from events related to this course:

V **CO2-neutral combustion engines and their fuels II**
2134151, SS 2025, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

T 6.43 Course: Competition in Networks [T-WIWI-100005]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 24/25	2561204	Competition in Networks	2 SWS	Lecture /	Mitusch
WT 24/25	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice /	Mitusch, Corbo
Exams					
WT 24/25	7900221	Competition in Networks			Mitusch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
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.

Recommendation
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Competition in Networks

2561204, WS 24/25, 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 6.44 Course: Computational Macroeconomics [T-WIWI-112723]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106472 - Advanced Macroeconomics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2025	2500162	Computational Macroeconomics	2 SWS	Lecture / 🗣	Brumm
ST 2025	2500164	Übung zu Computational Macroeconomics	1 SWS	Practice / 🗣	Hußmann
Exams					
WT 24/25	7900076	Computational Macroeconomics			Brumm

Legend: 🖥 Online, ♲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment takes place in the form of a written 60 min. examination during the lecture-free period of the semester. The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Annotation
New lecture starting summer semester 2024.

Workload
135 hours

T 6.45 Course: Computational Risk and Asset Management [T-WIWI-102878]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103120 - Financial Economics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	5

Competence Certificate
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.

Recommendation
Basic knowledge of capital markt theory.

Workload
135 hours

T 6.46 Course: Constitution and Properties of Wearresistant Materials [T-MACH-102141]

Responsible: Prof. Sven Ulrich
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
ST 2025	2194643	Constitution and Properties of Wear resistant materials	2 SWS	Lecture / 🗣	Ulrich
Exams					
WT 24/25	76-T-MACH-102141	Constitution and Properties of Wearresistant Materials			Ulrich
ST 2025	76-T-MACH-102141	Constitution and Properties of Wearresistant Materials			Ulrich

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (about 30 min)

no tools or reference materials

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Constitution and Properties of Wear resistant materials

2194643, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Teaching Content:

introduction

materials and wear

unalloyed and alloyed tool steels

high speed steels

stellites and hard alloys

hard materials

hard metals

ceramic tool materials

superhard materials

new developments

regular attendance: 22 hours
self-study: 98 hours

Basic understanding of constitution of wear-resistant materials, of the relations between constitution, properties and performance, of principles of increasing of hardness and toughness of materials as well as of the characteristics of the various groups of wear-resistant materials.

Recommendations: none

Organizational issues
Die Blockveranstaltung findet in folgendem Zeitraum statt:

11.06.-13.06.2025: jeweils von 8:00-17:15 Uhr;

Ort: KIT-CN, Geb. 681, Raum 214

Anmeldung verbindlich bis zum 04.06.2025 unter sven.ulrich@kit.edu.

Nach der Anmeldung wird Ihnen im Falle einer Online-Veranstaltung der Link zur Vorlesung per E-Mail am 10.06.2025 mitgeteilt.

Literature
Laska, R. Felsch, C.: Werkstoffkunde für Ingenieure, Vieweg Verlag, Braunschweig, 1981

Schedler, W.: Hartmetall für den Praktiker, VDI-Verlage, Düsseldorf, 1988

Schneider, J.: Schneidkeramik, Verlag moderne Industrie, Landsberg am Lech, 1995

Kopien der Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed

T 6.47 Course: Construction Technology [T-BGU-101691]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101004 - Fundamentals of Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each term	1 terms	1

Events					
ST 2025	6200410	Construction Technology	3 SWS	Lecture / 🗣	Gentes, Haghsheno, Schneider
ST 2025	6200411	Exercises to Construction Technology	1 SWS	Practice / 🗣	Gentes, Haghsheno, Schneider, Waleczko
Exams					
WT 24/25	8230101691	Construction Technology			Haghsheno, Gentes, Schneider

Legend: 🖥 Online, ♲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam with 90 minutes

Prerequisites
None

Recommendation
None

Annotation
None

Workload
180 hours

T 6.48 Course: Consumer Psychology [T-WIWI-114292]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2572174	Consumer Psychology	3 SWS	Lecture	Scheibehenne
ST 2025	2572176	Übung zu Consumer Psychology	1 SWS	Practice / 🗣	Scheibehenne, Vadakkedath Dharmapalan
Exams					
ST 2025	7900009	Consumer Psychology			Scheibehenne

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of success takes the form of a presentation (weighting 20%) as part of the exercise and a written examination (90 minutes, weighting 80%).

The point system for the assessment will be announced at the beginning of the course.

Prerequisites
None.

Annotation
For further information, please contact the research group Marketing and Sales (http://marketing.iism.kit.edu/).

Workload
90 hours

Below you will find excerpts from events related to this course:

V Consumer Psychology

Lecture (V)

2572174, SS 2025, 3 SWS, Language: English, Open in study portal

Content

Important information

2. Übung associated with this course is MANDATORY: Students will be asked to do presentations in groups of 3 (introduce and discuss academic papers assigned by the lecturer). This will take place over one day (as a blocked event) during the semester (When and where will be decided at the beginning of the semester). This task will count towards 20% of the final grades of the "Consumer Behavior" class. There will be no weekly or biweekly Übung besides this event.

Goal

The goal of the class is to gain a better understanding of the situational, biological, cognitive, and evolutionary factors that drive consumer behavior. We will address these questions from an interdisciplinary perspective, including relevant theories and empirical research findings from Psychology, Marketing, Cognitive Science, Biology, and Economics.

Description

Consumer decisions are ubiquitous in daily life and they can have long-ranging and important consequences for individual (financial) well-being and health but also for societies and the planet as a whole. To help people making better choices it is important to understand the factors that influence their behavior. Towards this goal, we will explore how consumer behavior is shaped by social influences, situational and cognitive constraints, as well as by emotions, motivations, evolutionary forces, neuronal processes, and individual differences. 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 lecture will be held in English.

Grading

Grading is based on two parts. An oral presentation that takes place in the Übung will count towards 20% of the grade. A written exam at the last day of class will make the rest 80%. The exam will cover the content of the lecture and the literature listed in the required reading list that will be made available to enrolled students on the first day of class. The exam questions will be in English. You are allowed to bring a language dictionary into the exam but you are not allowed to bring notes.

Workload

The total workload for this course is approximately 135 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45 hours

Exam and exam preparation: 60 hours

Organizational issues

Anmeldung über Campusportal

Literature

Will be made available to enrolled students on the first day of class.

6.49 Course: Control of Mobile Machines [T-MACH-111821]

Responsible: Simon Becker
Prof. Dr.-Ing. Marcus Geimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Exams			
ST 2025	76-T-MACH-111821	Control of mobile machines	Becker, Geimer

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
A prerequisite for participation in the examination is the preparation of a semester report. T-MACH-111820 must be passed.

Workload
120 hours

T 6.50 Course: Control of Mobile Machines – Prerequisites [T-MACH-111820]

Responsible: Simon Becker
Prof. Dr.-Ing. Marcus Geimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Exams			
ST 2025	76-T-MACH-111820	Control of mobile machines - Advance	Becker, Geimer

Competence Certificate
Preparation of a report on the completion of the semester task

Prerequisites
none

6.51 Course: Control Technology [T-MACH-105185]

Responsible: Hon.-Prof. Dr. Christoph Gönnheimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	2

Events					
ST 2025	2150683	Control Technology	2 SWS	Lecture / 🗣	Gönnheimer
Exams					
WT 24/25	76-T-MACH-105185	Control Technology			Gönnheimer
ST 2025	76-T-MACH-105185	Control Technology			Gönnheimer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

Control Technology
2150683, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 6.52 Course: Conveying Technology and Logistics [T-MACH-102135]

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

Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
WT 24/25	2119100	Fördertechnik und Logistiksysteme		Seminar / 🗣	Furmans
ST 2025	2119100	Fördertechnik und Logistiksysteme		Seminar / 🗣	Furmans
Exams					
WT 24/25	76-T-MACH-102135	Conveying Technology and Logistics			Furmans

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Workload
90 hours

Below you will find excerpts from events related to this course:

V Fördertechnik und Logistiksysteme
2119100, WS 24/25, 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 2025, 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 6.53 Course: Data-Driven Algorithms in Vehicle Technology [T-MACH-112126]

Responsible: Dr. Stefan Scheubner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	2113840	Data-Driven Algorithms in Vehicle Technology	2 SWS	Lecture /	Scheubner
Exams					
WT 24/25	7600001	Data-Driven Algorithms in Vehicle Technology			Scheubner
ST 2025	7600001	Data-Driven Algorithms in Vehicle Technology			Scheubner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

Workload
120 hours

Below you will find excerpts from events related to this course:

V Data-Driven Algorithms in Vehicle Technology

2113840, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Course Syllabus: Data-Driven Algorithms in Vehicle Technology
Motivation for the Course: Nowadays, engineers often develop technical systems using a combination of hard- and software. This is true especially for modern passenger vehicle development. In a digitalized world, such developments are built on knowledge gained from relevant data sources, e.g. the vehicle sensors. Therefore, engineers in automobile technology need qualifications from data science to successfully create new functionalities in the cars. To prevent remaining purely theoretical, the algorithms in this course are explained using a real-world problem of “EV Routing”. Students have the opportunity to test methods in Python with frequent exercises presented.
Goal of the Course: Students have a basic understanding of data-driven algorithms such as Markov Models, Machine Learning or Monte-Carlo Methods. The approach for building data-driven models in automobile technology are known to students and they are able to test algorithms in the programming language “Python”. Furthermore, students have learnt how to analyse the algorithm performance.
Content:
1. Introduction to function development as well as the prerequisites for the course (e.g. Fundamentals for running Python code)
2. Fundamentals for EV Routing and relevant data sources
3. Parameter estimation and state classification algorithms to determine the current situation of the vehicle
4. Learning methods for driver behaviour
5. Forecast algorithms to predict future energy consumption of an electric vehicle

Organizational issues

Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Die erste VL am 22.10.24 um 14:00 Uhr findet in Präsenz am Campus Ost, Geb. 70.04, Raum 219 statt.

Alle weiteren Vorlesungsinhalte werden als Videoaufzeichnungen in ILIAS bereit gestellt. In regelmäßigen Abständen wird es Sprechstunden geben. Die genauen Termine erfahren Sie dann über den entsprechenden ILIAS Kurs

T 6.54 Course: Derivatives [T-WIWI-102643]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2530550	Derivatives	2 SWS	Lecture / 🗣	Uhrig-Homburg, Thimme
ST 2025	2530551	Übung zu Derivate	1 SWS	Practice / 🗣	Dinger, Uhrig-Homburg, Thimme
Exams					
WT 24/25	7900051	Derivatives			Uhrig-Homburg
ST 2025	7900111	Derivatives			Uhrig-Homburg

Legend: Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

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 grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Derivatives
2530550, SS 2025, 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 6.55 Course: Design and Development of Mobile Machines [T-MACH-105311]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2113079	Design and Development of Mobile Machines	2 SWS	Lecture / 🗣	Geimer
Exams					
WT 24/25	76-T-MACH-105311	Design and Development of Mobile Machines			Geimer
ST 2025	76-T-MACH-105311	Design and Development of Mobile Machines			Geimer

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A registration is mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines*. In case of too many applications, attendance will be granted based on pre-qualification.

The course will be replenished by interestung lectures of professionals from leading hydraulic companies.

Prerequisites
Required for the participation in the examination is the preparation of a report during the semester. T-MACH-108887 must have been passed.

Recommendation
Knowledge in Fluid Power Systems

Annotation
After completion of the lecture, studens can:

- design working and travel drive train hydraulics of mobile machines and can derive characteristic key factors.
- choose and apply suitable state of the art designing methods succesfully
- analyse a mobile machines and break its structure down from a complex system to subsystems with reduced complexity
- identify and desrcibe interactions and links between subsystems of a mobile maschine
- present and document solutions of a technical problem according to R&D standards

The number of participants is limited.

Conent:

The working scenario of a mobile machine depends strongly on the machine itself. Highly specialised machines, e.g. pavers are also as common as universal machines with a wide range of applications, e.g. hydraulic excavators. In general, all mobile machines are required to do their intended work in an optimal way and satisfy various critera at the same time. This makes designing mobile machines to a great and interesting challenge. Nevertheless, usually key factors can be derived for every mobile machine, which affect all other machine parameters. During this lecture, those key factors and designing mobile machines accordingly will be adressed. To do so, an exemplary mobile machine will be discussed and designed in the lecture an as a semester project.

Literature:

See german recommendations

Workload
120 hours

Below you will find excerpts from events related to this course:

V

Design and Development of Mobile Machines

2113079, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

Wheel loaders and excavators are highly specialized mobile machines. Their function is to detach, pick up and deposit materials near by. Significant size for dimensioning of the machines is the content of their standard shovel. In this lecture the main steps in dimensioning a wheel loader or excavator are beeing thought. This includes among others:

- Defining the size and dimensions,
- the dimensioning of the electric drive train,
- the dimensioning of the primary energy supply,
- Determining the kinematics of the equipment,
- the dimension of the working hydraulics and
- Calculations of strength

The entire design process of these machines is strongly influenced by the use of standards and guidelines (ISO/DIN-EN). Even this aspect is dealt with.

The lecture is based on the knowledge from the fields of mechanics, strength of materials, machine elements, propulsion and fluid technique. The lecture requires active participation and continued collaboration.

Recommendations:

Knowledge in Fluid Technology (SoSe, LV 21093)

- regular attendance: 21 hours
- self-study: 99 hours

Literature

Keine.

T 6.56 Course: Design and Development of Mobile Machines - Advance [T-MACH-108887]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Jan Siebert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each term	1

Exams			
WT 24/25	76-T-MACH-108887	Design and Development of Mobile Machines - Advance	Geimer
ST 2025	76-T-MACH-108887	Design and Development of Mobile Machines - Advance	Geimer

Competence Certificate
Preparation of semester report

Prerequisites
none

T 6.57 Course: Development of Hybrid Drivetrains [T-MACH-110817]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2134155	Development of Hybrid Powertrains	2 SWS	Lecture / 🗣	Koch, Doppelbauer
Exams					
WT 24/25	76-T-MACH-110817	Development of hybrid drivetrains			Koch
ST 2025	76-T-MACH-110817	Development of hybrid drivetrains			Koch

Legend: 🖥 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 1 hour

Prerequisites
None

Workload
120 hours

Below you will find excerpts from events related to this course:

V Development of Hybrid Powertrains
2134155, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction and Goal
2. Alternative Powertrains
3. Fundamentals of Hybrid Powertrains
4. Fundamentals of Electric Components of Hybrid Powertrains
5. Interactions in Hybrid Powertrain Development
6. Overall System Optimization

T 6.58 Course: Digital Markets and Market Design [T-WIWI-112228]

Responsible: Prof. Dr. Adrian Hillenbrand
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2500035	Digital Markets and Market Design	2 SWS	Lecture / 🗣	Hillenbrand
WT 24/25	2500036	Digital Markets and Market Design	1 SWS	Practice / 🗣	Hillenbrand
Exams					
WT 24/25	7900354	Digital Markets and Market Design			Hillenbrand
ST 2025	7900249	Digital Markets and Market Design			Hillenbrand

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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

Annotation
The lecture will be held in English.

Below you will find excerpts from events related to this course:

V Digital Markets and Market Design
2500035, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Online Markets determine our everyday lives. At the same time rapid technological advancements quickly change the landscape of online markets posing challenges for market design and consumer protection. In this course we apply theoretical economic models in the area of digital markets in order to make sense of current developments. Topics include consumer search, algorithmic pricing, recommender systems and steering, price discrimination and matching markets. We also discuss the potential effects of current policies like the Digital Markets Act and Digital Services Act on market outcomes.

V Digital Markets and Market Design
2500036, WS 24/25, 1 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

Content
Exercise Session for the course "Digital Markets and Market Design

Organizational issues
Jede zweite Woche eine Übung

T 6.59 Course: Digital Services: Foundations [T-WIWI-111307]

Responsible: Prof. Dr. Gerhard Satzger
Dr. Michael Vössing

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101434 - eBusiness and Service Management
M-WIWI-102752 - Fundamentals of Digital Service Systems
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2595466	Digital Services: Foundations	2 SWS	Lecture /	Vössing, Holtmann
ST 2025	2595467	Exercise Digital Services: Foundations	1 SWS	Practice /	Vössing
Exams					
WT 24/25	7900062	Digital Services: Foundations			Satzger
ST 2025	7900165	Digital Services: Foundations			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations).

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-109938 - Digital Services must not have been started.

Annotation
The course will be offered in the form of a flipped classroom concept starting in summer semester 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 events related to this course:

V Digital Services: Foundations

2595466, SS 2025, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The world has been moving towards "service-led" economies: In many developed countries, services already account for more than 70% of the gross domestic product. In order to design, engineer, and manage services, traditional "goods-oriented" business models are often inappropriate. At the same time, the rapid development of information and communication technology (ICT) pushes "servitization" and the economic importance of digital services and, therefore, drives competition: Increased interaction and individualization options open up new dimensions of "value co-creation" between providers and customers; dynamic and scalable service value networks replace static value chains; services can instantly be delivered anywhere across the globe.

Building on a systematic categorization of different types of services and on the general notion of "value co-creation", we cover concepts and foundations for engineering and managing ICT-based digital services, allowing for further specialization in other KSRI/IISM courses at the Master level. Topics in this course include an introduction to services and human-centered design, as well as an introduction to AI-based services, and IoT-based services. Additionally, essential concepts for the design of AI-based services are covered, such as fairness, sustainability, and human-AI collaboration in services. In this context, regulation approaches for novel technologies emerging out of the fast-paced world of digital services are discussed from legislation and industry perspectives. Finally, the lecture lays the practical foundations for implementing, distributing, and managing services at scale. Besides those contents, the lecture entails first-hand research insights, exercises and discussion sessions, and guest lectures that will illustrate the relevance of digital services in today's world.

Literature

- Beverungen, D., Müller, O., Matzner, M., Mendling, J., & Vom Brocke, J. (2019). Conceptualizing smart service systems. *Electronic Markets*, *29*(1), 7-18.
- Böhmann, T., Leimeister, J. M., & Möslein, K. (2014). Service systems engineering. *Business & Information Systems Engineering*, *6*(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.
- Davenport, T., & Harris, J. (2017). *Competing on analytics: Updated, with a new introduction: The new science of winning*. Harvard Business Press.
- Fromm, H., Habryn, F., & Satzger, G. (2012). Service analytics: Leveraging data across enterprise boundaries for competitive advantage. In *Globalization of professional services* (pp. 139-149). Springer, Berlin, Heidelberg.
- Ostrom, A. L., Parasuraman, A., Bowen, D. E., Patrício, L., & Voss, C. A. (2015). Service research priorities in a rapidly changing context. *Journal of Service Research*, *18*(2), 127-159.
- Schüritz, R., & Satzger, G. (2016). Patterns of data-infused business model innovation. In *2016 IEEE 18th Conference on Business Informatics (CBI)* (Vol. 1, pp. 133-142). IEEE.
- Spohrer, J., Maglio, P. P., Bailey, J., & Gruhl, D. (2007). Steps toward a science of service systems. *Computer*, *40*(1), 71-77.

T 6.60 Course: Digitalization from Product Concept to Production [T-MACH-113647]

Responsible: Dr.-Ing. Marc Wawerla
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	2149702	Digitalization from Product Concept to Production	2 SWS	Lecture / 🗣	Wawerla
Exams					
WT 24/25	76-T-MACH-113647	Digitalization from Product Concept to Production			Wawerla

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.

Annotation
For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Further information for application can be found via: https://www.wbk.kit.edu/english/education.php.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Digitalization from Product Concept to Production — **Lecture (V) On-Site**
2149702, WS 24/25, 2 SWS, Language: English, Open in study portal

Content

The lecture deals with Digitalization along the entire value chain end-to-end, with a focus on production and supply chain. Within this context, concepts, tools, methods, technologies and concrete applications in the industry are presented. Furthermore, the students get the opportunity to get first-hand insights into the digitalization journey of a German technology company.

Main topics of the lecture:

- Concepts and methods such as disruptive innovation and agile project management
- Overview on technologies at disposal
- Practical approaches in innovation
- Applications in industry
- Field trip to ZEISS

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are able to analyze and evaluate the suitability of digitalization technologies in the optical industry.
- are able to assess the applicability of methods such as disruptive innovation and agile project management.
- are able to appreciate the practical challenges to digitalization in industry.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues

Aus organisatorischen Gründen ist die Teilnehmeranzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Weitere Informationen zur Bewerbung sind unter https://www.wbk.kit.edu/studium-und-lehre.php zu finden.

For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Further information for application can be found via:
https://www.wbk.kit.edu/english/education.php.

T 6.61 Course: Drive Train of Mobile Machines [T-MACH-105307]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2113077	Drive Train of Mobile Machines	2 SWS	Lecture / 🗣	Geimer
WT 24/25	2113078	Exercise Drivetrain of Mobile Machines	1 SWS	Practice / 🗣	Geimer, Bargen-Herzog
Exams					
WT 24/25	76-T-MACH-105307	Drive Train of Mobile Machines			Geimer
ST 2025	76-T-MACH-105307	Drive Train of Mobile Machines			Geimer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The final assessment will be an oral examination (20 min) taking place during the recess period. The examination will be offered in ervery semester and can be repeated at any regular examination date.

Prerequisites
none

Recommendation

- General principles of mechanicals engineering
- Basic knowledge of hydraulics
- Interest in mobile machinery

Annotation
At the end of the lecture, participants can explain the structure and function of all discussed drive trains of mobile machines. They can analyze complex gearbox schematics and synthesize simple transmission functions using rough calculations.

Content:

In this course the different drive trains of mobile machinery will be discussed. The focus of this course is:

- mechanical gears
- torque converter
- hydrostatic drives
- power split drives
- electrical drives
- hybrid drives
- axles
- terra mechanics

Media: projector presentation

Literature: Download of lecture slides from ILIAS. Further literature recommendations during lectures.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Drive Train of Mobile Machines
Lecture (V)
On-Site

2113077, WS 24/25, 2 SWS, Language: German, Open in study portal

Content
In this course will be discussed the different drive train of mobile machinerys. The fokus of this course is:
- improve knowledge of fundamentals
- mechanical gears
- torque converter
- hydrostatic drives
- continuous variable transmission
- eletrical drives
- hybrid drives
- axles
- terra mechanic

Recommendations:

- general basics of mechanical engineering
- basic knowledge in hydraulics
- interest in mobile machines

- regular attendance: 21 hours
- self-study: 89 hours

Literature
Skriptum zur Vorlesung downloadbar über ILIAS

T 6.62 Course: Economics and Behavior [T-WIWI-102892]

Responsible: Prof. Dr. Nora Szech
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2560137	Economics and Behavior	2 SWS	Lecture / On-Site	Rau
WT 24/25	2560138	Übung zu Economics and Behavior	1 SWS	Practice / On-Site	Zhao
Exams					
WT 24/25	7900134	Exam Economics and Behavior			Puppe
ST 2025	7900154	Exam Economics and Behavior (2)			Puppe

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Annotation
The lecture will be held in English.

Below you will find excerpts from events related to this course:

V Economics and Behavior
2560137, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course covers topics from behavioral economics with regard to contents and methods. In addition, the students gain insight into the design of economic experiments. Furthermore, the students will become acquainted with reading and critically evaluating current research papers in the field of behavioral economics.

The students

- gain insight into fundamental topics in behavioral economics;
- get to know different research methods in the field of behavioral economics;
- learn to critically evaluate experimental designs;
- get introduced to current research papers in behavioral economics;
- become acquainted with the technical terminology in English.

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.

The grade will be determined in a final written exam. Students can earn a bonus to the final grade by successfully participating in the exercises.

The total workload for this course is approximately 135.0 hours. For further information see German version.

The lecture will be held in English.

Recommendations:

Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Literature

Kahnemann, Daniel: Thinking, Fast and Slow. Farrar, Straus and Giroux, 2011.

6.63 Course: Economics I: Microeconomics [T-WIWI-102708]

Responsible: Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-100950 - Preliminary Exam
M-WIWI-101398 - Introduction to Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2610012	Economics I: Microeconomics	3 SWS	Lecture / 🗣	Reiß, Potarca
WT 24/25	2610013			Tutorial (/ 🗣	Reiß, Potarca
Exams					
WT 24/25	7910001	Economics I: Microeconomics			Reiß
WT 24/25	7910002	Economics I: Microeconomics			Reiß

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate

The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.

The main exam takes place subsequent to the lectur. The re-examination is offered at the same examination period. As a rule, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

Prerequisites

None

Below you will find excerpts from events related to this course:

V Economics I: Microeconomics

2610012, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This course provides a solid grounding in microeconomic theory. The two main parts of the course deal with questions of microeconomic decision theory (household and firm decisions) and questions of market theory (equilibria and efficiency on competitive markets). The last part of the lecture deals with problems of imperfect competition (oligopoly markets) as well as the basics of game theory and welfare economics.

Learning objectives:
The main aim of the course is to teach students the basics of thinking in microeconomic models. In particular, students should be able to analyze goods markets and the determinants of market outcomes. In detail, students will learn

- to name and define the basic microeconomic terms.
- to explain the interrelationships in microeconomic models.
- to calculate the important parameters of microeconomic models.
- to judge the possible effects of economic policy measures on the behavior of economic agents (in simple decision problems) and possibly propose alternative measures.
- to analyze as a participant in a tutorial simple microeconomic problems by solving written exercises and presenting the results of the exercises on the blackboard.
- to become familiar with the basic literature on microeconomics.

In this way, students acquire the necessary basic knowledge

- to recognize the structure of economic problems on a microeconomic level and develop proposals for solutions.
- to provide active decision support for simple economic decision problems.

Workload:
Total workload for 5 credit points: approx. 150 hours
Attendance: 45 hours
Self-study: 105 hours

Literature

- Varian, H. R. 2016. *Grundzüge der Mikroökonomik*. 9. Auflage. De Gruyter Oldenburg Verlag.
- Pindyck, R. S. und Rubinfeld, D. L. 2015. *Mikroökonomie*. 8. Auflage. Pearson.
- Frank, R. H. 2006. *Microeconomics and Behavior*. 6. Auflage. McGraw-Hill/Irwin.

T 6.64 Course: Economics II: Macroeconomics [T-WIWI-102709]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101398 - Introduction to Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2600014	Economics II: Macroeconomics	4 SWS	Lecture	Wigger
Exams					
WT 24/25	7900197	Economics II: Macroeconomics			Ott
ST 2025	790vwl2	Economics II: Macroeconomics			Wigger

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Economics II: Macroeconomics — Lecture (V)
2600014, SS 2025, 4 SWS, Language: German, Open in study portal

Content

Classical Theory of Macroeconomic Production

Chapter 1: Gross domestic product

Chapter 2: Money and Inflation

Chapter 3: Open Economy I

Chapter 4: Unemployment

Growth: The economy in the long term

Chapter 5: Growth I

Chapter 6: Growth II

Business cycle: The economy in the short term

Chapter 7: Economy and aggregate demand I

Chapter 8: Economy and aggregate demand II

Chapter 9: Open Economy II

Chapter 10: Macroeconomic supply

Advanced topics of macroeconomics

Chapter 11: Dynamic model of the economy as a whole

Chapter 12: Microeconomic foundations

Chapter 13: Macroeconomic economic policy

Learning goals:

The students. . .

- can name the basic indicators, technical terms and concepts of macroeconomics.
- can use models to reduce complex relationships to their basic components.
- can analyse economic policy debates and form their own opinion on them.

Workload:

Total effort for 5 credit points: approx. 150 hours

Presence time: 45 hours

Before and after the LV: 67.5 hours

Exam and exam preparation: 37.5 hours

Literature

Als Grundlage dieser Veranstaltung dient das bekannte Lehrbuch „Makroökonomik“ von Greg Mankiw vom Schäffer Poeschel Verlag in der aktuellen Fassung.

T 6.65 Course: Economics III: Introduction in Econometrics [T-WIWI-102736]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101599 - Statistics and Econometrics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	2

Events					
ST 2025	2520016	Economics III: Introduction to Econometrics	2 SWS	Lecture / 🗣	Schienle, Bracher
ST 2025	2520017	Übungen zu VWL III	2 SWS	Practice	Schienle, Rüter, Bracher, Leimenstoll
Exams					
WT 24/25	7900002	Economics III: Introduction in Econometrics			Schienle

Legend: 🖥 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, x Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 90-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Economics III: Introduction to Econometrics
2520016, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives:

- Familiarity with the basic concepts and methods of econometrics
- Preparation of simple econometric surveys

Content:

- Simple and multiple linear regression (estimating parameters, confidence interval, testing, prognosis, testing assumptions)
- Model assessment

Requirements:

Knowledge of the lectures Statistics I + II is required.

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 30 hours

Preparation and follow-up: 120 hours

Literature
Von Auer: Ökonometrie ISBN 3-540-00593-5

Goldberger: A course in Econometrics ISBN 0-674-17544-1

Gujarati. Basic Econometrics ISBN 0-07-113964-8

Schneeweiß: Ökonometrie ISBN 3-7908-0008-2

T 6.66 Course: eFinance: Information Systems for Securities Trading [T-WIWI-110797]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101434 - eBusiness and Service Management
M-WIWI-101465 - Topics in Finance I
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture / 🗣	Weinhardt
WT 24/25	2540455	Übungen zu eFinance: Information Systems for Securities Trading	1 SWS	Practice / 🗣	Motz, Motz
Exams					
WT 24/25	7900182	eFinance: Information Engineering and Management for Securities Trading			Weinhardt
ST 2025	7900269	eFinance: Information Systems for Securities Trading			Weinhardt

Legend: 🖥 Online, ❋ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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 Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102600 - eFinance: Information Engineering and Management for Securities Trading must not have been started.

Annotation
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 events related to this course:

V **eFinance: Information Systems for Securities Trading** — **Lecture (V) On-Site**
2540454, WS 24/25, 2 SWS, Language: English, Open in study portal

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 6.67 Course: Electric Energy Systems [T-ETIT-112850]

Responsible: Prof. Dr.-Ing. Marc Hiller
Prof. Dr.-Ing. Thomas Leibfried

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-ETIT-106821 - Electric Energy Systems and Power Generation

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2025	2306200	Electric Energy Systems	2 SWS	Lecture / 🗣	Hiller, Leibfried
ST 2025	2306201	Practice to Electric Energy Systems	2 SWS	Practice / 🗣	Hiller, Leibfried
Exams					
ST 2025	7306200	Electric Energy Systems			Leibfried, Hiller

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

6.68 Course: Electrical Engineering for Business Engineers, Part I [T-ETIT-100533]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101155 - Electrical Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 24/25	2304223	Electrical Engineering for Business Engineers, Part I	2 SWS	Lecture / 🗣	Menesklou
WT 24/25	2304225	Electrical Engineering for Business Engineers, Part I (Exercise to 2304223)	2 SWS	Practice / 🗣	Menesklou
Exams					
WT 24/25	7304223	Electrical Engineering for Business Engineers, Part I			Menesklou
ST 2025	7304223	Electrical Engineering for Business Engineers, Part I			Menesklou

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.69 Course: Electrical Engineering for Business Engineers, Part II [T-ETIT-100534]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2304224	Elektrotechnik II für Wirtschaftsingenieure	3 SWS	Lecture / 🗣	Menesklou
Exams					
WT 24/25	7304224	Electrical Engineering for Business Engineers, Part II			Menesklou
ST 2025	7304224	Electrical Engineering for Business Engineers, Part II			Menesklou

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.70 Course: Energy Policy [T-WIWI-102607]

Responsible: Prof. Dr. Martin Wietschel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	3

Events					
ST 2025	2581959	Energy Policy	2 SWS	Lecture / 🗣	Wietschel
Exams					
WT 24/25	7981959	Energy Policy			Fichtner

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy Policy

2581959, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The availability of cheap, environmentally friendly and secure energy is crucial for human welfare. However, the increasing scarcity of resources and increasing environmental pressures, with a particular focus on climate change, threaten human welfare through economic action. Energy contributes significantly to environmental pollution. The energy industry is characterised by high regulation and a significant influence of political decisions.

At the beginning of the lecture different perspectives on energy policy will be presented and the analysis of political decision-making processes will be discussed. Then the current energy policy challenges in the area of environmental pollution, regulation and the role of energy for households and industry will be discussed. Then the actors of energy policy and energy responsibilities in Europe will be discussed. The economic approaches from traditional environmental economics and sustainability as a new policy approach will then be discussed. Finally, energy policy instruments such as the promotion of renewable energies or energy efficiency are discussed in detail and how they can be evaluated.

The lecture emphasizes the relationship between theory and practice and presents some case studies.

Literature
Wird in der Vorlesung bekannt gegeben.

T 6.71 Course: Engine Measurement Techniques [T-MACH-105169]

Responsible: Dr.-Ing. Sören Bernhardt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2134137	Engine measurement techniques	2 SWS	Lecture / 🗣	Bernhardt
Exams					
ST 2025	76-T-MACH-105169	Engine Measurement Techniques			Koch

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: 0,5 hours, no auxiliary means

Prerequisites
none

Recommendation
T-MACH-102194 Combustion Engines I

Workload
120 hours

Below you will find excerpts from events related to this course:

V Engine measurement techniques

2134137, SS 2025, 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 6.72 Course: Enterprise Systems for Financial Accounting & Controlling [T-WIWI-113746]

Responsible: Christian Fleig
Prof. Dr. Alexander Mädche

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101434 - eBusiness and Service Management
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2500060	Enterprise Systems for Financial Accounting & Controlling	3 SWS	Lecture / 🗣	Mädche, Fleig
Exams					
WT 24/25	7900074	Enterprise Systems for Financial Accounting & Controlling			Mädche

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is assessed in the form of an alternative exam assessment. It consists of a one-hour exam and the implementation of a capstone project.

The final grade is made up of 60% of the exam grade and 40% of the capstone project grade.

Details on the structure of the assessment will be announced during the lecture.

Prerequisites
Keine.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Enterprise Systems for Financial Accounting & Controlling
2500060, WS 24/25, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

Enterprise Systems building on enterprise resource planning (ERP) packaged software such as SAP S/4HANA are information systems that target large-scale integration of business processes and data across a company's functional areas. These systems are crucial for financial accounting and controlling as they enable organizations to streamline and integrate their financial operations, ensuring accurate decision-making based on real-time financial data. Contemporary packaged ERP software provide modules that integrate core business processes in financial accounting including general ledger, accounts receivable, payable and asset accounting. The information generated in these processes serves as a major source of cost-related decision-making, reporting and data analyses in internal accounting ("controlling"). Packaged ERP software typically rely on industry best practices captured in the form of product software with a standardized structure of master data. Thereby, they also support regulatory compliance and analyzability of processes in approaches such as process mining which enhances overall business efficiency and competitiveness. However, implementing enterprise systems in practice imposes substantial challenges to organizations.

First, the B.Sc. lecture "Enterprise Systems for Financial Accounting & Controlling" introduces fundamental business processes and concepts in finance and controlling and explains how these processes are implemented in packaged ERP software such as SAP S/4HANA. Students learn the basic and most important terms and master data structures in the SAP FI/CO module. Second, students learn about the principles of packaged ERP software, gaining hands-on experience SAP S4/HANA. Third, the lecture introduces the challenges in enterprise system projects such as SAP S/4HANA implementations, Fourth, students actively apply their knowledge in collaborative team efforts when working with exemplary SAP data in Microsoft SQL Server to analyze finance and controlling master data processes (capstone project)

Learning Objectives:

The students …

- understand modern business concepts of financial accounting & controlling for large enterprises
- the importance of enterprise systems supporting the implemention of modern business concepts
- know the underlying principles of packaged software for enterprise resource planning and process intelligence
- Understand the opportunities and challenges of Enterprise Systems implementation at large enterprises
- Get hands-on knowledge about financial accounting & controlling with commercial product software (e.g., SAP S4/HANA)
- Apply their knowledge on enterprise systems implementation for financial accounting and controlling on real-world data in team effort

T 6.73 Course: Exam on Climatology [T-PHYS-105594]

Responsible: Prof. Dr. Joaquim José Ginete Werner Pinto
Organisation: KIT Department of Physics
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Version
Oral examination	5	Grade to a third	5

T 6.74 Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-101414 - Methodical Foundations of OR
M-WIWI-101421 - Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 24/25	2550486	Facility Location and Strategic Supply Chain Management	2 SWS	Lecture / 🗣	Nickel
WT 24/25	2550487	Exercises for Facility Location and Strategic Supply Chain Management	1 SWS	Practice / 🗣	Hoffmann
Exams					
WT 24/25	7900091	Facility Location and Strategic Supply Chain Management			Nickel

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.
Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Facility Location and Strategic Supply Chain Management
2550486, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Für die Klausurzulassung müssen 4 von 5 Online-Tests bestanden sein.

Die Zulassung ist ein Jahr gültig, außer es handelt sich um einen Zweitversuch. In diesem Falle müssen die Online-Tests nicht erneut absolviert werden.

Literature
Weiterführende Literatur:

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T 6.75 Course: Failure of Structural Materials: Deformation and Fracture [T-MACH-102140]

Responsible: Prof. Dr. Peter Gumbsch
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2181711	Failure of structural materials: deformation and fracture	3 SWS	Lecture / Practice (/	Gumbsch, Weygand
Exams					
WT 24/25	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture			Weygand, Gumbsch, Kraft
ST 2025	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture			Weygand, Gumbsch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

Workload
120 hours

Below you will find excerpts from events related to this course:

V Failure of structural materials: deformation and fracture

2181711, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

1. Introduction
2. linear elasticity
3. classification of stresses
4. Failure due to plasticity
    - tensile test
    - dislocations
    - hardening mechanisms
    - guidelines for dimensioning
5. composite materials
6. fracture mechanics
    - hypotheses for failure
    - linear elasic fracture mechanics
    - crack resitance
    - experimental measurement of fracture toughness
    - defect measurement
    - crack propagation
    - application of fracture mechanics
    - atomistics of fracture

The student

- has the basic understanding of mechanical processes to explain the relationship between externally applied load and materials strength.
- can explain the foundation of linear elastic fracture mechanics and is able to determine if this concept can be applied to a failure by fracture.
- can decribe the main empirical materials models for deformation and fracture and can apply them.
- has the physical understanding to describe and explain phenomena of failure.

preliminary knowlegde in mathematics, mechanics and materials science recommended

regular attendance: 22,5 hours
self-study: 97,5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Organizational issues
Übungstermine werden in der Vorlesung bekannt gegeben!

Die Veranstaltung wird letztmals im Wintersemester 2025/2026 angeboten!

Literature

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe

T 6.76 Course: Failure of Structural Materials: Fatigue and Creep [T-MACH-102139]

Responsible: Dr. Patric Gruber
Prof. Dr. Peter Gumbsch

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2181715	Failure of Structural Materials: Fatigue and Creep	2 SWS	Lecture / 🗣	Gruber, Gumbsch
Exams					
WT 24/25	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep			Gruber, Gumbsch
ST 2025	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep			Gruber, Gumbsch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

Workload
120 hours

Below you will find excerpts from events related to this course:

V Failure of Structural Materials: Fatigue and Creep

2181715, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1 Fatigue
1.1 Introduction
1.2 Lifetime
1.3 Fatigue Mechanisms
1.4 Material Selection
1.5 Notches and Shape Optimization
1.6 Case Studies: ICE-Accidents

2 Creep
2.1 Introduction
2.2 High Temperature Plasticity
2.3 Phänomenological DEsciption of Creep
2.4 Creep Mechanisms
2.5 Alloying Effects

The student

- has the basic understanding of mechanical processes to explain the relationships between externally applied load and materials strength.
- can describe the main empirical materials models for fatigue and creep and can apply them.
- has the physical understanding to describe and explain phenomena of failure.
- can use statistical approaches for reliability predictions.
- can use its acquired skills, to select and develop materials for specific applications.

preliminary knowlegde in mathematics, mechanics and materials science recommended

regular attendance: 22,5 hours
self-study: 97,5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Organizational issues
Die Veranstaltung wird letztmals im Wintersemester 2025/2026 angeboten!

Literature

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe
- Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); Standardwerk über Ermüdung, alle Materialklassen, umfangreich, für Einsteiger und Fortgeschrittene

T 6.77 Course: Fatigue of Materials [T-MACH-112106]

Responsible: Dr.-Ing. Stefan Guth
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2025	2173586	Fatigue of Materials	2 SWS	Lecture / 🗣	Guth
Exams					
WT 24/25	76-T-MACH-112106	Fatigue of Materials			Guth
ST 2025	76-T-MACH-112106	Fatigue of Materials			Guth

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, about 20 minutes

Prerequisites
none

Recommendation
Basic knowledge in Materials Science will be helpful.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Fatigue of Materials

2173586, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Introduction: historical review and some fatigue damage cases
- Cyclic Stress Strain Behaviour
- Crack Initiation
- Crack Propagation
- Lifetime Behaviour under Cyclic Loading
- Fatigue of Notched Components
- Structural Durability
- Fatigue of composites and compound materials

learning objectives:

The students are able to recognise the deformation and the failure behaviour of materials under cyclic loading and to assign it to the basic microstructural processes. They know the sequence and the development of fatigue damages and can evaluate the initiation and the growth of fatigue cracks.

The students can evaluate the cyclic strength behaviour of materials and components both qualitatively and quantitatively and know the procedures for the assessment of single-stage, multistage and stochastic cyclical loadings.

requirements:

none, basic knowledge in Material Science will be helpful

workload:

regular attendance: 21 hours
self-study: 99 hours

Literature

Ein Manuskript, das auch aktuelle Literaturhinweise enthällt, wird in der Vorlesung verteilt.

6.78 Course: Financial Accounting for Global Firms [T-WIWI-107505]

Responsible: Dr. Torsten Luedecke
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2530242	Financial Accounting for Global Firms	2 SWS	Lecture / 🗣	Luedecke
WT 24/25	2530243	Übung zu Financial Accounting for Global Firms	1 SWS	Practice / 🗣	Luedecke
Exams					
WT 24/25	7900142	Financial Accounting for Global Firms			Luedecke, Ruckes
ST 2025	7900195	Financial Accounting for Global Firms			Luedecke

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance and accounting.

Annotation
New lecture in the winter term 2017/18.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Financial Accounting for Global Firms
2530242, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.

Coenenberg, A.G., Haller, A. und W. Schultze (2016): Jahresabschluss und Jahresabschlussanalyse, 24. Auflage. Schäffer-Poeschel Verlag Stuttgart.

T 6.79 Course: Financial Data Science [T-WIWI-111238]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105610 - Financial Data Science

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each summer term	2

Competence Certificate
The examination is structured as an alternative assessment.

Further details regarding submission deadlines, exam format, and retake opportunities will be announced in the first session.

Prerequisites
None.

Workload
270 hours

T 6.80 Course: Financial Econometrics [T-WIWI-103064]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics
M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2520022	Financial Econometrics I	2 SWS	Lecture / 🗣	Schienle, Buse
WT 24/25	2520023	Übungen zu Financial Econometrics I	2 SWS	Practice / 🗣	Schienle, Buse
Exams					
WT 24/25	7900123	Financial Econometrics II			Schienle
WT 24/25	7900126	Financial Econometrics			Schienle
ST 2025	7900223	Financial Econometrics			Schienle

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Annotation
The next lecture will take place in the winter semester 2022/23.

Below you will find excerpts from events related to this course:

V Financial Econometrics I
2520022, WS 24/25, 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.

6.81 Course: Financial Econometrics II [T-WIWI-110939]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics
M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2025	2521302	Financial Econometrics II	2 SWS	Lecture / 🗣	Schienle, Buse
ST 2025	2521303	Übung zu Financial Econometrics II	1 SWS	Practice / 🗣	Buse, Schienle
Exams					
ST 2025	7900081	Financial Econometrics II			Schienle

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination (90 minutes). If the number of participants is low, an oral examination will be held instead.

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Financial Econometrics"

Annotation
Course language is English
The next lecture will take place in the summer semester of 2023.

Workload
135 hours

T 6.82 Course: Financial Intermediation [T-WIWI-102623]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2530232	Financial Intermediation	2 SWS	Lecture / 🗣	Ruckes
WT 24/25	2530233	Übung zu Finanzintermediation	1 SWS	Practice	Ruckes, Benz
Exams					
WT 24/25	7900063	Financial Intermediation			Ruckes
ST 2025	7900078	Financial Intermediation			Ruckes

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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

Recommendation
None

Below you will find excerpts from events related to this course:

V Financial Intermediation
2530232, WS 24/25, 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 6.83 Course: Financial Management [T-WIWI-102605]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101435 - Essentials of Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2530216	Financial Management	2 SWS	Lecture / 🗣	Ruckes
ST 2025	2530217	Übung zu Financial Management	1 SWS	Practice / 🗣	Ruckes
Exams					
WT 24/25	7900060	Financial Management			Ruckes
ST 2025	7900074	Financial Management			Ruckes

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to Section 4 (2), 1 of the examination regulation.
The exam takes place at every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Knowledge of the content of the course Business Administration: Finance and Accounting [25026/25027] is recommended.

Below you will find excerpts from events related to this course:

V Financial Management

2530216, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Weiterführende Literatur:

- Ross, Westerfield, Jaffe, Jordan (2009): Modern Financial Management, McGraw-Hill International Edition
- Berk, De Marzo (2016): Corporate Finance, 4. Edition, Pearson Addison Wesley

T 6.84 Course: FinTech [T-WIWI-112694]

Responsible: TT-Prof. Dr. Julian Thimme
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2500032	FinTech	3 SWS	Lecture / Practice (/	Thimme
Exams					
WT 24/25	7900064	FinTech			Thimme
ST 2025	7900089	FinTech			Thimme

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
Written examination (90 minutes) during the lecture-free period of the semester (according to §4(2), 1 SPO).

The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None

Recommendation
Knowledge of the course Business Administration: Finance and Accounting [25026/25027] is very helpful.

Workload
135 hours

T 6.85 Course: Fluid Power Systems [T-MACH-102093]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 24/25	2114093	Fluid Technology	2 SWS	Lecture / 🗣	Geimer
Exams					
WT 24/25	76-T-MACH-102093	Fluid Power Systems			Geimer
WT 24/25	76-T-MACH-102094	Fluid Power Systems			Geimer
ST 2025	76-T-MACH-102093	Fluid Power Systems			Geimer

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a oral exam taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
none

Annotation
Learning Objectives:

The student is able to

- apply and evaluate the physical principles of fluid technology,
- name common components and explain how they work,
- demonstrate the advantages and disadvantages of different components,
- dimension components for a given purpose
- and to calculate simple systems.

Contents:

In the area of hydrostatics, the following topics are covered

- Pressurized fluids,
- pumps and motors,
- valves,
- accessories and hydraulic circuits.

In the field of pneumatics, the following topics are covered

- Compressors,
- drives,
- valves and control systems.

Literature:

Lecture notes for the fluid technology lecture, downloadable via the ILIAS learning platform.

Workload
120 hours

Below you will find excerpts from events related to this course:

V

Fluid Technology

2114093, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

In the range of hydrostatics the following topics will be introduced:

- Hydraulic fluids
- Pumps and motors
- Valves
- Accessories
- Hydraulic circuits.

In the range of pneumatics the following topics will be introduced:

- Compressors
- Motors
- Valves
- Pneumatic circuits.

- regular attendance: 21 hours
- self-study: 92 hours

Literature

Skriptum zur Vorlesung *Fluidtechnik*
Institut für Fahrzeugsystemtechnik
downloadbar

T 6.86 Course: Foundations of Informatics I [T-WIWI-102749]

Responsible: Dr.-Ing. Tobias Käfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101417 - Foundations of Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	2

Events					
ST 2025	2511010	Foundations of Informatics I	2 SWS	Lecture / 🗣	Käfer
ST 2025	2511011	Exercises to Foundations of Informatics I		Practice / 🗣	Käfer, Popovic, Noullet, Kinder
Exams					
WT 24/25	79AIFB_Info1_A5	Foundations of Informatics I			Käfer
ST 2025	79AIFB_Info1	Foundations of Informatics I (Registration until 21 July 2025)			Käfer

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an 1h written exam according to Section 4 (2), 1 of the examination regulation.

The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Foundations of Informatics I
2511010, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture provides an introduction to basic concepts of computer science and software engineering. Essential theoretical foundations and problem-solving approaches, which are relevant in all areas of computer science, are presented and explained, as well as shown in practical implementations.

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:
The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Workload:

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

V

Exercises to Foundations of Informatics I

2511011, SS 2025, SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Content

The exercises are related to the lecture Foundations of Informatics I.

Multiple exercises are held that capture the topics, held in the lecture Foundations of Informatics I, 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:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:

The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

T 6.87 Course: Foundations of Informatics II [T-WIWI-102707]

Responsible: Prof. Dr. Sanja Lazarova-Molnar
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101417 - Foundations of Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2511012	Foundations of Informatics II	3 SWS	Lecture / 🗣	Lazarova-Molnar
WT 24/25	2511013	Tutorien zu Grundlagen der Informatik II	1 SWS	Tutorial (/ 🗣	Lazarova-Molnar, Götz, Khodadadi
Exams					
WT 24/25	79AIFB_Info2_Deutsch	Foundations of Informatics II			Lazarova-Molnar
WT 24/25	79AIFB_Info2_English	Grundlagen der Informatik II (englischsprachige Klausur, Anmeldung bis 03.02.2025)			Lazarova-Molnar
ST 2025	79AIFB_Info2	Foundations of Informatics II (Registration until 21 July 2025)			Lazarova-Molnar

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation. The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
It is recommended to attend the course "Foundations of Informatics I" beforehand.

Active participation in the practical lessons is strongly recommended.

Below you will find excerpts from events related to this course:

V Foundations of Informatics II
2511012, WS 24/25, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture deals with formal models for automata, languages and algorithms as well as real instances of these models, i.e. computer architecture and organization (hardware development, computer arithmetic, architecture models), programing languages (different language levels, from microprogramming to higher programming languages, as well as compiling and execution), operating systems and modes (architecture and properties of operating systems, operating system tasks, client-server systems), data organization and management (types of data organization, primary and secondary organization).

Learning objectives:

- Students acquire vast knowledge of methods and concepts in theoretical computer science and computer architectures.
- Based on the acquired knowledge and skills, students are capable of choosing and applying the appropriate methods and concepts for well-defined problem instances.
- Active participation in the tutorials enables students to acquire the necessary knowledge for developing appropriate solutions cooperatively.

Recommendations:

It is recommended to attend the course *Foundations of Informatics I* [2511010] beforehand.

Active participation in the practical lessons is strongly recommended.

Workload:

The total workload for this course is approximately 150 hours.

Organizational issues
Die Vorlesung wird zu Beginn des Semesters 4-stündig und am Ende 2-stündig gelesen, um eine bessere Abdeckung des Inhalts in den Übungen zu gewährleisten.

Literature
Weiterführende Literatur:

Literatur wird in der Vorlesung bekannt gegeben.

T 6.88 Course: Foundations of Interactive Systems [T-WIWI-109816]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101434 - eBusiness and Service Management
M-WIWI-102752 - Fundamentals of Digital Service Systems
M-WIWI-105928 - HR Management & Digital Workplace
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	3

Events					
ST 2025	2540560	Foundations of Interactive Systems	3 SWS	Lecture / Blended	Mädche, Feick
Exams					
WT 24/25	7900326	Foundations of Interactive Systems			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The assessment is carried out in the form of a one-hour written examination and by carrying out a Capstone project.

Details on the assessment will be announced during the lecture.

Prerequisites
None

Recommendation
None

Workload
135 hours

Below you will find excerpts from events related to this course:

V Foundations of Interactive Systems

2540560, SS 2025, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

Lecture Description

Computers have evolved from batch processors to highly interactive systems. This offers new possibilities besides challenges for designing a successful interaction between humans and computers. Interactive systems are socio-technical systems in which users perform tasks by interacting with technology in a specific context to achieve specified goals and outcomes.

This lecture introduces key concepts and principles of interactive systems from a human and computer perspective. From a human perspective, we discuss selected individual characteristics, cognitive processes, the interplay between cognition and activity, as well asmental models. From a computer perspective, we introduce established interaction technologies as well as contemporary multimodal technologies (e.g. augmented/mixed reality, eye-based interaction, etc.). We also introduce established principles and guidelines for designing user interfaces.. Furthermore, we describe the human-centered design process for interactive systems and supporting techniques & tools (e.g. personas, prototyping, user testing).

With this lecture, students acquire foundational knowledge to successfully **design the interaction between humans and computers** in business and private life. The course is complemented with a **Design Capstone Project**, where students in a team apply design methods & techniques to create an interactive prototype.

Learning Objectives

The students

- have a basic understanding of key conceptual and theoretical foundations of interactive systems from a human and computer perspective
- are aware of important design principles for the design of important classes of interactive systems
- know design processes and techniques for developing interactive systems
- know how to apply the knowledge and skills gathered in the lecture for a real-world problem (as part of design capstone project)

Prerequisites: No specific prerequisites are required for the lecture

Language of instruction: English

Bibliography

Alan Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale. 2003. Human-Computer Interaction (3rd Edition). Prentice-Hall, Inc., USA.

Further literature will be made available in the lecture. In case of questions feel free to approach Siu Liu (siu.liu@kit.edu).

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 der Durchführung eines Capstone Projektes. Details zur Ausgestaltung der Erfolgskontrolle werden im Rahmen der Vorlesung bekannt gegeben.

T 6.89 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Responsible: Hon.-Prof. Dr. Bernhard Ulrich Kehrwald
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2133108	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture / 🗣	Kehrwald
Exams					
WT 24/25	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald
ST 2025	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: ca. 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fuels and Lubricants for Combustion Engines

2133108, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
electric drives and fuel cell drives with the associated operating materials will also be presented

- Introduction, basics, primary energy and energy chains
- Illustrative chemistry of hydrocarbons
- Fossil fuels, exploration, processing, standards
- Operating materials not fossil, renewable, alternative
- Fuels, lubricants, coolants, AdBlue
- Laboratory analysis, testing, test benches and measurement technology
- Excursion to test fields for motorized drives from 0.5 to 3,500 kW

Literature
Skript

T 6.90 Course: Functional Ceramics [T-MACH-105179]

Responsible: Dr. Miriam Botros
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2126784	Functional Ceramics	2 SWS	Lecture /	Botros
Exams					
WT 24/25	76T-MACH-105179	Functional Ceramics			Botros, Hinterstein
ST 2025	76-T-MACH-105179	Functional Ceramics			Botros, Hinterstein

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min) taking place at the agreed date.

Auxiliary means: none

The re-examination is offered upon agreement.

Prerequisites
none

T 6.91 Course: Fundamentals for Design of Motor-Vehicle Bodies I [T-MACH-102116]

Responsible: Dipl.-Ing. Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2113814	Fundamentals for Design of Motor-Vehicles Bodies I	1 SWS	Lecture / 🗣	Bardehle
Exams					
WT 24/25	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I			Bardehle
ST 2025	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I			Bardehle, Knoch

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

Workload
60 hours

Below you will find excerpts from events related to this course:

V Fundamentals for Design of Motor-Vehicles Bodies I

2113814, WS 24/25, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. History and design

2. Aerodynamics

3. Design methods (CAD/CAM, FEM)

4. Manufacturing methods of body parts

5. Fastening technologie

6. Body in white / body production, body surface
Learning Objectives:

The students have an overview of the fundamental possibilities for design and manufacture of motor-vehicle bodies. They know the complete process, from the first idea, through the concept to the dimensioned drawings (e.g. with FE-methods). They have knowledge about the fundamentals and their correlations, to be able to analyze and to judge relating components as well as to develop them accordingly.

Organizational issues

Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Termine und nähere Informationen: siehe ILIAS oder Institutshomepage

Dates and further information will be published on the homepage of the institute

Literature

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T 6.92 Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

Responsible: Dipl.-Ing. Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each summer term	1

Events					
ST 2025	2114840	Fundamentals for Design of Motor-Vehicles Bodies II	1 SWS	Lecture / 🗣	Knoch
Exams					
WT 24/25	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II			Bardehle
ST 2025	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II			Bardehle, Knoch

Legend: 🖥 Online, ♲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

Workload
60 hours

Below you will find excerpts from events related to this course:

V Fundamentals for Design of Motor-Vehicles Bodies II

2114840, SS 2025, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Body properties/testing procedures
2. External body-parts
3. Interior trim
4. Compartment air conditioning
5. Electric and electronic features
6. Crash tests
7. Project management aspects, future prospects

Learning Objectives:

The students know that, often the design of seemingly simple detail components can result in the solution of complex problems. They have knowledge in testing procedures of body properties. They have an overview of body parts such as bumpers, window lift mechanism and seats. They understand, as well as, parallel to the normal electrical system, about the electronic side of a motor vehicle. Based on this they are ready to analyze and to judge the relation of these single components. They are also able to contribute competently to complex development tasks by imparted knowledge in project management.

Organizational issues
Voraussichtliche Termine, nähere Informationen und evtl. Änderungen:

siehe Institutshomepage.

Scheduled dates, further Information and possible changes of date:

see homepage of the institute.

Literature

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T 6.93 Course: Fundamentals in the Development of Commercial Vehicles [T-MACH-111389]

Responsible: Christof Weber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	see Annotations	2

Events					
WT 24/25	2113812	Fundamentals in the Development of Commercial Vehicles I	1 SWS	Lecture / 🗣	Weber
ST 2025	2114844	Fundamentals in the Development of Commercial Vehicles II	1 SWS	Lecture / 🗣	Weber
Exams					
WT 24/25	76T-MACH-111389	Fundamentals in the Development of Commercial Vehicles			Weber
ST 2025	76T-MACH-111389	Fundamentals in the Development of Commercial Vehicles			Weber

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral group examination

Duration: appr. 30 minutes

Auxiliary means: none

Prerequisites
none

Annotation
Fundamentals in the Development of Commercial Vehicles I, WT

Fundamentals in the Development of Commercial Vehicles II, ST

Workload
120 hours

Below you will find excerpts from events related to this course:

V Fundamentals in the Development of Commercial Vehicles I
2113812, WS 24/25, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction, definitions, history
2. Development tools
3. Complete vehicle
4. Cab, bodyshell work
5. Cab, interior fitting
6. Alternative drive systems
7. Drive train
8. Drive system diesel engine
9. Intercooled diesel engines

Learning Objectives:

The students have proper knowledge about the process of commercial vehicle development starting from the concept and the underlying original idea to the real design. They know that the customer requirements, the technical realisability, the functionality and the economy are important drivers.

The students are able to develop parts and components. Furthermore they have knowledge about different cab concepts, the interior and the interior design process. Consequently they are ready to analyze and to judge concepts of commercial vehicles as well as to participate competently in the commercial vehicle development.

Organizational issues

Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Termine und Nähere Informationen: siehe ILIAS oder Institutshomepage

Dates and further information will be published on the homepage of the institute.

Literature

1. Marwitz, H., Zittel, S.: ACTROS -- die neue schwere Lastwagenbaureihe von Mercedes-Benz, ATZ 98, 1996, Nr. 9

2. Alber, P., McKellip, S.: ACTROS -- Optimierte passive Sicherheit, ATZ 98, 1996

3. Morschheuser, K.: Airbag im Rahmenfahrzeug, ATZ 97, 1995, S. 450 ff.

V **Fundamentals in the Development of Commercial Vehicles II**
2114844, SS 2025, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Gear boxes of commercial vehicles
2. Intermediate elements of the drive train
3. Axle systems
4. Front axles and driving dynamics
5. Chassis and axle suspension
6. Braking System
7. Systems
8. Excursion

Learning Objectives:

The students know the advantages and disadvantages of different drives. Furthermore they are familiar with components, such as transfer box, propeller shaft, powered and non-powered frontaxle etc. Beside other mechanical components, such as chassis, axle suspension and braking system, also electric and electronic systems are known. Consequently the student are able to analyze and to judge the general concepts as well as to adjust them precisely with the area of application.

Organizational issues

Genaue Termine sowie nähere Informationen und eventuelle Terminänderungen:

siehe Institutshomepage.

Literature

1.HILGERS, M.: Nutzfahrzeugtechnik lernen, Springer Vieweg, ISSN: 2510-1803

2.SCHITTLER, M.; HEINRICH, R.; KERSCHBAUM, W.: Mercedes-Benz Baureihe 500 – neue V-Motorengeneration für schwere Nutzfahrzeuge, MTZ 57 Nr. 9, S. 460 ff, 1996

3.Robert Bosch GmbH (Hrsg.): Bremsanalgen für Kraftfahrzeuge, VDI-Verlag, Düsseldorf, 1. Auflage, 1994

4.RUBI, V.; STRIFLER, P. (Hrsg. Institut für Kraftfahrwesen RWTH Aachen): Indiustrielle Nutzfahrzeugentwicklung, Schriftenreihe Automobiltechnik, 1993

5.TEUTSCH, R.; CHERUTI, R.; GASSER, R.; PEREIRA, M.; de SOUZA, A.; WEBER, C.: Fuel Efficiency Optimization of Market Specific Truck Applications, Proceedings of the 5th Commercial Vehicle Technology Symposium – CVT 2018

6.94 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsible: 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 scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture / 🗣	Lox, Grunwaldt, Deutschmann

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration approx. 25 min., no auxiliary means

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Fundamentals of catalytic exhaust gas aftertreatment

Lecture (V)
On-Site

2134138, SS 2025, 2 SWS, Language: German, Open in study portal

Organizational issues
Blockvorlesung, Termin und Ort werden auf Ilias sowie der Homepage des IFKM und ITCP bekannt gegeben.

T 6.95 Course: Fundamentals of Production Management [T-WIWI-102606]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	1

Events					
ST 2025	2581950	Fundamentals of Production Management	2 SWS	Lecture / 🗣	Schultmann
ST 2025	2581951	Übungen Grundlagen der Produktionswirtschaft	2 SWS	Practice / 🗣	Frank, Fuhg
Exams					
WT 24/25	7981950	Fundamentals of Production Management			Schultmann

Legend: 🖥 Online, ❖ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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

Below you will find excerpts from events related to this course:

V Fundamentals of Production Management

2581950, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This lecture focuses on strategic production management with respect to various economic aspects. Interdisciplinary approaches of systems theory will be used to describe the challenges of industrial production. This course will emphasize the importance of R&D as the central step in strategic corporate planning to ensure future long-term success. In the field of site selection and planning for firms and factories, attention will be drawn upon individual aspects of existing and greenfield sites as well as existing distribution and supply centres. Students will obtain knowledge in solving internal and external transport and storage problems.

Organizational issues
Blockveranstaltung, siehe Institutsaushang

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.96 Course: Gear Cutting Technology [T-MACH-102148]

Responsible: Hon.-Prof. Dr. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2149655	Gear Technology	2 SWS	Lecture / 🗣	Klaiber
Exams					
WT 24/25	76-T-MACH-102148	Gear Technology			Klaiber

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Gear Technology

2149655, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 6.97 Course: Geological Hazards and Risk [T-PHYS-103525]

Responsible: Dr. Andreas Schäfer
Organisation: KIT Department of Physics
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	8	Grade to a third	Each winter term	2

Events					
WT 24/25	4060121	Geological Hazards and Risk	2 SWS	Lecture / 🗣	Schäfer, Rietbrock
WT 24/25	4060122	Exercises on Geological Hazards and Risk	2 SWS	Practice / 🗣	Schäfer, Rietbrock
Exams					
WT 24/25	7800114	Geological Hazards and Risk			Rietbrock

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Workload
240 hours

T 6.98 Course: Global Optimization I [T-WIWI-102726]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
Exams					
WT 24/25	7900004_WS2425_NK	Global Optimization I			Stein
ST 2025	7900205_SS2025_HK	Global Optimization I			Stein

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate

Success is in the form of a written examination (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

Recommendation

None

Annotation

Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Global Optimization I

2550134, SS 2025, 2 SWS, Language: German, 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 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, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

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 6.99 Course: Global Optimization I and II [T-WIWI-103638]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2025	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
ST 2025	2550135	Exercise to Global Optimization I	1 SWS	Practice / 🗣	Stein, Beck
ST 2025	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 24/25	7900006_WS2425_NK	Global Optimization I and II			Stein
ST 2025	7900207_SS2025_HK	Global Optimization I and II			Stein

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate

The assessment of the lecture is a written examination (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

Recommendation

None

Annotation

Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Global Optimization I

2550134, SS 2025, 2 SWS, Language: German, 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 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, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

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** **Lecture (V)**
2550136, SS 2025, 2 SWS, Language: German, Open in study portal **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, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

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 6.100 Course: Global Optimization II [T-WIWI-102727]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2025	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
ST 2025	2550137	Exercise to Global Optimization II	1 SWS	Practice / 🗣	Stein, Beck
Exams					
WT 24/25	7900005_WS2425_NK	Global Optimization II			Stein
ST 2025	7900206_SS2025_HK	Global Optimization II			Stein

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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 "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Global Optimization II
2550136, SS 2025, 2 SWS, Language: German, 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.

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- 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, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

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 6.101 Course: Global Production [T-MACH-113832]

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

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Exams			
WT 24/25	76-T-MACH-113832	Global Production	Lanza

Competence Certificate
Written Exam (60 min)

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.

Workload
150 hours

T 6.102 Course: Handling Characteristics of Motor Vehicles I [T-MACH-105152]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 24/25	2113807	Handling Characteristics of Motor Vehicles I	2 SWS	Lecture / 🖥	Unrau
Exams					
WT 24/25	76-T-MACH-105152	Handling Characteristics of Motor Vehicles I			Unrau
ST 2025	76-T-MACH-105152	Handling Characteristics of Motor Vehicles I			Unrau

Legend: 🖥 Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Verbally

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Handling Characteristics of Motor Vehicles I

2113807, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
1. Problem definition: Control loop driver - vehicle - environment (e.g. coordinate systems, modes of motion of the car body and the wheels)

2. Simulation models: Creation from motion equations (method according to D'Alembert, method according to Lagrange, programme packages for automatically producing of simulation equations), model for handling characteristics (task, motion equations)

3. Tyre behavior: Basics, dry, wet and winter-smooth roadway

Learning Objectives:

The students know the basic connections between drivers, vehicles and environment. They can build up a vehicle simulation model, with which forces of inertia, aerodynamic forces and tyre forces as well as the appropriate moments are considered. They have proper knowledge in the area of tyre characteristics, since a special meaning comes to the tire behavior during driving dynamics simulation. Consequently they are ready to analyze the most importent influencing factors on the driving behaviour and to contribute to the optimization of the handling characteristics.

Organizational issues
Die Vorlesung wird als Videostream zur Verfügung gestellt. Sie finden den Videostream und das Vorlesungsmaterial auf ILIAS. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Literature

1. Willumeit, H.-P.: Modelle und Modellierungsverfahren in der Fahrzeugdynamik,
B. G. Teubner Verlag, 1998

2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R.; Unrau, H.-J.: Umdrucksammlung zur Vorlesung Fahreigenschaften von Kraftfahrzeugen I

T 6.103 Course: Handling Characteristics of Motor Vehicles II [T-MACH-105153]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2025	2114838	Handling Characteristics of Motor Vehicles II	2 SWS	Lecture / 🖥	Unrau
Exams					
WT 24/25	76-T-MACH-105153	Handling Characteristics of Motor Vehicles II			Unrau
WT 24/25	76T-MACH-105153_wdh.	Handling Characteristics of Motor Vehicles II			Unrau
ST 2025	76-T-MACH-105153	Handling Characteristics of Motor Vehicles II			Unrau

Legend: 🖥 Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Handling Characteristics of Motor Vehicles II

2114838, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
1. Vehicle handling: Bases, steady state cornering, steering input step, single sine, double track switching, slalom, cross-wind behavior, uneven roadway

2. stability behavior: Basics, stability conditions for single vehicles and for vehicles with trailer

Learning Objectives:

The students have an overview of common test methods, with which the handling of vehicles is gauged. They are able to interpret results of different stationary and transient testing methods. Apart from the methods, with which e.g. the driveability in curves or the transient behaviour from vehicles can be registered, also the influences from cross-wind and from uneven roadways on the handling characteristics are well known. They are familiar with the stability behavior from single vehicles and from vehicles with trailer. Consequently they are ready to judge the driving behaviour of vehicles and to change it by specific vehicle modifications.

Organizational issues
Die Vorlesung wird als Videostream zur Verfügung gestellt. Sie finden den Videostream und das Vorlesungsmaterial auf ILIAS. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Literature

1. Zomotor, A.: Fahrwerktechnik: Fahrverhalten, Vogel Verlag, 1991

2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R.; Unrau, H.-J.: Umdrucksammlung zur Vorlesung Fahreigenschaften von Kraftfahrzeugen II

6.104 Course: High Performance Powder Metallurgy Materials [T-MACH-102157]

Responsible: apl. Prof. Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2126749	Advanced powder metals	2 SWS	Lecture /	Schell
Exams					
WT 24/25	76-T-MACH-102157	High Performance Powder Metallurgy Materials			Schell, Wagner
ST 2025	76-T-MACH-102157	High Performance Powder Metallurgy Materials			Schell

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral exam, 20- 30 min

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Advanced powder metals

2126749, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature

- W. Schatt ; K.-P. Wieters ; B. Kieback. ".Pulvermetallurgie: Technologien und Werkstoffe", Springer, 2007
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
- F. Thümmler, R. Oberacker. "Introduction to Powder Metallurgy", Institute of Materials, 1993

T 6.105 Course: HR-Management 1: HR Strategies in the Age of AI [T-WIWI-113745]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105928 - HR Management & Digital Workplace
M-WIWI-106860 - Leadership & Sustainable HR-Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2573005	HR-Management 1: HR strategies in the age of AI	2 SWS	Lecture / 🗣	Nieken
WT 24/25	2573006	Übung zu HR-Management 1: HR Strategies in the age of AI	1 SWS	Practice / 🗣	Nieken, Mitarbeiter
Exams					
WT 24/25	7900200	HR-Management 1: HR strategies in the age of AI (formerly Human Resource Management)			Nieken

Legend: 🖥 Online, ✣ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment is conducted in the form of an oral (30 minutes) or written (60 minutes) examination (according to §4(2), 1 examination regulations). The exam is offered every semester and can be retaken at any regular examination date.

Prerequisites
None

Recommendation
Prior attendance of the Business Administration module is recommended.

Below you will find excerpts from events related to this course:

V HR-Management 1: HR strategies in the age of AI — **Lecture (V) On-Site**
2573005, WS 24/25, 2 SWS, Language: German, Open in study portal

Content

In this course, students will acquire fundamental knowledge in the field of human resource management and delve deeply into the future of work. We explore not only classical topics but also the significance of artificial intelligence in the workplace, along with selected aspects related to sustainability and shaping the future of work. Drawing from microeconomic and behavioral economic approaches, we analyze various processes and tools in human resource management. We evaluate their alignment with corporate strategy. We investigate how we can design workplaces sustainably while considering the individual needs of employees. In addition, we look at how AI is transforming our work environment and the opportunities and challenges it presents.

Going beyond theoretical concepts, we validate our insights using real-world data from research papers and current events. Discussions are strongly encouraged!

Learning Outcomes

The student

- understands the processes and instruments of human resource management.
- analyzes different methods and evaluates their usefulness with a special focus on AI.
- analyzes different processes and evaluates the strengths and weaknesses.
- understands the challenges of human resource management and its link to corporate strategy with a special focus on AI and sustainability aspects.
- posses knowledge about the applicability and challenges of different scientific research methods and open science.

Workload

The total workload for this course is approximately 135 hours.

Lecture: 32 hours

Preparation of lecture: 52 hours

Exam preparation: 51 hours

Literature

- Personalmanagement, Stock-Homburg, 2019
- Personnel Economics, Kuhn, 2017
- Research papers and case studies (will be provided during the lecture)

T 6.106 Course: HR-Management 2: Organization, Fairness & Leadership [T-WIWI-114178]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101668 - Economic Policy I
M-WIWI-106860 - Leadership & Sustainable HR-Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2573001	HR-Management 2: Organization, Fairness & Leadership	2 SWS	Lecture / 🗣	Nieken
ST 2025	2573002	Übung zu HR-Management 2: Organization, Fairness & Leadership	1 SWS	Practice / 🗣	Nieken, Mitarbeiter, Gorny
Exams					
ST 2025	7900133	HR-Management 2: Organization, Fairness & Leadership (formerly Personnel Policies and Labor Market Institutions)			Nieken

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination of 1 hour. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendation
Completion of module Business Administration is recommended.

Basic knowledge of microeconomics, game theory, and statistics is recommended.

Below you will find excerpts from events related to this course:

V HR-Management 2: Organization, Fairness & Leadership

2573001, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

In the course, we explore central aspects of the working world. Students gain a deep understanding of the dynamics of wage and collective bargaining negotiations and critically engage with compensation structures within companies. A special focus lies in creating a sustainable workplace that meets both employees' needs and society's ecological and social demands. Additionally, we address topics related to diversity and inclusion. Students develop innovative approaches to leadership and new forms of work that are increasingly relevant in the modern work environment. Our analyses are based on microeconomic and behavioral economic approaches, evaluating their alignment with corporate strategy. We move beyond theoretical concepts, examining our insights using real-world data from research papers and current events. Discussions are explicitly encouraged!

Aim

The student

- understands the process and instruments of HR-Management with a focus on fair working conditions, sustainability, and leadership.
- analyzes various methods and evaluates their usefulness, particularly regarding fairness and leadership in organizations.
- analyzes various processes and assesses their strengths and weaknesses.
- evaluates the strengths and weaknesses of existing structures and regulations based on systematic criteria.
- possess knowledge about the applicability and challenges of different scientific research methods

Workload

The total workload for this course is approximately 135 hours.

Lecture 32 hours

Preparation of lecture 52 hours

Exam preparation 51 hours

Literature

- Arbeitsmarktökonomik, W. Franz, Springer, 2013
- The Nature of Leadership, Antonakis, J. Day, D. 2017

T 6.107 Course: Hydraulic Engineering and Water Management [T-BGU-101667]

Responsible: Prof. Dr. Mario Jorge Rodrigues Pereira da Franca
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	6200511	Hydraulic Engineering	2 SWS	Lecture / 🗣	Rodrigues Pereira da Franca
WT 24/25	6200512	Hydraulic Engineering - Excercise	1 SWS	Practice / 🗣	Seidel

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam with 60 minutes

Prerequisites
None

Recommendation
None

Annotation
None

Workload
120 hours

T 6.108 Course: Hydrogen and reFuels - Energy Conversion in Combustion Engines [T-MACH-111585]

Responsible: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	4	Grade to a third	Each winter term	1 terms	2

Events					
WT 24/25	2134155	Hydrogen and reFuels - Energy Conversion in Combustion Engines	2 SWS	Lecture / 🗣	Koch
Exams					
WT 24/25	76-T-MACH-111585	Hydrogen and reFuels - Energy Conversion in Combustion Engines			Kubach, Koch
ST 2025	76-T-MACH-105564	Hydrogen and reFuels - Energy Conversion in Combustion Engines			Koch, Kubach

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
oral exam, appr. 25 minutes, no auxillary means

Prerequisites
T-MACH-113979 must not have been started.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Hydrogen and reFuels - Energy Conversion in Combustion Engines

2134155, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
New types of CO2-neutral fuels such as gaseous hydrogen but also liquid synthetic fuels often place specific requirements on engine systems that differ significantly from operation with conventional fuels. These special aspects of engine energy conversion are dealt with in this lecture.

Introduction

Thermodynamics of combustion engines

Fundamentals

gas exchange

Flow field

Wall heat losses

Combustion in gasoline engines

Pressure Trace Analysis

Combustion in Diesel engines

Specific Topics of Hydrogen Combsution

Waste heat recovery

T 6.109 Course: Hydrology [T-BGU-101693]

Responsible: Prof. Dr.-Ing. Erwin Zehe
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6200513	Hydrology	2 SWS	Lecture / 🗣	Zehe, Wienhöfer
WT 24/25	6200514	Tutorial Hydrology	1 SWS	Practice / 🗣	Zehe, Wienhöfer
Exams					
WT 24/25	8230101693	Hydrology			Wienhöfer, Zehe

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

Workload
120 hours

T 6.110 Course: Ignition Systems [T-MACH-105985]

Responsible: Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Version
Oral examination	4	Grade to a third	1

Events					
WT 24/25	2133125	Ignition systems	2 SWS	Lecture / 🗣	Toedter
Exams					
WT 24/25	76-T-MACH-105985	Ignition systems			Koch

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, 20 min

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Ignition systems

2133125, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Ignition Process
- Spark Ignition
- Principle of Spark Ignition Systems
- Limits of Spark Ignition
- New Develpoments of Spark Ignition Systems
- New an Alternative Ignition Systems

T 6.111 Course: Industrial Organization [T-WIWI-102844]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Exams			
WT 24/25	7910003	Industrial Organization	Reiß

Competence Certificate
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

Recommendation
Completion of the module Economics [WW1VWL] is assumed.

Annotation
This course is not given in summer 2017.

T 6.112 Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-109054]

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

Part of: M-MACH-101272 - Integrated Production Planning

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2025	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (/ 🗣	Lanza
Exams					
WT 24/25	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza
ST 2025	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.

Workload
270 hours

Below you will find excerpts from events related to this course:

V Integrated Production Planning in the Age of Industry 4.0

2150660, SS 2025, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

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 6.113 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Responsible: Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / 🗣	Schlichtenmayer
Exams					
WT 24/25	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer
ST 2025	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Integrative Strategies in Production and Development of High Performance Cars — **Lecture (V) On-Site**
2150601, SS 2025, 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 6.114 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Events					
ST 2025	2530570	International Finance	2 SWS	Lecture / 🗣	Walter, Uhrig-Homburg
Exams					
WT 24/25	7900052	International Finance			Uhrig-Homburg
ST 2025	7900097	International Finance			Uhrig-Homburg

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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

Recommendation
None

Annotation
The course is offered as a 14-day or block course.

Below you will find excerpts from events related to this course:

V International Finance
2530570, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Kickoff am Mittwoch, 30.04.25, 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 6.115 Course: Internship [T-WIWI-102611]

Responsible: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101419 - Internship

Type	Credits	Grading scale	Version
Completed coursework	10	pass/fail	2

Competence Certificate
see module description

Prerequisites
Kein

T 6.116 Course: Introduction to Bionics [T-MACH-111807]

Responsible: apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Events					
ST 2025	2142151	Introduction to Biomimetics	2 SWS	Lecture / 🗣	Hölscher, Greiner
Exams					
WT 24/25	76-T-MACH-102172	Introduction into Biomimetics			Hölscher

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam (duration: 60 minutes)

Prerequisites
none

Annotation
Brick T-MACH-102172 may not be started

Below you will find excerpts from events related to this course:

V Introduction to Biomimetics

2142151, SS 2025, 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 6.117 Course: Introduction to Ceramics [T-MACH-100287]

Responsible: apl. Prof. Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 24/25	2125757	Introduction to Ceramics	3 SWS	Lecture / Blended	Schell
Exams					
WT 24/25	76-T-MACH-100287	Introduction to Ceramics			Schell, Bucharsky, Wagner
ST 2025	76-T-MACH-100287	Introduction to Ceramics			Schell, Bucharsky, Wagner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (30 min) taking place at a specific date.

The re-examination is offered at a specific date.

Prerequisites
None

Workload
180 hours

Below you will find excerpts from events related to this course:

V Introduction to Ceramics
2125757, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature

- H. Salmang, H. Scholze, "Keramik", Springer
- Kingery, Bowen, Uhlmann, "Introduction To Ceramics", Wiley
- Y.-M. Chiang, D. Birnie III and W.D. Kingery, "Physical Ceramics", Wiley
- S.J.L. Kang, "Sintering, Densification, Grain Growth & Microstructure", Elsevier

T 6.118 Course: Introduction to Energy Economics [T-WIWI-102746]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	7

Events					
ST 2025	2581010	Introduction to Energy Economics	2 SWS	Lecture / 🗣	Fichtner
ST 2025	2581011	Übungen zu Einführung in die Energiewirtschaft	2 SWS	Practice / 🗣	Sandmeier, Fichtner, Scharnhorst
Exams					
WT 24/25	7981010	Introduction to Energy Economics			Fichtner

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Introduction to Energy Economics

2581010, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction: terms, units, conversions
2. The energy carrier gas (reserves, resources, technologies)
3. The energy carrier oil (reserves, resources, technologies)
4. The energy carrier hard coal (reserves, resources, technologies)
5. The energy carrier lignite (reserves, resources, technologies)
6. The energy carrier uranium (reserves, resources, technologies)
7. The final carrier source electricity
8. The final carrier source heat
9. Other final energy carriers (cooling energy, hydrogen, compressed air)

The student is able to

- characterize and judge the different energy carriers and their peculiarities,
- understand contexts related to energy economics.

Literature
Weiterführende Literatur:

Pfaffenberger, Wolfgang. Energiewirtschaft. ISBN 3-486-24315-2

Feess, Eberhard. Umweltökonomie und Umweltpolitik. ISBN 3-8006-2187-8

Müller, Leonhard. Handbuch der Elektrizitätswirtschaft. ISBN 3-540-67637-6

Stoft, Steven. Power System Economics. ISBN 0-471-15040-1

Erdmann, Georg. Energieökonomik. ISBN 3-7281-2135-5

T 6.119 Course: Introduction to Engineering Geology [T-BGU-101500]

Responsible: Prof. Dr. Philipp Blum
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	6339057	Introduction to Engineering Geology	4 SWS	Lecture / Practice (	Blum, Fuchs, Menberg
Exams					
WT 24/25	8210_101500	Introduction to Engineering Geology			Blum

Prerequisites
none

Workload
150 hours

T 6.120 Course: Introduction to Engineering Mechanics I: Statics and Strength of Materials [T-MACH-102208]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101259 - Engineering Mechanics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2025	2162238	Introduction to Engineering Mechanics I: Statics and Strength of Materials	2 SWS	Lecture / 🗣	Böhlke, Kehrer
ST 2025	2162239	Introduction to Engineering Mechanics I: Statics and Strength of Materials (Tutorial)	1 SWS	Practice / 🗣	Luo
Exams					
WT 24/25	76-T-MACH-102208-1	Introduction to Engineering Mechanics I: Statics (75min)			Fidlin
WT 24/25	76-T-MACH-102208-2	Introduction to Engineering Mechanics I: Statics and Strength of Materials (120min)			Fidlin
ST 2025	76-T-MACH-102208-1	Introduction to Engineering Mechanics I: Statics (75 Min)			Fidlin
ST 2025	76-T-MACH-102208-2	Introduction to Engineering Mechanics I: Statics and Strength of Materials (120 Min)			Fidlin

Legend: 🖥 Online, ⚘ Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
The assessment consists of a written examination (120 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.

For students of economics the assessement consists of a written examination (Statics - 75 min.)

Permitted utilities: non-programmable calculator

Prerequisites
None

Workload
150 hours

Below you will find excerpts from events related to this course:

V Introduction to Engineering Mechanics I: Statics and Strength of Materials

Lecture (V)
On-Site

2162238, SS 2025, 2 SWS, Language: German, Open in study portal

Content
Statics: force · moment · general equilibrium condistions · center of mass · inner force in structure · plane frameworks · theory of adhesion

6.121 Course: Introduction to Engineering Mechanics II : Dynamics [T-MACH-102210]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2161276	Introduction to Engineering Mechanics II : Dynamics	2 SWS	Lecture / 🗣	Fidlin
Exams					
WT 24/25	76-T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics			Fidlin

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written examination (75 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

Permitted utilities: non-programmable calculator, literature.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Introduction to Engineering Mechanics II : Dynamics

Lecture (V)
On-Site

2161276, WS 24/25, 2 SWS, Language: German, Open in study portal

6.122 Course: Introduction to Finance and Accounting [T-WIWI-112820]

Responsible:	Dr. Torsten Luedecke Prof. Dr. Martin Ruckes Dr. Jan-Oliver Strych Prof. Dr. Marliese Uhrig-Homburg Prof. Dr. Marcus Wouters
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105769 - Financing and Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	2

Events					
ST 2025	2500025	Tutorial Introduction to Finance and Accounting	2 SWS	Tutorial (	Wouters, Ruckes, Assistenten, Kohl
ST 2025	2610026	Introduction to Finance and Accounting	2 SWS	Lecture / 🗣	Ruckes, Wouters, Thimme
Exams					
WT 24/25	7900005	Financing and Accounting			Ruckes, Wouters, Luedecke
ST 2025	7900043	Financing and Accounting			Ruckes, Wouters, Luedecke

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (150 min). The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Workload
150 hours

Below you will find excerpts from events related to this course:

V Introduction to Finance and Accounting

Lecture (V)
On-Site

2610026, SS 2025, 2 SWS, Language: German, Open in study portal

Content
The lecture covers the following topics:

- Investment and Finance
  - Valuation of Bonds and Stocks
  - Capital Budgeting
  - Portfolio Theory
- Financial Accounting
- Management Accounting

Literature
Ausführliche Literaturhinweise werden in den Materialen zur Vorlesung gegeben.

T 6.123 Course: Introduction to Game Theory [T-WIWI-102850]

Responsible: Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2025	2520525	Introduction to Game Theory	2 SWS	Lecture / 🗣	Reiß
Exams					
WT 24/25	7900006	Introduction to Game Theory			Puppe

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2),1 of the examination regulation.

The exam takes place in the recess period and can be repeated at every ordinary examination date.

Recommendation
Knowledge from the lecture "Economics I: Microeconomics" is recommended. Furthermore, basic knowledge of mathematics and statistics is assumed.

Below you will find excerpts from events related to this course:

V Introduction to Game Theory

2520525, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course focusses on non-cooperative game theory. It discusses models, solution concepts, and applications for simultaneous games as well as sequential games. Various solution concepts, e.g., Nash equilibrium and subgame-perfect equilibrium, are introduced along with more advanced concepts.

The assessment consists of a written exam (60 minutes) according to Section 4(2),1 of the examination regulation.

The exam takes place in the recess period and can be resited at every ordinary examination date.

Recommendation: You should have passed the module [M-WIWI-101398] *Introduction to Economics.*

Recommendations:

Basic knowledge of mathematics and statistics is assumed.

This course offers an introduction to the theoretical analysis of strategic interaction situations. At the end of the course, students shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings.

Compulsory textbook:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Additional Literature:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

Literature

Verpflichtende Literatur:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Ergänzende Literatur:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

T 6.124 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-101681]

Responsible: Dr.-Ing. Sven Wursthorn
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	4

Events					
WT 24/25	6071101	Introduction to GIS for Students of Natural Sciences, Engineering and Geosciences, L+E	4 SWS	Lecture / Practice (/ 🗣	Wursthorn
Exams					
WT 24/25	8280101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences			Wursthorn
ST 2025	8280101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences			Wursthorn

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 90 min.

Workload
90 hours

T 6.125 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite [T-BGU-103541]

Responsible: Dr.-Ing. Sven Wursthorn
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	3	pass/fail	Each winter term	1 terms	5

Events					
WT 24/25	6071101	Introduction to GIS for Students of Natural Sciences, Engineering and Geosciences, L+E	4 SWS	Lecture / Practice (/ 🗣	Wursthorn
Exams					
WT 24/25	8280103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences			Wursthorn

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The achievement control takes place via accepted exercises.

Prerequisites
none

Recommendation
none

Annotation
none

Workload
90 hours

T 6.126 Course: Introduction to Machine Learning [T-WIWI-111028]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr. Abdolreza Nazemi

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105482 - Machine Learning and Data Science

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	2540539	Introduction to Machine Learning	2 SWS	Lecture / 🗣	Nazemi
WT 24/25	2540540	Übung zu Introduction to Machine Learning	1 SWS	Practice / 🗣	Nazemi
Exams					
WT 24/25	7900349	Introduction to Machine Learning (WS 2024/2025)			Geyer-Schulz
ST 2025	7900076	Introduction to Machine Learning			Geyer-Schulz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate

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-point-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.

Workload

135 hours

Below you will find excerpts from events related to this course:

V Introduction to Machine Learning

2540539, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

- Introduction
- Data Cleaning
- Data Visualization
- Linear Regression
- Logistic Regression
- Tree-based Algorithms
- Support Vector Machine
- Shrinkage Models
- Dimensionality Reduction
- Clustering

Literature

- Alpaydin, E. (2014). *Introduction to Machine Learning*. Third Edition, MIT Press.
- Hall, J. (2020). *Machine Learning in Business: An Introduction to the World of Data Science.*Independently published.
- James, G., Witten, D., Hastie, T., and R. Tibshirani (2013). *An Introduction to Statistical Learning: with Applications in R*. Springer.
- Tan, P. N., Steinbach, M., Karpatne, A., & Kumar, V. (2018). *Introduction to data mining*. Pearson

T 6.127 Course: Introduction to Microsystem Technology - Practical Course [T-MACH-108312]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each term	1

Events					
WT 24/25	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
ST 2025	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
Exams					
WT 24/25	76-T-MACH-108312	Introduction to Microsystem Technology - Practical Course			Last

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
non-graded written examination

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Introduction to Microsystem Technology - Practical Course

2143877, WS 24/25, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

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 2025, 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 in den Laboren des IMT am KIT-CN statt. Treffpunkt: Eingang Bau 301.

Teilnahmeanfragen an Dr. A. Last, arndt.last@kit.edu

Literature

Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 6.128 Course: Introduction to Microsystem Technology I [T-MACH-114100]

Responsible: Dr. Vlad Badilita
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 24/25	2141861	Introduction to Microsystem Technology I	2 SWS	Lecture / 🗣	Korvink, Badilita

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written examination (60 min)

Prerequisites
T-MACH-114035 and T-MACH-105182 must not have started

Workload
120 hours

Below you will find excerpts from events related to this course:

V Introduction to Microsystem Technology I — **Lecture (V) On-Site**
2141861, WS 24/25, 2 SWS, Language: English, Open in study portal

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 6.129 Course: Introduction to Microsystem Technology II [T-MACH-114101]

Responsible: Dr. Vlad Badilita
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2025	2142874	Introduction to Microsystem Technology II	2 SWS	Lecture / 🗣	Korvink, Badilita

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written examination (60 min)

Prerequisites
T-MACH-114035 and T-MACH-105183 must not have started

Workload
120 hours

Below you will find excerpts from events related to this course:

V Introduction to Microsystem Technology II
2142874, SS 2025, 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 6.130 Course: Introduction to Neural Networks and Genetic Algorithms [T-WIWI-111029]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105482 - Machine Learning and Data Science

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	2540541	Introduction to Neural Networks and Genetic Algorithms	2 SWS	Lecture	Geyer-Schulz
ST 2025	2540542	Übung Introduction to Neural Networks and Genetic Algorithms	1 SWS	Practice	Geyer-Schulz
Exams					
WT 24/25	7900295	Introduction to Neural Networks and Genetic Algorithms (Nachklausur SoSe 2024)			Geyer-Schulz
ST 2025	7900303	Introduction to Neural Networks and Genetic Algorithms			Geyer-Schulz

Competence Certificate
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-point-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.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Introduction to Neural Networks and Genetic Algorithms

2540541, SS 2025, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The course consists of a short introduction and two parts:

1. In the introduction, the biological mechanisms of neural and genetic methods are presented.
   Furthermore, a common framework for the learning performance evaluation of these methods in applications is introduced.
2. In the field of genetic methods, simple genetic algorithms and their variants are introduced, analyzed, and applied.
3. In the area of neural methods, the basic algorithms are presented (e.g., backpropagation) as well as their applications in data science.

Learning Objectives:

The student knows the essential algorithms, learning procedures, and methods for neural networks and genetic algorithms. They can apply these methods (e.g. in R) and evaluate their quality.

Literature

- Goldberg, David E. (2001)
  Genetic Algorithms in Search, Optimization and Machine Learning.
  Addison-Wesley, New York.
- Bishop, Christopher M. (2006)
  Pattern Recognition and Machine Learning.
  Springer, New York.
- Goodfellow, Ian; Bengio, Yoshua; Courville, Aaron (2016)
  Deep Learning.
  MIT Press. Cambridge.

T 6.131 Course: Introduction to Operations Research I and II [T-WIWI-102758]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101418 - Introduction to Operations Research

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	see Annotations	2

Events					
WT 24/25	2500030	Computer Exercises on Introduction to Operations Research II	1 SWS	Tutorial (/ 🖥	Dunke
WT 24/25	2530043	Introduction to Operations Reseasrch II		Lecture / 🗣	Nickel
WT 24/25	2530044			Tutorial (/ 🗣	Dunke
WT 24/25	2550043	Introduction to Operations Research II		Lecture / 🗣	Nickel
ST 2025	2500008	Computer Exercises on Introduction to Operations Research I	1 SWS	Tutorial (/ 🖥	Dunke
ST 2025	2550040	Introduction to Operations Research I	2 SWS	Lecture / 🗣	Stein
ST 2025	2550043	Tutorials on Introduction to Operations Research I	2 SWS	Tutorial (/ 🗣	Dunke
Exams					
WT 24/25	00060	Introduction to Operations Research I and II			Nickel

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of the module is carried out by a written examination (120 minutes) according to Section 4(2), 1 of the examination regulation.
In each term (usually in March and August), one examination is held for both courses.
The overall grade of the module is the grade of the written examination.

Prerequisites
None

Recommendation
Knowledge of Mathematics I and II is recommended, as well as programming knowledge for the software laboratory.
It is strongly recommended to attend the course Introduction to Operations Research I [2550040] before attending the courseIntroduction to Operations Research II [2530043].

Workload
270 hours

Below you will find excerpts from events related to this course:

V Introduction to Operations Reseasrch II

2530043, WS 24/25, SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Integer and combinatorial optimization: basic concepts, cutting plane methods, branch-and-bound methods, branch-and-cut methods, heuristic methods.

Nonlinear optimization: basic concepts, optimality conditions, solution methods for convex and nonconvex optimization problems.

Dynamic and stochastic models and methods: Dynamic optimization, Bellman methods, lot-sizing models and dynamic and stochastic models of inventory, queues.

Learning Objectives:

The student

- knows and describes the basic concepts of integer and combinatorial optimization, nonlinear optimization and dynamic optimization,
- knows the methods and models indispensable for a quantitative analysis,
- models and classifies optimization problems and selects appropriate solution procedures to solve simple optimization problems independently,
- validates, illustrates and interprets obtained solutions.

Literature

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

V **Introduction to Operations Research II**
2550043, WS 24/25, SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Integer and Combinatorial Programming: Basic notions, cutting plane metehods, branch and bound methods, branch and cut methods, heuristics.

Nonlinear Programming: Basic notions, optimality conditions, solution methods for convex and nonconvex optimization problems.

Dynamic and stochastic models and methods: dynamical programming, Bellman method, lot sizing models, dyanical and stochastic inventory models, queuing theory.

Learning objectives:

The student

- names and describes basic notions of integer and combinatorial optimization, nonlinear programming, and dynamic programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Literature

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

V **Introduction to Operations Research I**
2550040, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

Examples for typical OR problems.

Linear Programming: Basic notions, simplex method, duality, special versions of the simplex method (dual simplex method, three phase method), sensitivity analysis, parametric optimization, game theory.

Graphs and Networks: Basic notions of graph theory, shortest paths in networks, project scheduling, maximal and minimal cost flows in networks.

Learning objectives:

The student

- names and describes basic notions of linear programming as well as graphs and networks,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Literature

- Nickel, Rebennack, Stein, Waldmann: Operations Research, 3. Auflage, Springer, 2022
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

T 6.132 Course: Introduction to Programming with Java [T-WIWI-102735]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101581 - Introduction to Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 24/25	2511000	Introduction to Programming with Java	3 SWS	Lecture / 🗣	Zöllner
WT 24/25	2511002	Tutorien zu Programmieren I: Java	1 SWS	Tutorial (	Zöllner, Stegmaier, Mütsch
WT 24/25	2511003	Computer lab Introduction to Programming with Java	2 SWS		Zöllner, Stegmaier, Mütsch
Exams					
WT 24/25	79AIFB_Prog1	Introduction to Programming with Java			Zöllner
ST 2025	7900042	Introduction to Programming with Java			Zöllner

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation.

The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.

The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Annotation
see german version

Below you will find excerpts from events related to this course:

V Introduction to Programming with Java
2511000, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture "Introduction to Programming with Java " introduces systematic programming and provides essential practical basics for all advanced computer science lectures.

Based on considerations of the structured and systematic design of algorithms, the most important constructs of modern higher programming languages as well as programming methods are explained and illustrated with examples. One focus of the lecture is on teaching the concepts of object-oriented Programming. Java is used as the programming language. Knowledge of this language is required in advanced computer science lectures.

At the end of the lecture period, a written examination will be held for which admission must be granted during the semester after successful participation in the practices. The exact details will be announced in the lecture.

Learning objectives:

- Knowledge of the fundamentals, methods and systems of computer science.
- The students acquire the ability to independently solve algorithmic problems in the programming language Java, which dominates in business applications.
- In doing so, they will be able to find strategic and creative answers in finding solutions to well-defined, concrete and abstract problems.

Workload:

The total workload for this course is approximately 150 hours. For further information see German version.

Literature

Ratz, D. Schulmeister-Zimolong, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 8. Aktualisierte und erweiterte Auflage, Hanser 2018

T 6.133 Course: Introduction to Public Finance [T-WIWI-102877]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101403 - Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2560131	Introduction to Public Finance	3 SWS	Lecture /	Wigger
Exams					
WT 24/25	790fiwi	Introduction to Public Finance			Wigger
ST 2025	790fiwi	Introduction to Public Finance			Wigger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Introduction to Public Finance
2560131, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The course *Introduction to Public Finance* provides an overview of the fundamental issues in public economics. The first part of the course deals with normative theories about the economic role of the state in a market economy. Welfare economics theory is offered as a base model, with which alternative normative theories are compared and contrasted. Within this theoretical framework, arguments concerning efficiency and equity are developed as justification for varying degrees of economic intervention by the state. The second part of the course deals with the positivist theory of public economics. Processes of public decision making are examined and the conditions that lead to market failures resulting from collective action problems are discussed. The third part of the course examines a variety of public spending programs, including social security systems, the public education system, and programs aimed at reducing poverty. The fifth part of the course addresses the key theoretical and political issues associated with fiscal federalism.

Learning goals:

Students are able to:

- critically assess the economic role of the state in a market economy
- explain and discuss key concepts in public finance, including: public goods; economic externalities; and market failure
- explain and critically discuss competing theoretical approaches to public finance, including welfare economics and public choice theory
- explain the theory of bureaucracy according to Weber and critically assess its strengths and weaknesses
- evaluate the incentives inherent in the bureaucratic model, as well as the more recent introduction of market-oriented incentives associated with public-sector reform

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Literatur:

Wigger, B. U. 2006. *Grundzüge der Finanzwissenschaft*. Springer: Berlin.

6.134 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR
M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2025	2550470	Introduction to Stochastic Optimization	2 SWS	Lecture / 🖥	Rebennack
ST 2025	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice / 🗣	Rebennack, Kandora
ST 2025	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	2 SWS	Others (sons	Rebennack, Kandora
Exams					
WT 24/25	7900242	Introduction to Stochastic Optimization			Rebennack
ST 2025	7900311	Introduction to Stochastic Optimization			Rebennack

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites
None.

Workload
135 hours

6.135 Course: Investments [T-WIWI-102604]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101435 - Essentials of Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2530575	Investments	2 SWS	Lecture / 🗣	Uhrig-Homburg, Thimme
ST 2025	2530576	Übung zu Investments	1 SWS	Practice / 🗣	Uhrig-Homburg, Kargus, Thimme
Exams					
WT 24/25	7900054	Investments			Uhrig-Homburg
ST 2025	7900109	Investments			Uhrig-Homburg

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

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 grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
Knowledge of Business Administration: Finance and Accounting [2610026] is recommended.

Below you will find excerpts from events related to this course:

V Investments
2530575, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Weiterführende Literatur:

Bodie/Kane/Marcus (2010): Essentials of Investments, 8. Aufl., McGraw-Hill Irwin, Boston

T 6.136 Course: Laboratory Production Metrology [T-MACH-108878]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Dr. Florian Stamer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	5	pass/fail	Each summer term	3

Events					
ST 2025	2150550	Laboratory Production Metrology	3 SWS	Practical course / 🗣	Lanza, Stamer
Exams					
ST 2025	76-T-MACH-108878	Laboratory Production Metrology			Lanza, Stamer

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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
none

Annotation
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 events related to this course:

V Laboratory Production Metrology — **Practical course (P) On-Site**
2150550, SS 2025, 3 SWS, Language: German, Open in study portal

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 (http://www.wbk.kit.edu/studium-und-lehre.php).

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 6.137 Course: Large Diesel and Gas Engines for Ship Propulsions [T-MACH-110816]

Responsible: Dr.-Ing. Heiko Kubach
Organisation:
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	4	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	2134154	Large Diesel and Gas Engines for Ship Propulsions	2 SWS	Lecture / 🗣	Weisser
Exams					
ST 2025	76-T-MACH-110816	Großdiesel- und -gasmotoren für Schiffsantriebe			Weisser

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, 20 minutes

Prerequisites
None

Workload
120 hours

Below you will find excerpts from events related to this course:

V Large Diesel and Gas Engines for Ship Propulsions
2134154, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Introduction and History
- Types of Ships amd Propulsion Systems
- Thermodynamic
- Boosting
- Design
- Fuels
- Lubricants
- Injection of liquid Fuels
- Combustions Processes for liquid Fuels
- Injection of Gaseous Fuels
- Combustion Processes for Gaseous Fuels
- Emissions
- Integration of Engines in Ships
- Large Engines in other Applications

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.

6.138 Course: Learning Factory “Global Production“ [T-MACH-105783]

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

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	4

Events					
WT 24/25	2149612	Learning Factory “Global Production“	4 SWS	/	Lanza
Exams					
WT 24/25	76-T-MACH-105783	Learning Factory "Global Production"			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative test achievement (graded):

- Knowledge acquisition in the context of the seminar (4 achievements 20 min each) with weighting 40%.
- Interaction between participants with weighting 15%.
- Scientific colloquium (in groups of 3 students approx. 45 min each) with weighting 45%.

Prerequisites
none

Annotation
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 events related to this course:

V **Learning Factory “Global Production“**
2149612, WS 24/25, 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. To make this challenges come alive, students can run a production of electric motors under real production conditions.
The course is divided into e-learning units and presence dates. The e-learning units help to learn essential basics and to immerse themselves in specific topics (e.g. selection of location, supplier selection and planning of production networks). The focus of the presence appointments is the case-specific application of relevant methods for planning and control of production systems that are suitable for the location. In addition to traditional methods and tools to organize lean production systems (e.g. Kanban and JIT/ JIS, Line Balancing) the lecture in particular deals with site-specific quality assurance and scalable automation. Essential methods for quality assurance in complex production systems are taught and brought to practical experience by a Six Sigma project. In the area of scalable automation, it is important to find solutions for the adaption of the level of automation of the production system to the local production conditions (e.g. automated workpiece transport, integration of lightweight robots for process linking) and to implement them physically. At the same time safety concepts should be developed and implemented as enablers for human-robot collaboration.
The course also includes an excursion to the production plant for the manufacturing of electric motors of an industrial partner.

Main focus of the lecture:

- site selection
- site-specific factory planning
- site-specific quality assurance
- scalable automation
- supplier selection

Learning Outcomes:

The students are able to ...

- evaluate and select alternative locations using appropriate methods.
- use methods and tools of lean management to plan and manage production systems that are suitable for the location.
- use the Six Sigma method and apply goal-oriented process management.
- select an appropriate level of automation of the production units based on quantitative variables.
- make use of well-established methods for the evaluation and selection of suppliers.
- apply methods for planning a global production network depending on company-specific circumstances to sketch a suitable network and classify and evaluating it according to specific criteria.
- apply the learned methods and approaches with regard to problem solving in a global production environment and able to reflect their effectiveness.

Workload:

e-Learning: ~ 24 h
regular attendence: ~ 36 h
self-study: ~ 60 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 6.139 Course: Logistics and Supply Chain Management [T-MACH-110771]

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

Part of: M-MACH-105298 - Logistics and Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each summer term	5

Events					
ST 2025	2118078	Logistics and Supply Chain Management	4 SWS	Lecture / 🗣	Furmans, Alicke

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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 (20 min) during the semester break

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

Prerequisites
The course T-WIWI-102870 "Logistics and Supply Chain Management" must not have been selected.

Annotation
The brick cannot be taken if one of the bricks "T-MACH-102089 – Logistics - Organisation, Design and Control of Logistic Systems" and "T-MACH-105181 – Supply Chain Management" has been taken.

Workload
270 hours

Below you will find excerpts from events related to this course:

V Logistics and Supply Chain Management

2118078, SS 2025, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

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 14:00 to 15:30. The dates can be found in the schedule in Ilias.

Examination dates: This is a "Prüfungsleistung anderer Art", consisting of a written and an oral part. The written exam is planned on 14th August 2024 from 8:00 am to 9:00 am. The oral examinations are expected to take place the two weeks before, i.e. in calendar weeks 31 and 32. An oral examination lasts 20 minutes.

Contact person: In the summer semester 2024, the contact persons for organisational matters are Maximilian Barlang and Alexander Ernst. Please contact us at
log-scm∂ifl.kit.edu

T 6.140 Course: Logistics and Supply Chain Management [T-WIWI-102870]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	2

Events					
ST 2025	2581996	Logistics and Supply Chain Management	2 SWS	Lecture / 🗣	Schultmann, Rosenberg
Exams					
WT 24/25	7981996	Logistics and Supply Chain Management			Schultmann

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110771 - Logistics and Supply Chain Management must not have been started.

Below you will find excerpts from events related to this course:

V Logistics and Supply Chain Management
2581996, SS 2025, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students are introduced to the methods and tools of logistics and supply chain management. They students learn the key terms and components of supply chains together with key economic trade-offs. In detail, students gain knowledge of decisions in supply chain management, such as facility location, supply chain planning, inventory management, pricing and supply chain cooperation. In this manner, students will gain knowledge in analyzing, designing and steering of decisions in the domain of logistics and supply chain management.

- Introduction: Basic terms and concepts
- Facility location and network optimization
- Supply chain planning I: flexibility
- Supply chain planning II: forecasting
- Inventory management & pricing
- Supply chain coordination I: the Bullwhip-effect
- Supply chain coordination II: double marginalization
- Supply chain risk management

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.141 Course: Machine Tools and High-Precision Manufacturing Systems [T-MACH-110963]

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

Part of: M-MACH-101286 - Machine Tools and Industrial Handling

Type	Credits	Grading scale	Recurrence	Version
Oral examination	9	Grade to a third	Each winter term	2

Events					
WT 24/25	2149910	Machine Tools and High-Precision Manufacturing Systems	6 SWS	Lecture / Practice (/ 🗣	Fleischer
Exams					
WT 24/25	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer
ST 2025	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.

Workload
270 hours

Below you will find excerpts from events related to this course:

V Machine Tools and High-Precision Manufacturing Systems — **Lecture / Practice (VÜ) On-Site**
2149910, WS 24/25, 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 6.142 Course: Macroeconomic Theory [T-WIWI-109121]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101501 - Economic Theory
M-WIWI-101668 - Economic Policy I
M-WIWI-106472 - Advanced Macroeconomics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 24/25	2560404	Macroeconomic Theory	2 SWS	Lecture / 🗣	Brumm
WT 24/25	2560405	Übung zu Macroeconomic Theory	1 SWS	Practice / 🗣	Pegorari
Exams					
WT 24/25	7900264	Macroeconomic Theory			Brumm

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Macroeconomic Theory
2560404, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This course introduces a modern approach to macroeconomics by building on microeconomic principles. To be able to rigorously address key macroeconomic questions a general framework based on intertemporal decision making is introduced. Starting by the principles of consumer and firm behavior, this framework is successively expanded by introducing market imperfections, monetary factors as well as international trade. With this framework at hand students are able to analyze labor market policies, government deficits, monetary policy, trade policy, and other important macroeconomic problems. Throughout the course, we not only point out the power of theory but also its limitations.

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 6.143 Course: Macroeconomics: Theory and Computation [T-WIWI-112735]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106472 - Advanced Macroeconomics

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each term	1

Competence Certificate
The assessment of success takes place in the form of an overall examination of 9 LP on the course Macroeconomic Theory and the course Computational Macroeconomics. The duration of the overall examination is 120 minutes. The examination is offered every semester and can be repeated at any regular examination date.

Annotation
Teaching and learning format: Lecture and exercise

Workload
270 hours

T 6.144 Course: Macro-Finance [T-WIWI-106194]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103120 - Financial Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Competence Certificate
The grade is based on an exam. The exam covers all the material that is taught in the current semester. The exam takes place in the last week of the lecture-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period).

Prerequisites
None.

Recommendation
None

Annotation
Teaching and learning format: Lecture and exercise

Workload
135 hours

6.145 Course: Management Accounting 1 [T-WIWI-102800]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2025	2579900	Management Accounting 1	2 SWS	Lecture / Online	Wouters
ST 2025	2579901	Tutorial Management Accounting 1 (Bachelor)	2 SWS	Practice / On-Site	Dickemann
ST 2025	2579902	Tutorial Management Accounting 1 (Master)	2 SWS	Practice / On-Site	Dickemann
Exams					
WT 24/25	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
WT 24/25	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (120 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Recommendation
We recommend that you take part in our exercise for the lecture.

Annotation
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 events related to this course:

V Management Accounting 1
2579900, SS 2025, 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.

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)**
2579901, SS 2025, 2 SWS, Language: English, Open in study portal
Practice (Ü)
On-Site

Content

see Module Handbook

V **Tutorial Management Accounting 1 (Master)**
2579902, SS 2025, 2 SWS, Language: English, Open in study portal
Practice (Ü)
On-Site

Content

see Module Handbook

T 6.146 Course: Management Accounting 2 [T-WIWI-102801]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 24/25	2579903	Management Accounting 2	2 SWS	Lecture / 🖥	Wouters
WT 24/25	2579904	Tutorial Management Accounting 2 (Bachelor)	2 SWS	Practice / 🗣	Letmathe
WT 24/25	2579905	Tutorial Management Accounting 2 (Master)	2 SWS	Practice / 🗣	Letmathe
Exams					
WT 24/25	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
WT 24/25	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters

Legend: 🖥 Online, ❁ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (120 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
It is recommended:

- to take part in the course "Management Accounting1" before this course
- participation in the exercise for the lecture "Management Accounting 2"

Annotation
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 events related to this course:

V Management Accounting 2 — **Lecture (V) Online**
2579903, WS 24/25, 2 SWS, Language: English, Open in study portal

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 24/25, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

V **Tutorial Management Accounting 2 (Master)** — **Practice (Ü) On-Site**
2579905, WS 24/25, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

T 6.147 Course: Management and Marketing [T-WIWI-111594]

Responsible: Prof. Dr. Martin Klarmann
Prof. Dr. Hagen Lindstädt
Prof. Dr. Petra Nieken
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105768 - Management and Marketing

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 24/25	2600023	Management	2 SWS	Lecture / 🗣	Nieken, Lindstädt, Terzidis
WT 24/25	2610026	Marketing	2 SWS	Lecture / 🗣	Klarmann
Exams					
WT 24/25	7900012	Management and Marketing			Nieken, Terzidis, Klarmann, Lindstädt
ST 2025	7900184	Management and Marketing			Nieken, Terzidis, Klarmann

Legend: 🖥 Online, ❖ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam (90 min) on the two courses "Management" and "Marketing". The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Prerequisites
None

Workload
150 hours

Below you will find excerpts from events related to this course:

V Marketing
2610026, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Ausführliche Literaturhinweise werden in den Materialen zur Vorlesung gegeben.

T 6.148 Course: Managing Organizations [T-WIWI-102630]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101425 - Strategy and Organization

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	4

Events					
WT 24/25	2577902	Managing Organizations	2 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 24/25	7900049	Managing Organizations			Lindstädt
ST 2025	7900066	Managing Organizations			Lindstädt

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 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

Below you will find excerpts from events related to this course:

V Managing Organizations
2577902, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

This course enables participants to make a sound assessment of existing organizational structures and regulations. Students learn concepts and models for designing organizational structures, regulating organizational processes, and managing organizational change.

Through intensive exposure to real-world case studies, students are encouraged to learn and apply strategic actions in real-world business settings. The course features an action-oriented approach and provides students with a realistic understanding of the possibilities and limitations of rational design approaches.

Content in Keywords:

- Fundamentals of organizational management: fundamental concepts and theoretical background knowledge
- Management of organizational structures and processes: Corporate headquarters, departmental organization, instruction structure and incentive systems
- Ideal organizational structures: organic vs. mechanistic, Mintzberg's types, relationship to strategy and 7S model
- Management of organizational change (change management): Change processes within an organization, management of revolutionary change

Structure:

Lectures in the course are available to students online as recordings, while class dates are reserved for active discussion of real-world case studies.

Learning Objectives:

Upon completion of the course, students will be able to,

- critically evaluate existing organizational structures and regulations
- compare alternative structural options in a practical setting and evaluate and interpret their effectiveness and efficiency
- analyze and evaluate change processes in organizational management
- apply theoretical knowledge in practical situations

Recommendations:

None.

Workload:

- Total workload for 3.5 credit points: approx. 105 hours
- Attendance time: 30 hours
- Self-study: 75 hours

Verification:

The assessment of success takes place in the form of a written examination (60min.) (according to §4(2), 1 SPO) at the beginning of the lecture-free period of the semester. The examination is offered every semester and can be repeated at any regular examination date.
A bonus can be earned through successful participation in the exercise. If the grade on the written exam 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 lecture.

Literature

- Laux, H.; Liermann, F.: *Grundlagen der Organisation*, Springer. 6. Aufl. Berlin 2005.
- Lindstädt, H.: *Organisation*, in Scholz, C. (Hrsg.): Vahlens Großes Personallexikon, Verlag Franz Vahlen. 1. Aufl. München, 2009.
- Schreyögg, G.: *Organisation. Grundlagen moderner Organisationsgestaltung*, Gabler. 4. Aufl. Wiesbaden 2003.

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

T 6.149 Course: Managing the Marketing Mix [T-WIWI-102805]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2025	2571152	Managing the Marketing Mix	2 SWS	Lecture / 🗣	Klarmann
ST 2025	2571153	Übung zu Marketing Mix (Bachelor)	1 SWS	Practice / 🗣	Daumann, Weber
Exams					
WT 24/25	7900061	Managing the Marketing Mix			Klarmann
ST 2025	7900023	Managing the Marketing Mix			Klarmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of success takes place through the preparation and presentation of a case study (max. 30 points) as well as a written exam with additional aids in the sense of an open book exam (max. 60 points). In total, a maximum of 90 points can be achieved in the course. Further details will be announced during the lecture.

Prerequisites
None

Annotation
The course is compulsory in the module "Foundations of Marketing".
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Workload
135 hours

Below you will find excerpts from events related to this course:

V Managing the Marketing Mix

2571152, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The content of this course concentrates on the elements of the marketing mix. Therefore the main chapters are brand management, pricing, promotion and sales management.

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

This course is compulsory within or the module "Foundations of Marketing" and must be examined.

Learning objectives:

student

- know the meaning of the branding, the brand positioning and the possibilities of the brand value calculation
- understand the price behavior of customers and can apply this knowledge to the practice
  know different methods for price determination (conjoint analysis, cost-plus determination, target costing, customer surveys, bidding procedures) and price differentiation
- are able to name and explain the relevant communication theories
- can identify crisis situations and formulate appropriate response strategies
- can name and judge different possibilities of the Intermediaplanung
- know various design elements of advertising communication
- understand the measurement of advertising impact and can apply it
- know the basics of sales organization
- are able to evaluate basic sales channel decisions

Workload:

The total workload for this course is approximately 135.0 hours.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 6.150 Course: Manufacturing Measurement Technology [T-ETIT-106057]

Responsible: Prof. Dr.-Ing. Michael Heizmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-106581 - Measurement, Control, and Manufacturing Measurement Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2025	2302116	Manufacturing Measurement Technology	2 SWS	Lecture /	Heizmann
Exams					
WT 24/25	7302116	Manufacturing Measurement Technology			Heizmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.151 Course: Manufacturing Technology [T-MACH-102105]

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

Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	3

Events					
WT 24/25	2149657	Manufacturing Technology	6 SWS	Lecture / Practice (/	Schulze
Exams					
WT 24/25	76-T-MACH-102105	Manufacturing Technology			Schulze
ST 2025	76-T-MACH-102105	Manufacturing Technology			Schulze

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written Exam (180 min)

Prerequisites
none

Workload
240 hours

Below you will find excerpts from events related to this course:

V Manufacturing Technology
2149657, WS 24/25, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content

The objective of the lecture is to look at manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to impart detailed process knowledge of the common processes. The lecture covers the basic principles of manufacturing technology and deals with the manufacturing processes according to their classification into main groups regarding technical and economic aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Quality control
- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming, plastics engineering)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing

This lucture provides an excursion to an industry company.

Learning Outcomes:

The students ...

- are capable to specify the different manufacturing processes and to explain their functions.
- are able to classify the manufacturing processes by their general structure and functionality according to the specific main groups.
- have the ability to perform a process selection based on their specific characteristics.
- are enabled to identify correlations between different processes and to select a process regarding possible applications.
- are qualified to evaluate different processes regarding specific applications based on technical and economic aspects.
- are experienced to classify manufacturing processes in a process chain and to evaluate their specific influence on surface integrity of workpieces regarding the entire process chain.

Workload:

regular attendance: 63 hours
self-study: 177 hours

Organizational issues

Vorlesungstermine montags und dienstags, Übungstermine mittwochs.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Die LV wird letztmalig im WS 2024/25 angeboten (Vorlesungsvideos bleiben online).

Die Prüfung wird für Erstschreiber letztmalig im SS 2025 und Wiederholer letztmalig im WS 2025/26 angeboten.

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 6.152 Course: Material Flow in Production and Logistics [T-MACH-112968]

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

Part of: M-MACH-106995 - Automation and Material Flow in Logistics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	4,5	Grade to a third	Each winter term	1 terms	2

Events					
ST 2025	2118181	Material flow in production and logistics	3 SWS	Lecture /	Furmans

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (approx. 20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Recommendation
none

Workload
135 hours

Below you will find excerpts from events related to this course:

V	Material flow in production and logistics 2118181, SS 2025, 3 SWS, Language: German, Open in study portal	Lecture (V) Blended (On-Site/Online)

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

Termine: (Doppelblock am Morgen: Vorlesungsblock: 9:45 - 13:00 Uhr**)**

- 22.04.2025
- 06.05.2025
- 20.05.2025
- 03.06.2025
- 17.06.2025
- 01.07.2025
- 15.07.2025
- 29.07.2025

Ort: IFL Selmayr-Hörsaal

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, …).

Literature

Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 7. Auflage 2019

T 6.153 Course: Material Science II for Business Engineers [T-MACH-102079]

Responsible: Dr.-Ing. Susanne Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-MACH-101262 - Emphasis Materials Science
M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2126782	Materials Science II for Business Engineers	2 SWS	Lecture / 🗣	Wagner
Exams					
WT 24/25	76-T-MACH-102079	Material Science II			Wagner, Schell, Bucharsky
ST 2025	76-T-MACH-102079	Material Science II for Business Engineers			Wagner, Schell, Bucharsky

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the winter term is carried out by a written or oral exam.

Prerequisites
The module *Material Science* has to be completed beforehand.

Workload
150 hours

Below you will find excerpts from events related to this course:

V Materials Science II for Business Engineers

2126782, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Weiterführende Literatur:

- Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
- Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
- Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
- Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7

6.154 Course: Materials Science I [T-MACH-102078]

Responsible: Dr.-Ing. Susanne Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101260 - Materials Science

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 24/25	2125760	Materials Science I	2 SWS	Lecture /	Wagner
Exams					
WT 24/25	76-T-MACH-102078	Materials Science I			Wagner, Schell, Bucharsky
ST 2025	76-T-MACH-102078	Materials Science I			Wagner, Schell, Bucharsky

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.

Prerequisites
None

Workload
90 hours

Below you will find excerpts from events related to this course:

V Materials Science I
2125760, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
Weiterführende Literatur:

Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7 .

6.155 Course: Mathematics I - Final Exam [T-MATH-111493]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Dr. Franz Nestmann
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-105754 - Mathematics 1

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	1

Exams			
WT 24/25	00027	Mathematics I - Final Exam	Nestmann, Last, Winter
ST 2025	7700050	Mathematics I - Final Exam	Winter, Nestmann, Last

T 6.156 Course: Mathematics I - Midterm Exam [T-MATH-111492]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Dr. Franz Nestmann
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-105754 - Mathematics 1

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	1

Exams			
WT 24/25	00070	Mathematics I - Midterm Exam	Nestmann, Last, Winter
ST 2025	7700053	Mathematics I - Midterm Exam	Winter, Nestmann, Last

T 6.157 Course: Mathematics II - Final Exam [T-MATH-111496]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Dr. Franz Nestmann
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-105756 - Mathematics 2

Type	Credits	Grading scale	Version
Written examination	3,5	Grade to a third	1

Exams			
WT 24/25	00021	Mathematics II - Final Exam	Nestmann, Winter, Last

T 6.158 Course: Mathematics II - Midterm Exam [T-MATH-111495]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Dr. Franz Nestmann
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-105756 - Mathematics 2

Type	Credits	Grading scale	Version
Written examination	3,5	Grade to a third	1

Exams			
WT 24/25	00020	Mathematics II - Midterm Exam	Nestmann, Winter, Last

T 6.159 Course: Mathematics III - Final Exam [T-MATH-111498]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Dr. Franz Nestmann
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-105757 - Mathematics 3

Type	Credits	Grading scale	Version
Written examination	4	Grade to a third	1

Exams			
WT 24/25	6700051	Mathematics III - Final Exam	Nestmann, Winter, Last
ST 2025	7700064	Mathematics III - Final Exam	Winter, Last, Nestmann

T 6.160 Course: Measurement and Control Technology [T-ETIT-112852]

Responsible: Prof. Dr.-Ing. Michael Heizmann
Prof. Dr.-Ing. Sören Hohmann

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-ETIT-106581 - Measurement, Control, and Manufacturing Measurement Technology

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each summer term	1 terms	1

Events					
ST 2025	2302300	Measurement and Control Technology	2 SWS	Lecture / 🗣	Heizmann, Hohmann, Piscol, Schmerbeck
ST 2025	2302301	Practice to 2302300 Measurement and Control Technology	2 SWS	Practice / 🗣	Heizmann, Hohmann, Schmerbeck, Piscol

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of success takes place in the form of a written examination lasting 120 minutes. The module grade is the grade of the written examination.

Prerequisites
none

T 6.161 Course: Mechanical Design A [T-MACH-112984]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106527 - Mechanical Design A

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	7	Grade to a third	Each winter term	1 terms	2

Events					
WT 24/25	2145170	Mechanical Design A	3 SWS	Lecture / On-Site	Matthiesen, Düser
WT 24/25	2145194	Tutorial for Mechanical Design A	1 SWS	Practice / On-Site	Matthiesen, Düser
Exams					
WT 24/25	76-T-MACH-112984	Mechanical Design A			Matthiesen, Düser
ST 2025	76T-MACH-112984	Mechanical Design A			Matthiesen, Düser

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written exam with a duration of 90 Minutes

Prerequisites
Admission to the exam only with succesful completion of Workshop Mechanical Design A (T-MACH-112981)

Recommendation
None

Annotation
Students are familiar with the basic machine elements of technical systems and are able to analyze them in a system context

Workload
180 hours

Below you will find excerpts from events related to this course:

V Mechanical Design A

2145170, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Students are introduced to fundamental topics in Mechanical Design A. The focus is on the analysis of existing systems and the development of knowledge for fundamental elements and functionality of technical systems. The course is divided into the following topics:

- Springs
- Technical systems
- Bearings
- Seals
- Component connection
- Gearbox

Literature
Alle genannten Bücher können über die KIT-Bibliothek in physischer Form oder als eBook eingesehen/bezogen werden.

- Konstruktionselemente des Maschinenbaus 1 - Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer; Springer Verlag, ISBN 978-3-662-66822-1 oder eBook ISBN 978-662-66823-8
- Konstruktionselemente des Maschinenbaus 2 - Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer; Springer Verlag, ISBN 978-3-662-67013-2 oder eBook ISBN 978-3-662-67014-9
- Technisches Zeichnen: Grundlagen, Normen, Beispiele, Darstellende Geometrie; Hoischen, Hans; Cornelson, ISBN 978-3-064-52361-6

V **Tutorial for Mechanical Design A**
2145194, WS 24/25, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Content
Specific applications and tasks in the subject areas of MKL A:

- Springs
- Technical systems
- Bearings
- Seals
- Component connection
- Gearbox

Literature
Alle genannten Bücher können über die KIT-Bibliothek in physischer Form oder als eBook eingesehen/bezogen werden.

- Konstruktionselemente des Maschinenbaus 1 - Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer; Springer Verlag, ISBN 978-3-662-66822-1 oder eBook ISBN 978-662-66823-8
- Konstruktionselemente des Maschinenbaus 2 - Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer; Springer Verlag, ISBN 978-3-662-67013-2 oder eBook ISBN 978-3-662-67014-9
- Technisches Zeichnen: Grundlagen, Normen, Beispiele, Darstellende Geometrie; Hoischen, Hans; Cornelson, ISBN 978-3-064-52361-6

T 6.162 Course: Mechanical Design A, Workshop [T-MACH-112981]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106527 - Mechanical Design A

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each winter term	1 terms	2

Events					
WT 24/25	2145171	Mechanical Design A - Workshop	1 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
WT 24/25	76-T-MACH-112981	Mechanical Design A, Workshop			Düser, Matthiesen

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendation
None

Annotation
None

Workload
60 hours

Below you will find excerpts from events related to this course:

V Mechanical Design A - Workshop

2145171, WS 24/25, 1 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
In addition to the MD A lecture, the students are familiarized with the design process in a series of three workshops. The focus here is on application-oriented learning and understanding. For example, the students independently disassemble and assemble small demonstrator systems and thus gain a better understanding of the relevant problems in the field of mechanical design.

Organizational issues
Dauer eines Workshop Slots: 1,5 h (Informationen zu den Terminen und der Anmeldung im MKL A ILIAS Kurs)

Literature
Alle genannten Bücher können über die KIT-Bibliothek in physischer Form oder als eBook eingesehen/bezogen werden.

- Konstruktionselemente des Maschinenbaus 1 - Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer; Springer Verlag, ISBN 978-3-662-66822-1 oder eBook ISBN 978-662-66823-8
- Konstruktionselemente des Maschinenbaus 2 - Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer; Springer Verlag, ISBN 978-3-662-67013-2 oder eBook ISBN 978-3-662-67014-9
- Technisches Zeichnen: Grundlagen, Normen, Beispiele, Darstellende Geometrie; Hoischen, Hans; Cornelson, ISBN 978-3-064-52361-6

T 6.163 Course: Mechatronical Systems and Products (mach/etit/wiwi) [T-MACH-112647]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106236 - Mechatronic Product Design

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 24/25	2303003	Exercises for 2303161 Mechatronical Systems and Products	1 SWS	Practice / 🗣	Matthiesen, Hohmann
WT 24/25	2303161	Mechatronical Systems and Products	2 SWS	Lecture / 🔀	Matthiesen, Hohmann
ST 2025	2303003	Exercises for 2303161 Mechatronical Systems and Products	1 SWS	Practice / 🗣	Matthiesen, Hohmann
ST 2025	2303161	Mechatronical Systems and Products	2 SWS	Lecture / 🔀	Matthiesen, Hohmann

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam (60 min)

Workload
120 hours

T 6.164 Course: Metal Forming [T-MACH-105177]

Responsible: Prof. Dr.-Ing. Thomas Herlan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2025	2150681	Metal Forming	2 SWS	Lecture / 🗣	Herlan
Exams					
ST 2025	76-T-MACH-105177	Metal Forming			Herlan

Legend: 🖥 Online, 🗘 Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Metal Forming
2150681, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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

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 6.165 Course: Microactuators [T-MACH-101910]

Responsible: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Events					
ST 2025	2142881	Microactuators	2 SWS	Lecture / 🗣	Kohl
Exams					
WT 24/25	76-T-MACH-101910	Microactuators			Kohl
ST 2025	76-T-MACH-101910	Microactuators			Kohl

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
T-MACH-114036 must not be started

Workload
120 hours

Below you will find excerpts from events related to this course:

V Microactuators

2142881, SS 2025, 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: Micrognippers, 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 6.166 Course: Microeconometrics [T-WIWI-112153]

Responsible: Prof. Dr. Fabian Krüger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics
M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Exams			
WT 24/25	7700004	Microeconometrics	Krüger

Competence Certificate
The assessment consists of a written examination (60 minutes). 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

Recommendation
Students are expected to have a good working knowledge of the linear regression model (e.g. by having attended the course `Volkswirtschaftslehre III: Einführung in die Ökonometrie', or attending it in the same semester as `Microeconometrics').

Annotation
The course will be offered in the summer semester 2024.

Workload
135 hours

6.167 Course: Mobile Machines [T-MACH-105168]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	8	Grade to a third	Each summer term	2

Events					
ST 2025	2114073	Mobile Machines	4 SWS	Lecture / 🗣	Geimer, Kazenwadel
Exams					
WT 24/25	76T-MACH-105168	Mobile Machines			Geimer
ST 2025	76-T-MACH-105168	Mobile Machines			Geimer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
The assessment consists of an oral exam (45 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
none

Recommendation
Knowledge in Fluid Power Systems is required. It is recommended to attend the course *Fluid Power Systems* [2114093] beforehand.

Annotation
Learning objectives:

After successful participation in the course:

- the student will be able to name the wide range of mobile machinery
- know the possible applications and operating sequences of the most important mobile machines
- be able to describe selected subsystems and components

Content:

- Presentation of the components used and the most important mobile machines
- Basics and structure of the machines
- Practical insights into the development of the machines

Media:

Downloadable set of slides for the lecture

Book "Grundlagen mobiler Arbeitsmaschinen", Karlsruhe series of publications on vehicle systems technology, Volume 22, KIT Scientific Publishing

Workload
240 hours

Below you will find excerpts from events related to this course:

V **Mobile Machines** — **Lecture (V)** **On-Site**
2114073, SS 2025, 4 SWS, Language: German, Open in study portal

Content

- Introduction of the required components and machines
- Basics of the structure of the whole system
- Practical insight in the development techniques

Knowledge in Fluid Power is required.

Recommendations:

It is recommended to attend the course *Fluid Power Systems* [2114093] beforehand.

- regular attendance: 42 hours
- self-study: 184 hours

6.168 Course: Mobility and Infrastructure [T-BGU-101791]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101067 - Mobility and Infrastructure

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	9	Grade to a third	Each term	1 terms	2

Events					
ST 2025	6200404	Spatial Planning and Planning Law	2 SWS	Lecture /	Wilske
ST 2025	6200405	Exercises to Spatial Planning and Planning Law	1 SWS	Practice /	Wilske, Mitarbeiter/innen
ST 2025	6200406	Transportation Systems	2 SWS	Lecture /	Vortisch
ST 2025	6200407	Exercises to Transportation Systems	1 SWS	Practice /	Vortisch, Mitarbeiter/innen
ST 2025	6200408	Design Basics in Highway Engineering	2 SWS	Lecture /	Zimmermann, Stelzenmüller
ST 2025	6200409	Exercises to Design Basics in Highway Engineering	1 SWS	Practice /	Zimmermann, Stelzenmüller
Exams					
WT 24/25	8234101791	Mobility and Infrastructure			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam, 150 min.

Prerequisites
None

Recommendation
For students from the KIT-Department of Economics and Management it is recommended to take part in the excercises.

Annotation
none

Workload
275 hours

T 6.169 Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	4

Events					
ST 2025	2550490	Modellieren und OR-Software: Einführung	3 SWS	Practical course /	Nickel, Linner, Pomes, Subas
Exams					
WT 24/25	7900081	Modeling and OR-Software: Introduction			Nickel
ST 2025	7900153	Modeling and OR-Software: Introduction			Nickel

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The assessment is a written examination (60 min.). The examination is held in every semester.

Recommendation
Firm knowledge of the contents from the lecture *Introduction to Operations Research I* [2550040] of the module *Operations Research.*

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered in every term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Modellieren und OR-Software: Einführung

2550490, SS 2025, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, ...), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis. Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

Organizational issues
Die Teilnehmerzahl für diese Veranstaltung ist begrenzt.

Die Bewerbung erfolgt über das Wiwi-Portal

Der Bewerbungszeitraum ist vom 07.03.25 bis zum 30.03.25.

Die Kick-Off Veranstaltung findet am 30.04.25 um 09:45 Uhr statt.

T 6.170 Course: Nonlinear Optimization I [T-WIWI-102724]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR
M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 24/25	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 24/25	2550112	Exercises Nonlinear Optimization I	1 SWS	Practice / 🗣	Stein, Schwarze, Neussel
Exams					
WT 24/25	7900001_WS2425_HK	Nonlinear Optimization I			Stein
ST 2025	7900202_SS2025_NK	Nonlinear Optimization I			Stein

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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.

Annotation
Part I and II of the lecture are held consecutively in the *same* semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization I
2550111, WS 24/25, 2 SWS, Language: German, 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, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- 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 6.171 Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	6

Events					
WT 24/25	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 24/25	2550112	Exercises Nonlinear Optimization I	1 SWS	Practice / 🗣	Stein, Schwarze, Neussel
WT 24/25	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 24/25	7900003_WS2425_HK	Nonlinear Optimization I and II			Stein
ST 2025	7900204_SS2025_NK	Nonlinear Optimization I and II			Stein

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consits of a written exam (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.

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization I
2550111, WS 24/25, 2 SWS, Language: German, 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, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- 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 24/25, 2 SWS, Language: German, 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, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- 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 6.172 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 24/25	2550112	Exercises Nonlinear Optimization I	1 SWS	Practice / 🗣	Stein, Schwarze, Neussel
WT 24/25	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 24/25	7900002_WS2425_HK	Nonlinear Optimization II			Stein
ST 2025	7900203_SS2025_NK	Nonlinear Optimization II			Stein

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consits 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 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.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization II
2550113, WS 24/25, 2 SWS, Language: German, 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, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- 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 6.173 Course: Novel Actuators and Sensors [T-MACH-102152]

Responsible: Prof. Dr. Manfred Kohl
Dr. Martin Sommer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	4

Events					
WT 24/25	2141865	Novel actuators and sensors	2 SWS	Lecture / 🗣	Kohl, Sommer
Exams					
WT 24/25	76-T-MACH-102152	Novel Actuators and Sensors			Kohl, Sommer
ST 2025	7600010	Novel Actuators and Sensors			Kohl
ST 2025	76-T-MACH-102152	Novel Actuators and Sensors			Sommer, Kohl

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 minutes

Prerequisites
T-MACH-114036 must not be started

Workload
120 hours

Below you will find excerpts from events related to this course:

V Novel actuators and sensors

2141865, WS 24/25, 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 6.174 Course: Optimization under Uncertainty [T-WIWI-106545]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 24/25	2550464	Optimization Under Uncertainty	2 SWS	Lecture / Blended	Rebennack
WT 24/25	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	1 SWS	Practice / On-Site	Rebennack
WT 24/25	2550466		2 SWS	Others (sons	Rebennack
Exams					
WT 24/25	7900240	Optimization under Uncertainty			Rebennack
ST 2025	7900309	Optimization under Uncertainty			Rebennack

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
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

6.175 Course: Optoelectronic Components [T-ETIT-101907]

Responsible: Prof. Dr.-Ing. Sebastian Randel
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2309486	Optoelectronic Components	2 SWS	Lecture / 🧩	Randel
ST 2025	2309487	Optoelectronic Components (Tutorial)	1 SWS	Practice / 🧩	Randel
Exams					
WT 24/25	7309486	Optoelectronic Components			Randel
ST 2025	7309486	Optoelectronic Components			Randel

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

Annotation
This course is recommended for Master programs. For details, see description of M-ETIT-100509 "Optoelectronic Components".

T 6.176 Course: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 6.177 Course: PH APL-ING-TL02 [T-WIWI-106292]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 6.178 Course: PH APL-ING-TL03 [T-WIWI-106293]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 6.179 Course: PH APL-ING-TL04 ub [T-WIWI-106294]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 6.180 Course: PH APL-ING-TL05 ub [T-WIWI-106295]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 6.181 Course: PH APL-ING-TL06 ub [T-WIWI-106296]

Organisation: University

Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 6.182 Course: PH APL-ING-TL07 [T-WIWI-108384]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 6.183 Course: Physical Basics of Laser Technology [T-MACH-102102]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	5

Events					
WT 24/25	2181612	Physical basics of laser technology	3 SWS	Lecture / Practice (/	Schneider
Exams					
WT 24/25	76-T-MACH-102102	Physical Basics of Laser Technology			Schneider
ST 2025	76-T-MACH-102102	Physical Basics of Laser Technology			Schneider

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral examination (ca. 25-30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with brick Laser Material Processing [T-MACH-112763], brick Laser Application in Automotive Engineering [T-MACH-105164] and brick Physical Basics of Laser Technology [T-MACH-109084].

Recommendation
Basic knowledge of physics, chemistry and material science

Workload
150 hours

Below you will find excerpts from events related to this course:

V Physical basics of laser technology

2181612, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Based on the description of the physical basics about the formation and the properties of laser light the lecture goes through the different types of laser beam sources used in industry these days. The lecture focuses on the usage of lasers especially in materials engineering. Other areas like measurement technology or medical applications are also mentioned.

- physical basics of laser technology
- laser beam sources (solid state, diode, gas, liquid and other lasers)
- beam properties, guiding and shaping
- lasers in materials processing
- lasers in measurement technology
- lasers for medical applications
- savety aspects

The lecture is complemented by a tutorial.

The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of different laser sources.
- can describe the influence of laser, material and process parameters for the most important methods of laser-based materials processing and choose laser sources suitable for specific applications.
- can illustrate the possible applications of laser sources in measurement and medicine technology
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

regular attendance: 33,5 hours
self-study: 116,5 hours

The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

It is allowed to select only one of the lectures "Laser in automotive engineering" (2182642) or "Physical basics of laser technology" (2181612) during the Bachelor and Master studies.

Organizational issues
Termine für die Übung werden in der Vorlesung bekannt gegeben!

Literature
M. W. Sigrist: Laser: Theorie, Typen und Anwendungen, 2018, Springer Spektrum

T. Graf: Laser - Grundlagen der Laserstrahlerzeugung 2015, Springer Vieweg

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

H. Hügel, T. Graf: Materialbearbeitung mit Laser, 2023, Springer Vieweg

J. Eichler, H.-J. Eichler: Lasers - Basics, Advances and Applications, 2018, Springer

W. T. Silfvast: Laser Fundamentals, 2008, Cambridge University Press

W. M. Steen: Laser Material Processing, 2010, Springer

R. Poprawe, et al.: Tailored Light 1 - High Power Lasers for Production, 2018, Springer

R. Poprawe, et al.: Tailored Light 2 - Laser Applications, 2024, Springer

T 6.184 Course: Physics for Engineers [T-MACH-100530]

Responsible: Prof. Dr. Martin Dienwiebel
Prof. Dr. Peter Gumbsch
apl. Prof. Dr. Alexander Nesterov-Müller
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2025	2142890	Physics for Engineers	4 SWS	Lecture / Practice (/	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch
Exams					
ST 2025	76-T-MACH-100530	Physics for Engineers			Gumbsch, Weygand, Nesterov-Müller, Dienwiebel

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam 90 min

Prerequisites
none

Workload
150 hours

Below you will find excerpts from events related to this course:

V Physics for Engineers

2142890, SS 2025, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

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).

Organizational issues
Kontakt: daniel.weygand@kit.edu

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 6.185 Course: Platform Economy [T-WIWI-107506]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101421 - Supply Chain Management
M-WIWI-101434 - eBusiness and Service Management
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	3

Events					
WT 24/25	2540468	Platform Economy	2 SWS	Lecture / 🗣	Weinhardt, Fegert
WT 24/25	2540469	Übung zu Platform Economy	1 SWS	Practice / 🗣	Stano
Exams					
WT 24/25	7900213	Platform Economy			Weinhardt

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment. The assessment is carried out in the form of a one-hour written examination and by carrying out a case study. Details on the assessment will be announced during the lecture.

Prerequisites
see below

Recommendation
None

Workload
135 hours

Below you will find excerpts from events related to this course:

V Platform Economy
2540468, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

The lecture kick-off this Semester will take place on the 29th of October 2024.

Lecture and Exercise

The "Platform Economy" lecture provides a broad range of knowledge related to online platforms and their business models, examining their significance for users, operators, and society as a whole. The course is structured into 8 topical blocks, each exploring a different aspect of the platform economy in depth. Each block is led by a different lecturer who is an expert in the respective topic. The key topics covered in the lecture include:

Network Effects and Two-Sided Markets

- Business Models and Auctions
- Energy Market Engineering
- Digital Involvement: Crowd X & Citizen Science
- Digital Democracy and Social Media
- Analyzing User Behavior
- Trust and Reputation in Digital Platforms
- Ethical Considerations in the Platform Economy

To reinforce the lecture material, each block is accompanied by interactive exercises that encourage a deeper understanding of the topics. In these exercises, students will engage in discussions and explore practical examples that illustrate the theoretical concepts introduced during the lectures. The lecture and exercise also offer a chance to get an idea of the lectures offered during the master's program at our chair.

Case Study

In addition to the lectures, you will work on a case study in small groups. Your task will be to develop a business model for an innovative and novel online platform, which will be presented to you by one of our experts, either from the academic team or the industry. This case study offers a chance to gain deeper insights into current trends in the platform economy and to apply the knowledge acquired throughout the course in a practical, hands-on way.

Literature

- Bundesministerium für Wirtschaft und Energie (2017). „Kompetenzen für eine digitale Sourveränität“(abrufbar unter https://www.bmwi.de/Redaktion/DE/Publikationen/Studien/kompetenzen-fuer-eine-digitale-souveraenitaet.html)
- Bundesministerium für Wirtschaft und Energie (2017). „Weißbuch Digitale Plattformen.“ (abrufbar unter https://www.bmwi.de/Redaktion/DE/Publikationen/Digitale-Welt/weissbuch-digitale-plattformen.pdf?__blob=publicationFile&v=8)
- Easley, D., and Kleinberg, J. 2010. “Network Effects,” in Networks, Crowds, and Markets: Reasoning about a Highly Connected World, Cambridge University Press, pp. 509–542.
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T 6.186 Course: Polymer Engineering I [T-MACH-102137]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	2

Events					
WT 24/25	2173590	Polymer Engineering I	2 SWS	Lecture / 🗣	Liebig
Exams					
WT 24/25	76-T-MACH-102137	Polymer Engineering I			Liebig
ST 2025	76-T-MACH-102137	Polymer Engineering I			Liebig

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
T-MACH-114007 must not have been started

Workload
120 hours

Below you will find excerpts from events related to this course:

V Polymer Engineering I

2173590, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Economical aspects of polymers
2. Introductiom of mechanical,
chemical end electrical properties
3. Processing of polymers
(introduction)
4. Material science of polymers
5. Synthesis

learning objectives:

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material "polymer" meeting its requirements in an economical and ecological way.

The students

- are able to describe and classify polymers
based on the fundamental synthesis processing techniques
- can find practical applications for state-of-the-art polymers and manufacturing technologies
- are able to apply the processing techniques, the application of polymers and polymer composites regarding to the basic principles of material science
- can describe the special mechanical, chemical and elctrical prooperties of polymers and correlate these properties to the chemical bindings.
- can define application areas and the limitation in the use of polymers

requirements:
none

workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.

T 6.187 Course: Polymer Engineering II [T-MACH-102138]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2025	2174596	Polymer Engineering II	2 SWS	Lecture / 🗣	Liebig
Exams					
WT 24/25	76-T-MACH-102138	Polymerengineering II			Liebig
ST 2025	76-T-MACH-102138	Polymerengineering II			Liebig

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
T-MACH-114007 must not be started.

Recommendation
Knowledge in Polymerengineering I

Workload
120 hours

Below you will find excerpts from events related to this course:

V **Polymer Engineering II** — **Lecture (V) On-Site**
2174596, SS 2025, 2 SWS, Language: German, Open in study portal

Content
1. Processing of polymers
2. Properties of polymer components
Based on practical examples and components
2.1 Selection of material
2.2 Component design
2.3 Tool engineering
2.4 Production technology
2.5 Surface engineering
2.6 Sustainability, recycling

learning objectives:

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, that the students gather knowledge and technical skills to use the material "polymer" meeting its requirements in an economical and ecological way.

The students

- can describe and classify different processing techniques
  and can exemplify mould design principles based on technical parts.
- know about practical applications and processing of polymer parts
- are able to design polymer parts according to given restrictions
- can choose appropriate polymers based on the technical requirements
- can decide how to use polymers regarding the production, economical and ecological requirements

requirements:
Polymerengineering I
workload:

The workload for the lecture Polymerengineering II is 120 h per semester and consists of the presence during the lecture (21 h) as well as preparation and rework time at home (99 h).

Literature
Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.

Recommended literature and selected official lecture notes are provided in the lecture.

T 6.188 Course: Power Generation [T-ETIT-101924]

Responsible: Dr.-Ing. Bernd Hoferer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-106821 - Electric Energy Systems and Power Generation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	2

Events					
WT 24/25	2307356	Power Generation	2 SWS	Lecture / 🗣	Hoferer
Exams					
WT 24/25	7307356	Power Generation			Hoferer
ST 2025	7307356	Power Generation			Hoferer

Legend: 🖥 Online, ✿ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 6.189 Course: Practical Seminar: Digital Services [T-WIWI-110888]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102752 - Fundamentals of Digital Service Systems
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	1

Competence Certificate
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion. In the seminar, a maximum score of 60 points can be achieved, consisting of

- maximum 25 points for the documentation (written examination)
- maximum 25 points for the practical assessment
- maximum 10 points for the participation during the discussion sessions

The practical seminar is passed when at least a score of 30 points is achieved.

Prerequisites
None

Recommendation
None

Annotation
The current range of seminar topics is announced on the following Website:
www.dsi.iism.kit.edu.

T 6.190 Course: Practical Seminar: Interactive Systems [T-WIWI-111914]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105928 - HR Management & Digital Workplace
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 24/25	2540555	Practical Seminar: Interactive Systems	3 SWS	Lecture /	Mädche
ST 2025	2540555	Practical Seminar: Interactive Systems	3 SWS	Lecture /	Mädche
Exams					
WT 24/25	7900367	Practical Seminar: Interactive Systems			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment.

The assessment of this course consists of the implementation of a practical component, the preparation of a written documentation, and active participation in the discussions.

A total of 60 points can be achieved, of which:

- maximum 25 points for the written documentation
- maximum 25 points for the practical component
- maximum 10 points for active participation in the discussions

A minimum of 30 points must be achieved to pass this course.

Please note that a practical component, such as conducting a survey or implementing an application, is also part of the course. Please refer to the institute website issd.iism.kit.edu for the current offer of practical seminar theses.

Workload
135 hours

Below you will find excerpts from events related to this course:

V Practical Seminar: Interactive Systems

2540555, SS 2025, 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

T 6.191 Course: Practical Seminar: Platform Economy [T-WIWI-112154]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Competence Certificate
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 (e.g. implementation of a prototype) 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.

Annotation
Teaching and learning format: Seminar

Workload
135 hours

T 6.192 Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
WT 24/25	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
ST 2025	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
Exams					
WT 24/25	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology			Last

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam

Prerequisites
none

Below you will find excerpts from events related to this course:

V Introduction to Microsystem Technology - Practical Course
2143875, WS 24/25, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

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, WS 24/25, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

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 2025, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content

In the practical training includes ten experiments:

1. Röntgenoptik
2. UVL + REM
3. Mischerbauteil
4. Rasterkraftmikroskopie
5. 3D-Printing
6. Lichtstreuung an Chrommasken
7. Abformung
8. SAW-Biosensorik
9. Nano3D-Drucker - Materialtransfer dünnster Schichten
10. Elektrospinning

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 in den Laboren des IMT am CN statt. Treffpunkt: Bau 301, vor dem Eingang.

Teilnahmeanfragen an arndt.last@kit.edu

Literature

Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 6.193 Course: Principles of Whole Vehicle Engineering [T-MACH-114075]

Responsible: Dr. Manfred Harrer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each term	1

Exams			
ST 2025	76-T-MACH-114075	Principles of Whole Vehicle Engineering	Harrer

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
T-MACH-114095 - Fundamentals of Automobile Development must not be started.

Workload
120 hours

T 6.194 Course: Principles of Whole Vehicle Engineering [T-MACH-114095]

Responsible: Dr. Manfred Harrer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each term	1

Exams			
ST 2025	76-T-MACH-114095	Principles of Whole Vehicle Engineering	Harrer

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
T-MACH-114075 – Grundsätze der PKW-Entwicklung must not be started.

Workload
120 hours

6.195 Course: Problem Solving, Communication and Leadership [T-WIWI-102871]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101425 - Strategy and Organization

Type	Credits	Grading scale	Recurrence	Version
Written examination	2	Grade to a third	Each summer term	2

Events					
ST 2025	2577910	Problem solving, communication and leadership	1 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 24/25	7900070	Problem Solving, Communication and Leadership			Lindstädt
ST 2025	7900068	Problem Solving, Communication and Leadership			Lindstädt

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (30 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

Below you will find excerpts from events related to this course:

V **Problem solving, communication and leadership** — **Lecture (V) On-Site**
2577910, SS 2025, 1 SWS, Language: German, Open in study portal

Content

The course highlights the aspects of problem solving and communication by first providing a structured look at how problem solving processes work. Participants will be empowered to identify, structure, analyze and communicate problems effectively. In addition, they are introduced to precise concepts for systematically structuring problem-solving processes. They learn how to apply and analyze structured communication in diagrams and presentations.

In addition, the course teaches key leadership concepts and frameworks that address the influence of situation, leadership personality and characteristics of those being led. Driven by current and practical perspectives, the course thus aims to teach cross-disciplinary skills.

In addition, through intensive interaction via selected case studies, participants are prepared for the practical application of what they have learned in various professional contexts.

Structure

The lectures of the course are available to students online as recordings, while the course dates are reserved for active discussion of practice-relevant case studies.

Learning Objectives

Upon completion of the course, students will be able to,

- structure problem-solving processes,
- apply the principles of goal-oriented communication in diagrams and presentations,
- Understand leadership decisions and place them in the context of situation and personality.

Recommendations:

None.

Workload:

- Total workload for 2 credit hours: approximately 30*2 hours.
- Thereof attendance time: 12-14 hours
- Remainder for preparation and post-processing as well as exam preparation.

Evidence:

Depending on further pandemic developments, the exam will be offered in the summer semester 2021 either as an open-book exam (exam performance of other kind according to SPO § 4 Abs. 2, Pkt. 3), or as a 60-minute written exam (written exam according to SPO § 4 Abs. 2, Pkt. 1).

It is expected that the exam will take place at the beginning of the semester's lecture-free period.

The examination is offered every semester and can be repeated at any regular examination date.

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

Literature

Verpflichtende Literatur:

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

Ergänzende Literatur:

- Hungenberg, Harlad: Problemlösung und Kommunikation, 3. Aufl. München 2010

- Zelazny, Gene; Delker, Christel: Wie aus zahlen Bilder werden, 6. Aufl. Wiesbaden 2008

- Minto, Barbara: Das Prinzip der Pyramide: Ideen klar, verständlich und erfolgreich kommunizieren. 2005

T 6.196 Course: Procedures of Remote Sensing [T-BGU-103542]

Responsible: Dr.-Ing. Uwe Weidner
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Version
Oral examination	3	Grade to a third	2

Events					
ST 2025	6020243	Procedures of Remote Sensing	2 SWS	Lecture / 🗣	Weidner

Legend: 🖥 Online, ❂ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.197 Course: Procedures of Remote Sensing, Prerequisite [T-BGU-101638]

Responsible: Dr.-Ing. Uwe Weidner
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	1

Events					
ST 2025	6020244	Procedures of Remote Sensing, Excercise	1 SWS	Practice / 🗣	Weidner
Exams					
ST 2025	8284101638	Procedures of Remote Sensing, Prerequisite			Weidner

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

Workload
30 hours

T 6.198 Course: Process Fundamentals by the Example of Food Production [T-CIWVT-106058]

Responsible: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Grading scale	Version
Written examination	3	Grade to a third	2

Events					
WT 24/25	2211110	Process Fundamentals by the Example of Food Production	2 SWS	Lecture / 🗣	Gaukel
Exams					
WT 24/25	7220007	Process fundamentals by the example of food production			Gaukel

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The examination will be offered for the last time for first-time writers in the winter semester 2024/2025. A last examination opportunity for repeaters (no admission for first-time writers) will be offered in the summer semester 2025.

The assessment is a written examination lasting 120 minutes.

Prerequisites
none

T 6.199 Course: Product- and Production-Concepts for Modern Automobiles [T-MACH-110318]

Responsible: Dr. Stefan Kienzle
Dr. Dieter Steegmüller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture /	Steegmüller, Kienzle
Exams					
WT 24/25	76-T-MACH-110318	Product- and Production-Concepts for modern Automobiles			Steegmüller, Kienzle

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
T-MACH-105166 - Materials and Processes for Body Leightweight Construction in the Automotive Industry must not have been started.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Product- and Production-Concepts for modern Automobiles

2149670, WS 24/25, 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 6.200 Course: Production Economics and Sustainability [T-WIWI-102820]

Responsible: Prof. Dr. Frank Schultmann
Dr.-Ing. Rebekka Volk
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2581960	Production Economics and Sustainability	2 SWS	Lecture / 🗣	Volk, Schultmann, Bischof
Exams					
WT 24/25	7981960	Production Economics and Sustainability			Schultmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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 events related to this course:

V Production Economics and Sustainability

2581960, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The analysis and management of material flows on the company level and above will be the focus of this lecture. Herein, the discussion will be about cost-effective and environmentally acceptable steps to avoid, abate and recycle emissions and waste as well as ways of efficient resources handling. As methods material flow analysis (MFA), life cycle assessment (LCA) and OR methods, e.g. for decision support, are introduced.

Topics:
- regulations related to materials and substances
- raw materials, reserves and their availabilities/lifetimes
- material and substance flow analysis (MFA/SFA)
- material related ecoprofiles, e.g. Carbon Footprint
- LCA
- resource efficiency
- emission abatement
- waste management and closed-loop recycling
- raw material oriented production systems
- environmental management (EMAS, ISO 14001, Ecoprofit), eco-controlling

Organizational issues
Seminarraum Uni-West, Geb. 06.33

Literature
wird in der Veranstaltung bekannt gegeben

6.201 Course: Production Technology for E-Mobility [T-MACH-110984]

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

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	2

Events					
ST 2025	2150605	Production Technology for E-Mobility	2 SWS	Lecture / 🗣	Fleischer
Exams					
WT 24/25	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer
ST 2025	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Production Technology for E-Mobility
2150605, SS 2025, 2 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. To apply what has been learned, practical appointments are taking place at the Karlsruhe Forschungsfabrik as part of the course.

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

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.

Zwei der Veranstaltungstermine finden in Form von Praktika in der Forschungsfabrik statt. Hier sollen die Studierenden das in der Vorlesung vermittelte Wissen durch praktische Tätigkeiten an Demonstratoranlagen der Brennstoffzellenfertigung anwenden. Diese sollen auch die kreative Lösungskompetenz der Studierenden fördern. Die Teilnahme an den Praxiseinheiten wird für die Teilnahme an der Prüfung vorausgesetzt.

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.

Two of the course dates take the form of practical training in the Forschungsfabrik. Here, students will apply the knowledge imparted in the lectures by carrying out practical tasks on demonstrator systems for fuel cell production. These are also designed to foster students' creative problem-solving skills. Participation in the practical units is a prerequisite for taking the exam.

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/)

6.202 Course: Production, Logistics and Information Systems [T-WIWI-111602]

Responsible: Prof. Dr. Wolf Fichtner
Prof. Dr. Andreas Geyer-Schulz
Prof. Dr. Alexander Mädche
Prof. Dr. Stefan Nickel
Prof. Dr. Frank Schultmann
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105770 - Production, Logistics and Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 24/25	2600004		2 SWS	Lecture	Mädche
WT 24/25	2600005	Produktion und Logistik	2 SWS	Lecture / 🗣	Fichtner, Nickel, Schultmann
WT 24/25	2610029		2 SWS	Tutorial (	Nickel
Exams					
WT 24/25	7900154	Production, Logistics and Information Systems			Schultmann, Nickel, Weinhardt, Mädche, Geyer-Schulz, Fichtner
ST 2025	7900077	Production, Logistics and Information Systems			Schultmann, Nickel, Fichtner, Weinhardt, Mädche, Geyer-Schulz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
Written Exam (90 min). The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Workload
150 hours

Below you will find excerpts from events related to this course:

V 2600004, WS 24/25, 2 SWS, Open in study portal **Lecture (V)**

T 6.203 Course: Project in Applied Remote Sensing [T-BGU-101814]

Responsible: Prof. Dr.-Ing. Stefan Hinz
Dr.-Ing. Uwe Weidner

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Version
Completed coursework	1	pass/fail	1

Events					
ST 2025	6020245	Project Exercise Applied Remote Sensing	2 SWS	Practice / 🗣	Hinz, Weidner, Wursthorn
Exams					
ST 2025	8284101814	Project in Applied Remote Sensing			Weidner

Legend: 🖥 Online, ❊ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Workload
30 hours

T 6.204 Course: Project Internship Additive Manufacturing: Development and Production of an Additive Component [T-MACH-110960]

Responsible: Prof. Dr.-Ing. Frederik Zanger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each winter term	2

Events					
WT 24/25	2149700	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	2 SWS	Practical course / 🗣	Zanger, Frey
ST 2025	2149700	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	2 SWS	Practical course / 🗣	Zanger, Frey
Exams					
WT 24/25	76-T-MACH-110960	Project Internship Aditive Manufacturing: Development and Production of an Additive Component			Zanger
ST 2025	76-T-MACH-110960	Project Internship Additive Manufacturing: Development and Production of an Additive Component			Zanger

Legend: 🖥 Online, ✲ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative test achievement (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
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Project Internship Aditive Manufacturing: Development and Production of an Additive Component

Practical course (P)
On-Site

2149700, WS 24/25, 2 SWS, Language: German, Open in study portal

Content

The lecture "Project Internship Additive Manufacturing: Development and Production of an Additive Component" combines the basics of metallic laser powder bed fusion (LPBF) with a development project in cooperation with an industrial company.
The students learn the basics of the following topics in the project-related lecture:

- Influence of different process variables on the component quality of parts produced in the LPBF process
- Preparation and simulation of the LPBF process
- Production of additive metallic components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- CAM for subtractive rewor

The topics addressed in the course will be applied practically in various workshops on the individual topics and transferred to the developmental task in self-study.
Finally, the results of the elaborations are produced additively and post-processed subtractively.

Learning Outcomes:

The students ...

- are able to describe the properties and applications of the additive manufacturing processes laser powder bed fusion (LPBF).
- are able to select the appropriate manufacturing process for a technical application.
- are able to describe and implement the creation of a product along the entire additive process chain (CAD, simulation, work preparation, CAM) from the idea to the production.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- are able to perform topology optimization.
- are able to simulate the additive process, compensate for process-related distortions and determine the ideal alignment on the building platform.
- are able to create necessary support structures for the additive process and to derive a building order file.
- are able to create a CAM model for the subtractive rework process of additive parts.

Workload:

regular attendance: 12 hours
self-study: 108 hours

Organizational issues

Die Veranstaltung beginnt mit einer Blockveranstaltung vor Semesterbeginn. Während des Semesters finden nur einzelne Pflichtveranstaltungen statt. Die genauen Termine werden über die Vorlesungsankündigung des wbk mitgeteilt: http://www.wbk.kit.edu/studium-und-lehre.php

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Der Link zur Bewerbung wird in der Vorlesungsankündigung über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php) zur Verfügung gestellt.

Literature

Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

V	**Project Internship Aditive Manufacturing: Development and Production of an Additive Component** 2149700, SS 2025, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **On-Site**

Content
The lecture "Project Internship Additive Manufacturing: Development and Production of an Additive Component" combines the basics of metallic laser powder bed fusion (LPBF) with a development project in cooperation with an industrial company.
The students learn the basics of the following topics in the project-related lecture:

- Influence of different process variables on the component quality of parts produced in the LPBF process
- Preparation and simulation of the LPBF process
- Production of additive metallic components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- CAM for subtractive rewor

The topics addressed in the course will be applied practically in various workshops on the individual topics and transferred to the developmental task in self-study.
Finally, the results of the elaborations are produced additively and post-processed subtractively.

Learning Outcomes:

The students ...

- are able to describe the properties and applications of the additive manufacturing processes laser powder bed fusion (LPBF).
- are able to select the appropriate manufacturing process for a technical application.
- are able to describe and implement the creation of a product along the entire additive process chain (CAD, simulation, work preparation, CAM) from the idea to the production.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- are able to perform topology optimization.
- are able to simulate the additive process, compensate for process-related distortions and determine the ideal alignment on the building platform.
- are able to create necessary support structures for the additive process and to derive a building order file.
- are able to create a CAM model for the subtractive rework process of additive parts.

Workload:

regular attendance: 12 hours
self-study: 108 hours

Organizational issues
Die Veranstaltung beginnt mit einer Blockveranstaltung vor Semesterbeginn. Während des Semesters finden nur einzelne Pflichtveranstaltungen statt. Die genauen Termine werden über die Vorlesungsankündigung des wbk mitgeteilt: http://www.wbk.kit.edu/studium-und-lehre.php

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Der Link zur Bewerbung wird in der Vorlesungsankündigung über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php) zur Verfügung gestellt.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

T 6.205 Course: Project Management [T-BGU-101675]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101004 - Fundamentals of Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each term	1 terms	2

Events					
WT 24/25	6200106	Project Management	2 SWS	Lecture / Practice (/	Haghsheno, Schneider, John, Gloser
Exams					
WT 24/25	8230101675	Project Management (graded)			Haghsheno, Schneider

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam with 60 minutes

Prerequisites
None

Recommendation
None

Annotation
None

Workload
90 hours

Below you will find excerpts from events related to this course:

V Project Management

6200106, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
This course provides a comprehensive introduction to (construction) project management. It takes a closer look at the organisation and delivery of a construction project from the client's perspective. In this context, a range of competences are presented that should be on hand for the successful execution of project management. In addition, we present a selection of project management methods for individual competences and illustrate them with case studies.

Organizational issues
Vorlesungen: Mittwochs vom 23.10.2024 bis 12.02.2025, jeweils 09:45 – 11:15 Uhr (hybrid)

Übungen: Asynchron ab 13.11.2024, 04.12.2024, 08.01.2025, 05.02.2025 (online)

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
- 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.
- KOCHENDÖRFER, Bernd; LIEBCHEN, Jens H.; VIERING, Markus G. (2021) *Bau-Projekt-Management: Grundlagen und Vorgehensweisen*, 6. Auflage, Springer Vieweg, Wiesbaden
- SCHULZ, Markus (2020) *Projektmanagement: Zielgerichtet. Effizient. Klar.*, 2. Auflage, UVK Verlag, Tübingen

T 6.206 Course: Project Workshop: Automotive Engineering [T-MACH-102156]

Responsible: Dr.-Ing. Michael Frey
Dr.-Ing. Martin Gießler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles
M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each term	1

Events					
WT 24/25	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture / 🗣	Gießler, Frey
ST 2025	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture / 🗣	Gießler, Frey

Legend: 🖥 Online, ⯐ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Workload
180 hours

Below you will find excerpts from events related to this course:

V Project Workshop: Automotive Engineering

2115817, WS 24/25, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Learning Objectives:

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Organizational issues

Begrenzte Teilnehmerzahl mit Auswahlverfahren, in deutscher Sprache. Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.
Termin und Raum: siehe Institutshomepage.

Limited number of participants with selection procedure, in German language. Please send the application at the end of the previous semester

Date and room: see homepage of institute.

Literature

Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

Skripte werden beim Start-up Meeting ausgegeben.

The scripts will be supplied in the start-up meeting.

V	**Project Workshop: Automotive Engineering** 2115817, SS 2025, 3 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Learning Objectives:

The students are familiar with typical industrial development processes and working style. They are able to apply knowledge gained at the university to a practical task. They are able to analyze and to judge complex relations. They are ready to work self-dependently, to apply different development methods and to work on approaches to solve a problem, to develop practice-oriented products or processes.

Organizational issues

Begrenzte Teilnehmerzahl mit Auswahlverfahren, die Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.

Raum und Termine: s. Aushang bzw. Homepage

Literature

Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

Skripte werden beim Start-up Meeting ausgegeben.

T 6.207 Course: Public Law I & II [T-INFO-110300]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-105084 - Public and Civil Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
WT 24/25	2424016	Öffentliches Recht I - Grundlagen	2 SWS	Lecture / 🗣	Zufall
ST 2025	24520	Öffentliches Recht II - Öffentliches Wirtschaftsrecht	2 SWS	Lecture / 🗣	Zufall
Exams					
WT 24/25	7500138	Public Law I & II			Zufall
ST 2025	7500298	Public Law I & II			Zufall

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.208 Course: Public Revenues [T-WIWI-102739]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101403 - Public Finance
M-WIWI-101499 - Applied Microeconomics
M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2025	2560120	Public Revenues	2 SWS	Lecture / 🗣	Wigger
ST 2025	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice / 🗣	Wigger, Schmelzer
Exams					
WT 24/25	790oeff	Public Revenues			Wigger
ST 2025	790oeff	Public Revenues			Wigger

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V Public Revenues
2560120, SS 2025, 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 6.209 Course: Python Algorithms for Vehicle Technology [T-MACH-110796]

Responsible: Stephan Rhode
Organisation:
Part of: M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	2114862	Python Algorithms for Automotive Engineering	2 SWS	Lecture / Blended	Rhode
Exams					
ST 2025	76-T-MACH-110796	Python Algorithm for Vehicle Technology			Rhode

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Python Algorithms for Automotive Engineering
2114862, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Teaching content:

- Introduction to Python and useful tools and libraries for creating algorithms, graphical representation, optimization, symbolic arithmetic and machine learning
  - Anaconda, Pycharm, Jupyter
  - NumPy, Matplotlib, SymPy, Scikit-Learn
- Methods and tools for creating software
  - Version management GitHub, git
  - Testing software pytest, Pylint
  - Documentation Sphinx
  - Continuous Integration (CI) Travis CI
  - Workflows in Open Source and Inner Source, Kanban, Scrum
- Practical programming projects to:
  - Road sign recognition
  - Vehicle state estimation
  - Calibration of vehicle models by mathematical optimization
  - Data-based modelling of the powertrain of an electric vehicle

Objectives:

The students have an overview of the programming language Python and important Python libraries to solve automotive engineering problems with computer programs. The students know current tools around Python to create algorithms, to apply them and to interpret and visualize their results. Furthermore, the students know
basics in the creation of software to be used in later programming projects in order to develop high-quality software solutions in teamwork. Through practical programming projects (road sign recognition, vehicle state estimation, calibration, data-based modelling), the students can perform future complex tasks from the area of driver assistance systems.

Organizational issues

Die Vorlesung beginnt mit zwei Kick-Off Veranstaltung in Präsenz am 25.04. sowie am 09.05.2025 um 11:30 Uhr am Campus Ost, Geb.70.04, Raum 219. Die restlichen Termine finden überwiegend digital statt. Weitere Infos über ILIAS.

Literature

- A Whirlwind Tour of Python, Jake VanderPlas, Publisher: O'Reilly Media, Inc. Release Date: August 2016, ISBN: 9781492037859 link
- Scientific Computing with Python 3, Olivier Verdier, Jan Erik Solem, Claus Führer, Publisher: Packt Publishing, Release Date: December 2016, ISBN: 9781786463517 link
- Introduction to Machine Learning with Python, Sarah Guido, Andreas C. Müller, Publisher: O'Reilly Media, Inc., Release Date: October 2016, ISBN: 9781449369880, link
- Clean Code, Robert C. Martin, Publisher: Prentice Hall, Release Date: August 2008, ISBN: 9780136083238, link

T 6.210 Course: Quality Management [T-MACH-102107]

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

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	3

Events					
WT 24/25	2149667	Quality Management	2 SWS	Lecture / Blended	Lanza, Stamer
Exams					
WT 24/25	76-T-MACH-102107	Quality Management			Lanza
ST 2025	76-T-MACH-102107	Quality Management			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
It is not possible to combine this brick with brick Quality Management [T-MACH-112586].

Workload
120 hours

Below you will find excerpts from events related to this course:

V Quality Management

2149667, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
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 6.211 Course: Rail System Technology [T-MACH-102143]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101274 - Rail System Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each term	6

Events					
WT 24/25	2115919	Rail System Technology	2 SWS	Lecture / 🗣	Cichon
WT 24/25	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🗣	Cichon
ST 2025	2115919	Rail System Technology	2 SWS	Lecture / 🗣	Cichon
ST 2025	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🗣	Cichon
Exams					
WT 24/25	76-T-MACH-102143	Rail System Technology			Cichon
ST 2025	76-T-MACH-102143	Rail System Technology			Cichon

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
writen examination in German language
Duration. 120 minutes
No tools or reference materials may be used during the exam except calculator and dictionary

Prerequisites
none

Workload
270 hours

Below you will find excerpts from events related to this course:

V Rail System Technology
2115919, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 Vehicle Technology
2115996, WS 24/25, 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 System Technology** 2115919, SS 2025, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

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
ab SS 2024 schriftliche Prüfung

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 2025, 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
ab SS 2024 schriftliche Prüfung

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

T 6.212 Course: Rapid Industrialization of Immature Products using the Example of Electric Mobility [T-MACH-113031]

Responsible: Dr. Jörg Bauer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	2149621	Rapid Industrialization of Immature Products using the Example of Electric Mobility	2 SWS	Lecture / 🗣	Bauer
Exams					
WT 24/25	76-T-MACH-113031	Rapid Industrialization of Immature Products using the Example of Electric Mobility			Bauer
ST 2025	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

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Rapid Industrialization of Immature Products using the Example of Electric Mobility
Lecture (V)
On-Site

2149621, WS 24/25, 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 im Januar/Februar 2025. Termine und Ort werden online bekannt gegeben. (http://www.wbk.kit.edu/studium-und-lehre.php).

Block course in January/February 2025. Timetable and location will be published online. (http://www.wbk.kit.edu/studium-und-lehre.php).

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 6.213 Course: Remote Sensing, Exam [T-BGU-101636]

Responsible: Prof. Dr. Jan Cermak
Prof. Dr.-Ing. Stefan Hinz
Dr.-Ing. Uwe Weidner

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2025	6020241	Remote Sensing Systems	1 SWS	Lecture / 🗣	Hinz, Cermak
ST 2025	6020242	Remote Sensing Systems, Excercise	1 SWS	Practice / 🗣	Bork-Unkelbach
ST 2025	6020243	Procedures of Remote Sensing	2 SWS	Lecture / 🗣	Weidner
ST 2025	6020244	Procedures of Remote Sensing, Excercise	1 SWS	Practice / 🗣	Weidner
Exams					
WT 24/25	8284101636	Remote Sensing, exam			Hinz, Weidner, Pauli
ST 2025	8284101636	Remote Sensing, exam			Weidner, Hinz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Recommendation
None

Workload
120 hours

T 6.214 Course: Renewable Energy-Resources, Technologies and Economics [T-WIWI-100806]

Responsible: Prof. Dr. Patrick Jochem
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	8

Events					
WT 24/25	2581012	Renewable Energy – Resources, Technologies and Economics	2 SWS	Lecture / 🗣	Jochem
Exams					
WT 24/25	7981012	Renewable Energy-Resources, Technologies and Economics			Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes, in English, answers are possible in German or English) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Renewable Energy – Resources, Technologies and Economics

2581012, WS 24/25, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
1. General introduction: Motivation, Global situation

2. Basics of renewable energies: Energy balance of the earth, potential definition

3. Hydro

4. Wind

5. Solar

6. Biomass

7. Geothermal

8. Other renewable energies

9. Promotion of renewable energies

10. Interactions in systemic context

11. Excursion to the "Energieberg" in Mühlburg

Learning Goals:

The student

- understands the motivation and the global context of renewable energy resources.
- gains detailed knowledge about the different renewable resources and technologies as well as their potentials.
- understands the systemic context and interactions resulting from the increased share of renewable power generation.
- understands the important economic aspects of renewable energies, including electricity generation costs, political promotion and marketing of renewable electricity.
- is able to characterize and where required calculate these technologies.

Organizational issues
Blockveranstaltung, freitags 14:00-17:00 Uhr, 25.10., 08.11., 22.11., 06.12., 20.12., 17.01., 31.01. 14.02.

Literature
Weiterführende Literatur:

- Kaltschmitt, M., 2006, Erneuerbare Energien : Systemtechnik, Wirtschaftlichkeit, Umweltaspekte, aktualisierte, korrigierte und ergänzte Auflage Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg.
- Kaltschmitt, M., Streicher, W., Wiese, A. (eds.), 2007, Renewable Energy: Technology, Economics and Environment, Springer, Heidelberg.
- Quaschning, V., 2010, Erneuerbare Energien und Klimaschutz : Hintergründe - Techniken - Anlagenplanung – Wirtschaftlichkeit München : Hanser, Ill.2., aktualis. Aufl.
- Harvey, D., 2010, Energy and the New Reality 2: Carbon-Free Energy Supply, Eathscan, London/Washington.
- Boyle, G. (ed.), 2004, Renewable Energy: Power for a Sustainable Future, 2nd Edition, Open University Press, Oxford.

T 6.215 Course: Seminar Application of Artificial Intelligence in Production [T-MACH-112121]

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

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	5

Events					
ST 2025	2150910	Seminar Application of Artificial Intelligence in Production	2 SWS	Seminar / 🗣	Fleischer
Exams					
ST 2025	76-T-MACH-112121	Seminar Application of Artificial Intelligence in Production			Fleischer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
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

Recommendation
Previous participation in the lecture 2149921 "Artificial Intelligence in Production" or advanced knowledge of Python.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Seminar Application of Artificial Intelligence in Production — Seminar (S) On-Site
2150910, SS 2025, 2 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 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 25.04.2025.
Alle nachfolgenden Termine werden über Ilias (https://ilias.studium.kit.edu/) bekanntgegeben.

Die Teilnehmerzahl für die Lehrveranstaltung ist begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Informationen zur Bewerbung und zum Ablauf der Lehrveranstaltung werden auf der Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php) bereitgestellt.

The number of participants for the course is limited. Consequently, a selection process will take place. Information on how to apply and how the course will be run will be provided on the wbk homepage (https://www.wbk.kit.edu/english/education.php).

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

Materialien zur Lehrveranstaltung werden über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Course materials will be provided onIlias (https://ilias.studium.kit.edu/).

6.216 Course: Seminar Data-Mining in Production [T-MACH-108737]

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

Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	2

Events					
WT 24/25	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🗣	Lanza
Exams					
WT 24/25	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Annotation
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 events related to this course:

V **Seminar Data Mining in Production** — **Seminar (S) On-Site**
2151643, WS 24/25, 2 SWS, Language: German, Open in study portal

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 6.217 Course: Seminar in Business Administration (Bachelor) [T-WIWI-103486]

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	00063	Seminar Social Sentiment in Times of Crises	2 SWS	Seminar	Fegert
WT 24/25	2500006	Digital Citizen Science	2 SWS	Seminar /	Greif-Winzrieth
WT 24/25	2500045	Digital Democracy - Challenges and Opportunities of the Digital Society	2 SWS	Seminar /	Fegert, Stein, Bezzaoui, Pekkip
WT 24/25	2500061	Special Topics in Transportation Strategy	2 SWS	Seminar /	Müller
WT 24/25	2500125	Human-Centered Systems Seminar: Engineering	2 SWS	Seminar /	Mädche
WT 24/25	2500165	Student2Startup	2 SWS	Seminar /	Böhrer, Mohammadi
WT 24/25	2500215	Entrepreneurship Seasonal School	2 SWS	Block /	Weimar
WT 24/25	2530580	Seminar in Finance (Bachelor)	2 SWS	Seminar /	Uhrig-Homburg
WT 24/25	2530586			Seminar /	Uhrig-Homburg, Molnar
WT 24/25	2540473	Business Data Analytics	2 SWS	Seminar /	Grote, Schulz, Motz
WT 24/25	2540475	Positive Information Systems	2 SWS	Seminar /	Knierim, del Puppo
WT 24/25	2540478	Smart Grids and Energy Markets	2 SWS	Seminar /	Weinhardt, Semmelmann, Miskiw
WT 24/25	2540524	Bachelor Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz, Nazemi
WT 24/25	2540557	Human-Centered Systems Seminar: Research	2 SWS	Seminar /	Mädche
WT 24/25	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar /	Hirte
WT 24/25	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar /	Wohlfeil, Wohlfeil
WT 24/25	2571180	Seminar in Marketing and Sales (Bachelor)	2 SWS	Seminar /	Klarmann, Mitarbeiter
WT 24/25	2573010	Seminar: Human Resources and Organizations (Bachelor)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 24/25	2573011	Seminar: Human Resource Management (Bachelor)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 24/25	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar /	Wouters, Dickemann
WT 24/25	2581030	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Sloot
WT 24/25	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar /	Schultmann, Rudi
WT 24/25	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar /	Volk, Schultmann
WT 24/25	2581978	Seminar in Production and Operations Management	2 SWS	Seminar /	Schultmann, Rosenberg
WT 24/25	2581979	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Kleinebrahm
WT 24/25	2581980	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Sandmeier
WT 24/25	2581981	Seminar in Energy Economics	2 SWS	Seminar /	Ardone, Fichtner, Slednev

ST 2025	00063	Seminar Social Sentiment in Times of Crises	2 SWS	Seminar	Fegert
ST 2025	2500020	Digital Democracy - Challenges and opportunities of the digital society	2 SWS	Seminar /	Fegert
ST 2025	2500056	ABBA Summer School Seminar: Biosignal-Adaptive GenAI Systems	2 SWS	Seminar /	Mädche
ST 2025	2500061	Special Topics in Transportation Strategy	2 SWS	Seminar /	Müller
ST 2025	2500125	Human-Centered Systems Seminar: Engineering	3 SWS	Seminar /	Mädche
ST 2025	2530293	Seminar in Finance (Bachelor, Prof. Ruckes)	2 SWS	Seminar /	Ruckes, Luedecke, Benz, Kohl, Sarac
ST 2025	2540468	Bachelor Seminar: AI-Driven Information Systems	2 SWS	Seminar /	Pfeiffer, Bennardo
ST 2025	2540473	Business Data Analytics	2 SWS	Seminar	Hariharan
ST 2025	2540475	Positive Information Systems	2 SWS	Seminar	Knierim
ST 2025	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Weinhardt
ST 2025	2540524	Bachelor Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2025	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar /	Mädche, Beigl
ST 2025	2540557	Human-Centered Systems Seminar: Research	3 SWS	Seminar /	Mädche
ST 2025	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar /	Hirte, Terzidis
ST 2025	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar /	Wohlfeil, Terzidis
ST 2025	2571187	Seminar Digital Marketing (Bachelor)	2 SWS	Seminar /	Kupfer
ST 2025	2573010	Seminar Human Resources and Organizations (Bachelor)	2 SWS	Seminar /	Nieken, Mitarbeiter, Walther
ST 2025	2573011	Seminar Human Resource Management (Bachelor)	2 SWS	Seminar /	Nieken, Mitarbeiter, Gorny
ST 2025	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar /	Letmathe
ST 2025	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar /	Fichtner, Sloot
ST 2025	2581031	Seminar Energiewirtschaft V	2 SWS	Seminar /	Plötz
ST 2025	2581032	Seminar Energiewirtschaft VI	2 SWS	Seminar /	Slednev, Fichtner
ST 2025	2581976	Seminar Produktionswirtschaft und Logistik I	2 SWS	Seminar /	Schultmann, Rudi
ST 2025	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar /	Volk, Schultmann
ST 2025	2581978	Seminar Produktionswirtschaft und Logistik III	2 SWS	Seminar /	Schultmann
ST 2025	2581979	Seminar Energiewirtschaft I	2 SWS	Seminar /	Fichtner, Kleinebrahm
ST 2025	2581981	Seminar Energiewirtschaft III	2 SWS	Seminar /	Ardone, Fichtner
Exams					
WT 24/25	00064	Seminar Social Sentiment in Times of Crises			Weinhardt
WT 24/25	00072	Seminar Positive Information Systems			Weinhardt
WT 24/25	00074	Seminar Business Data Analytics			Weinhardt
WT 24/25	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 24/25	7900069	Human-Centered Systems Seminar: Engineering			Mädche
WT 24/25	7900085	Entrepreneurship Basics (Track 1)			Terzidis
WT 24/25	7900087	Entrepreneurship Basics (Track 2)			Terzidis
WT 24/25	7900129	Special Topics in Transportation Strategy			Lindstädt
WT 24/25	7900138	Seminar in Marketing and Sales (Bachelor)			Klarmann
WT 24/25	7900146	Entrepreneurship Seasonal School			Terzidis

WT 24/25	7900157	Seminar Human Resources and Organizations (Bachelor)	Nieken
WT 24/25	7900161	Seminar Human Resource Management (Bachelor)	Nieken
WT 24/25	7900168	Bachelor Seminar in Data Science and Machine Learning	Geyer-Schulz
WT 24/25	7900175	Seminar in Finance: How Retail Investors Influence Stock Markets - The Game Stop Case	Uhrig-Homburg
WT 24/25	7900203	Seminar "Finance in a nutshell"	Uhrig-Homburg
WT 24/25	7900233	Human-Centered Systems Seminar: Research	Mädche
WT 24/25	7900309	Student2Startup	Terzidis
WT 24/25	7900335	Seminar Energy Economics IV	Fichtner
WT 24/25	79-2579919-B	Seminar Management Accounting - Sustainability Topics (Bachelor)	Wouters
WT 24/25	7981976	Seminar in Production and Operations Management I	Schultmann
WT 24/25	7981977	Seminar in Production and Operations Management II	Schultmann
WT 24/25	7981978	Seminar in Production and Operations Management III	Schultmann
WT 24/25	7981979	Seminar Energy Economics I	Fichtner
WT 24/25	7981980	Seminar Energy Economics II	Fichtner
WT 24/25	7981981	Seminar Energy Economics III	Fichtner
ST 2025	7900003	Seminar in Finance (Bachelor, Prof. Ruckes)	Ruckes
ST 2025	7900100	Seminar Human Resource Management (Bachelor)	Nieken
ST 2025	7900230	Seminar Human Resources and Organizations (Bachelor)	Nieken
ST 2025	792581030	Seminar Energy Economics IV	Fichtner
ST 2025	792581031	Seminar Energy Economics V	Plötz
ST 2025	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2025	7981977	Seminar in Production and Operations Management II	Schultmann
ST 2025	7981979	Seminar Energy Economics I	Fichtner
ST 2025	7981981	Seminar Energy Economics III	Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
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.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
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 events related to this course:

V **Student2Startup**
2500165, WS 24/25, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

Content:

In this seminar, five pre-seed startup projects will define strategic challenges and ask students to work on solutions. Mentors from the industry will support the teams. In addition to a kick-off and final event, we will organize regular seminar sessions to provide background and help the student teams in their tasks.

Learning Objectives:

After completing this course, the course participants will be able to

- Understand and apply basic concepts of entrepreneurship, including business modeling, lean startup approaches, and market analysis
- Work in a team, organize the division of labor into separate tasks, and coordinate the tasks to attain a result
- Understand specific challenges of startup projects
- Interact with experts from the industry and potential users to develop answers/solutions to a given challenge
- Present the results to the startups and experts from the industry

Exam:

Team presentation at the final event, detailed presentation appendix with background information, and active participation in all sessions

Target group:

Bachelor students

Organizational issues

Registration is via the Wiwi-Portal.

In the seminar, you will work on a project in teams of max five people. The groups are formed in the seminar.

V	**Entrepreneurship Seasonal School** 2500215, WS 24/25, 2 SWS, Language: English, Open in study portal	**Block (B)** **On-Site**

Content

During the Entrepreneurship Seasonal School, students develop a business model based on innovative technologies and social problems in workshops in international teams for one week.

Course Content:

The Entrepreneurship Seasonal School brings together students from different universities to spend a week strengthening their knowledge of digital entrepreneurship in healthcare. Experience the life of an entrepreneur and learn how to attain resources to realize a product vision. During one week, you will develop a range of entrepreneurial competences crucial for establishing a successful venture. Our primary focus is on digital healthcare ventures, granting you the opportunity to delve into the realm of entrepreneurship within the healthcare system. By 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.

In WS 2023/24 the one-week program is being hosted by the Karlsruhe Institute of Technology, with co-teaching support from the Eucor partners University of Basel and the University of Strasbourg.

In the seminar you will work on a project in teams of max. 5 persons.

Learning Objectives:

After attending the event, you will be able to...

- describe the role of entrepreneurship
- develop innovative and technology-based solutions for societal problems,
- develop a viable business model for a problem,
- present a business idea to a panel of judges,
- and be empowered to work independently in multidisciplinary and multicultural teams

Organizational issues

Expected date: 17.02.25 – 21.02.25, Details will be announced later. Registration via wiwi portal.

V	2530586, WS 24/25, 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 21.10.24 um 16 Uhr, Zwischenpräsentation am 10.12.24, 16 Uhr und Abschlusspräsentation am 21.01.25, 17:45 Uhr am Campus B (Geb. 09.21), Raum 209

V **Business Data Analytics**

2540473, WS 24/25, 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 **Bachelor Seminar in Data Science and Machine Learning**

2540524, WS 24/25, 2 SWS, Language: German, Open in study portal

Seminar (S)

Literature

Weiterführende Literatur:

- W. Thomson. A Guide for the Young Economist. The MIT Press, 2001
- D.J. Brauner, H.-U. Vollmer. Erfolgreiches wissenschaftliches Arbeiten. Verlag Wissenschaft & Praxis, 2004
- University of Chicago Press. The Chicago Manual of Style. University of Chicago Press, 13th ed., 1982
- American Psychological Association. Concise of Rules of APA Style. American Psychological Association, 2005
- American Psychological Association. Publication Manual of the American Psychological Association. American Psychological Association, 2001

V **Entrepreneurship Basics (Track 1)**

2545010, WS 24/25, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Course Content:

This seminar explains important factors for becoming an entrepreneur and guides you through a structured process from the first business idea to a pitch of your final business model. Therefore, a business idea will be developed in the context of the UN Sustainable Development Goals. In small teams you create, develop, validate and present your business model. It simulates the basics of a start-up process up to the investor pitch.

Learning Objectives

After completing this course, the course participants will be able to

- Reflect on and define your personal and team core values
- Reflect on and define your personal and team competencies
- Reflect on and recall a definition for business opportunity
- Define your field of interest for opportunity recognition using the UN SDGs
- Analyze a specific domain to identify business opportunities
- Develop a first draft for your business model by using the Business Model Canvas
- Pitch / present your business idea

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

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 **Entrepreneurship Basics (Track 2)** — **Seminar (S)** **Blended (On-Site/Online)**
2545011, WS 24/25, 2 SWS, Language: English, Open in study portal

Content
Course Content:

The seminar introduces the basics of planning and modeling of business ideas. Based on a structured process, you will be guided through the development of your own business ideas, the derivation and testing of initial business model hypotheses, and the final creation of a business plan. In small teams you will create, develop, validate and present your business model. The basic steps of a start-up process are simulated.

Learning Objectives

After completing this seminar, students will have learned and actually practiced the whole business model development process. In particular this means that students will know:

- how business ideas are created and how they can be developed
- what the value proposition of a business idea is
- how a business model hypothesis can be generated and tested
- which successful business model patterns exist and how they can be used for one's own business
- how to pitch business ideas and convince potential investors

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

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 **Seminar: Human Resources and Organizations (Bachelor)** — **Seminar (S)** **On-Site**
2573010, WS 24/25, 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: Human Resource Management (Bachelor)** 2573011, WS 24/25, 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 Management Accounting - Sustainability Topics** 2579919, WS 24/25, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

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	**ABBA Summer School Seminar: Biosignal-Adaptive GenAI Systems** 2500056, SS 2025, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Background: In the ABBA Summer School Seminar hosted at the Karlsruhe Decision & Design Lab (KD^{2}Lab) at KIT, we aim to enable students to explore biosignal sensors for designing user-adaptive systems. This comprehensive three-day program is designed for both bachelor's and master's students who want to gain an understanding of biosignal and the development of user-adaptive systems. The learning objective is to design human-centered biosignal-adaptive systems to address user needs in learning scenarios.

Course Content: Throughout the summer school, students will learn the foundations of biosignal-adaptive systems through a series of lectures and apply the knowledge in practical group work. For the group work, we offer students two contexts for their research topics: literature research during thesis writing and programming with LLM. Aiming to address user challenges in these two contexts, we provide two biosignal sensors: EEG or eye-tracking sensors. By collecting biosignal data with the sensors, we encourage students to integrate cutting-edge AI algorithms for their design and implementation. In the end, students should present their results to showcase the functionality, innovation, and a prototype of their biosignal-adaptive systems.

Learning Outcome: By successfully achieving the learning objective, students will receive a certificate from KIT and will have the opportunity to apply their acquired skills and knowledge for further research.

The seminar will be held in a three-day format from 23th to 25th September with 3 ECTS. For any questions, please ask Luke (shi.liu@kit.edu) for more information!

V	**Human-Centered Systems Seminar: Engineering** 2500125, SS 2025, 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 **Bachelor Seminar: AI-Driven Information Systems**
2540468, SS 2025, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This bachelor seminar explores information systems that leverage AI algorithms from multiple perspectives: While some topics examine these systems from a managerial viewpoint, others take a design-oriented approach. For example, one topic explores how sensor data can enhance system intelligence to assist consumers during their purchasing decisions. Another investigates how collaboration in digital work is affected when intelligent assistance systems serve as fully virtual advisors. Additionally, some topics are situated in virtual reality, reflecting one of the key research areas of our research group.

This seminar is offered by the newly established Information Systems III research group headed by Prof. Dr. Jella Pfeiffer at the Institute for Information Systems (WIN). To learn more about us, please visit our website (WIN - Information Systems III).

V **User-Adaptive Systems Seminar**
2540553, SS 2025, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
User-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 user-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 user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-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**
2540557, SS 2025, 3 SWS, Language: English, Open in study portal

Seminar (S)
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 Basics (Track 1)** 2545010, SS 2025, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Content

This seminar explains important factors for becoming an entrepreneur and guides you through a structured process from the first business idea to a pitch of your final business model. Therefore, a business idea will be developed in the context of the UN Sustainable Development Goals. In small teams you create, develop, validate and present your business model. It simulates the basics of a start-up process up to the investor pitch.

Learning Objectives

After completing this course, the course participants will be able to

- Reflect on and define your personal and team core values
- Reflect on and define your personal and team competencies
- Reflect on and recall a definition for business opportunity
- Define your field of interest for opportunity recognition using the UN SDGs
- Analyze a specific domain to identify business opportunities
- Develop a first draft for your business model by using the Business Model Canvas
- Pitch / present your business idea

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

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 **Entrepreneurship Basics (Track 2)**
2545011, SS 2025, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Course Content:

This seminar shows what is important for entrepreneurs and it guides you through a structured process from the first business idea to a pitch of your final business model. In teams you create, develop, validate and present your business model. It partially simulates a start-up process up to the investor pitch.

Starting with a rough business idea, you learn to understand and validate the customer problems. Together with your teammates and the feedback from the other teams and the lecturer, you will create a sharp business model by using tools like the Value Proposition Canvas, the Business Model Canvas and customer interviews. With some further information about rapid prototyping and structuring a pitch and a one-pager for business angels, you will learn, how to present the developed business. This seminar is teamwork. You grow as a team, learn to communicate and to work efficient in a team so all your results (the pitch and the written outline) are presented by the team.

Learning Objectives

- Learning of entrepreneurial skills.
- Understanding of value creation importance.
- Experience on how to derive and test hypothesis.
- Transition from ideas to a business model that works.
- Leaning how to pitch and to convince investors.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

Organizational issues
Registration is via the Wiwi-Portal.

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.

V **Seminar Human Resources and Organizations (Bachelor)**
2573010, SS 2025, 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

V	**Seminar Human Resource Management (Bachelor)** 2573011, SS 2025, 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 Management Accounting - Sustainability Topics** 2579919, SS 2025, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

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.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

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.

Note:

- Maximum of 8 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

T 6.218 Course: Seminar in Economics (Bachelor) [T-WIWI-103487]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	2520405	Topics in Experimental Economics		Seminar /	Reiß, Peters
WT 24/25	2520561	Wirtschaftstheoretisches Seminar I (Bachelor)	2 SWS	Seminar /	Puppe, Ammann, Kretz, Okulicz
WT 24/25	2520562	Wirtschaftstheoretisches Seminar II (Bachelor)	2 SWS	Seminar /	Puppe, Ammann, Kretz
WT 24/25	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Rüter
WT 24/25	2560130	Seminar Public Finance	2 SWS	Seminar /	Wigger, Schmelzer
WT 24/25	2560140	Seminar Game Theory and Behavioral Economics (Bachelor)	2 SWS	Seminar /	Rau, Rosar
WT 24/25	2560141	AI and Digitization for Society (Bachelor)	2 SWS	Seminar /	Zhao
WT 24/25	2560400	Seminar in Macroeconomics I	2 SWS	Seminar /	Brumm, Pegorari, Frank
WT 24/25	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba, Mitusch
ST 2025	2500009	Seminar in Economic Theory I	2 SWS	Seminar /	Ammann, Kretz, Okulicz
ST 2025	2500040	Seminar zur Bahnökonomie und -politik	2 SWS	Seminar /	Krenn, Mitusch
ST 2025	2520367	Strategische Entscheidungen	2 SWS	Seminar /	Ehrhart
ST 2025	2520535	Seminar in Economic Theory I	2 SWS	Seminar /	Ammann, Kretz, Okulicz
ST 2025	2560130	Seminar Public Finance	2 SWS	Block /	Wigger, Schmelzer
ST 2025	2560259	Organisation and Management of Development Projects	2 SWS	Seminar /	Sieber
ST 2025	2560400	Seminar in Macroeconomics I	2 SWS	Seminar /	Brumm, Kissling, Frank
ST 2025	2560553	Seminar Co-opetition: A Practical Perspective on Game Theory in the Digital Economy (Bachelor)	2 SWS	Seminar /	Rosar
ST 2025	2560555	Seminar Lying and Cheating in Economic Decision Situations (Bachelor)	2 SWS	Seminar /	Rau

Exams			
WT 24/25	7900124	Seminar Game Theory and Behavioral Economics (Bachelor)	Puppe
WT 24/25	7900139	Selected Aspects of European Transport Planning and Modelling	Mitusch
WT 24/25	7900144	Topics in Econometrics	Schienle
WT 24/25	7900155	Seminar: How to Make Democracy Work? Voting Methods in Theory and Practice (Bachelor)	Puppe
WT 24/25	7900212	Seminar in Economic Policy	Ott
WT 24/25	7900278	Seminararbeit AI and Digitization for Society (Bachelor)	Puppe
WT 24/25	79100005	Topics in Experimental Economics	Reiß
WT 24/25	79sefi1	Seminar Public Finance (Bachelor)	Wigger
ST 2025	7900051	Seminar in Economic Policy	Ott

ST 2025	7900164	Seminar in Economics (Bachelor)	Mitusch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
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.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
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 events related to this course:

V **Topics in Experimental Economics**
2520405, WS 24/25, SWS, Language: German/English, Open in study portal
Seminar (S) On-Site

Organizational issues
Blockseminar; Blücherstraße 17; Termine werden separat bekannt gegeben

Literature
Als Pflichtliteratur dienen ausgewählte Paper.

V **Topics in Econometrics**
2521310, WS 24/25, 2 SWS, Language: German, Open in study portal
Seminar (S)

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V **Seminar Game Theory and Behavioral Economics (Bachelor)**
2560140, WS 24/25, 2 SWS, Language: English, Open in study portal
Seminar (S) On-Site

Content
For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: 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

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: 23.10.24, 14.00 - 15.30 h, Geb. 01.85, KD2 Lab (1. floor über Außentreppe), Team Room

Presentations: 13.01.2025 08.00 - 13.00 h, 01.85, KD2 Lab (1. floor über Außentreppe), Team Room

V	**AI and Digitization for Society (Bachelor)** 2560141, WS 24/25, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
For Bachelor 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 http://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: 23.10.2024, 11.00 - 12.00 (online)

Presentations: 17.01.2025, 08.00 - 13.00 h, Geb. 01.85, KD2Lab Team room

V	**Seminar Public Finance** 2560130, SS 2025, 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 Co-opetition: A Practical Perspective on Game Theory in the Digital Economy (Bachelor)** 2560553, SS 2025, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Dr. Frank Rosar **SoSe 2025**

ECON – Lehrstuhl für Wirtschaftstheorie

7 Seminar Co-opetition: A Practical Perspective on Game Theory in the Digital Economy

This seminar offers an alternative perspective on game theory that is more applied, complementing the more mathematical approach taught in standard university courses (e.g., "Einführung in die Spieltheorie").

Traditional game theory focuses on abstract mathematical models. The insights from these models are useful in real-life situations, particularly in business contexts. However, strategic interactions in such contexts are often complex, and it is not always obvious what *the 'right game'* looks like. Moreover, effectively communicating game-theoretical principles to colleagues, subordinates, and stakeholders is just as important as the analysis itself.

In their 1996 book "Co-opetition", Nalebuff and Brandenburger address these issues by explaining game-theoretic principles using real-world business examples rather than mathematical models. The authors argue rigorously but '*hide*' the underlying mathematical models. While many of the book's stories now seem outdated, the lessons remain valuable for anyone interested in *applying* game theory.

7.1 Seminar Objectives

In this seminar, students will either work alone or in small groups. Each group will be assigned one chapter of the book and will address three key tasks:

1. **Presentation of Ideas**: Each group will demonstrate their understanding of the assigned chapter by clearly communicating its key insights in their own words.
2. **Application to Modern Contexts**: Each group will transfer the chapter's ideas to examples from today's digital economy, such as platform markets, AI-driven business models, digital advertising strategies, and data-driven competition.
3. **Linking to Game Theory**: Each group will demonstrate their ability to engage with academic literature by identifying literature related to their book chapter and discussing these connections.

7.2 Seminar Organization

Introductory Meeting: The seminar will start with a kick-off meeting on April 24, 2024, at 14:00. In this meeting, students will be assigned to groups and chapters of the book and receive further guidance on expectations. The meeting will last approximately one hour.

Presentations: Each group will give a 30-minute presentation, followed by a discussion, in a blocked event on June 27. Attendance at all presentations is mandatory for successful completion of the seminar.

Seminar paper: Each group must submit a 12-page seminar paper by August 3. The seminar paper is a polished version of the presentation, incorporating useful feedback from the discussion on the seminar presentation day.

For further questions, don't hesitate to get in touch with **Dr. Frank Rosar** (rosar@kit.edu).

7.3 References

Nalebuff, Barry J., Brandenburger, A. (1996). Co-opetition. Currency.

Organizational issues
Registration via WiWi-Portal

Kick-off: 24.04.2025

Presentations: 27.06.2025

V **Seminar Lying and Cheating in Economic Decision Situations (Bachelor)** — **Seminar (S) On-Site**
2560555, SS 2025, 2 SWS, Language: English, Open in study portal

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

Introduction: 23.04.2025, 14.00 - 14.45 h , KD2Lab Teamraum

Presentations: 02.07.2025, KD2Lab Teamraum

Seminar Topics in Political Economy

T 7.219 Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

Responsible: Fachvertreter ingenieurwissenschaftlicher Fakultäten
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	3

Competence Certificate
See German version.

Prerequisites
See module description.

Recommendation
None

T 7.220 Course: Seminar in Informatics (Bachelor) [T-WIWI-103485]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	2513200	Seminar Programming 3 (Bachelor)	2 SWS	Seminar /	Oberweis, Fritsch, Frister, Forell, Rybinski
WT 24/25	2513214	Seminar Information security and Data protection (Bachelor)	2 SWS	Seminar /	Volkamer, Raabe, Schiefer, Hennig, Werner, Ullrich
WT 24/25	2513312	Seminar Linked Data and the Semantic Web (Bachelor)	3 SWS	Seminar /	Käfer, Braun
WT 24/25	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/	Hoellig, Käfer, Thoma
WT 24/25	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/	Hoellig, Käfer, Thoma
ST 2025	2513308	Seminar Knowledge Discovery and Data Mining (Bachelor)	2 SWS	Seminar /	Käfer, Noullet, Popovic, Qu , Shao, Kinder
ST 2025	2513310	Seminar Data Science & Real-time Big Data Analytics (Bachelor)	2 SWS	Seminar /	Käfer, Thoma, Hoellig
ST 2025	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar /	Schneider, Zöllner, Daaboul
Exams					
WT 24/25	7900038	Seminar Linked Data and the Semantic Web (Bachelor)			Färber
WT 24/25	7900042	Seminar Programming 3 (Bachelor)			Oberweis
WT 24/25	7900121	Security and Privacy Awareness			Volkamer
WT 24/25	7900187	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)			Färber
WT 24/25	7900284	Seminar Information Security and Data Protection (Bachelor)			Oberweis

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
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.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
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 events related to this course:

V **Seminar Programming 3 (Bachelor)**
2513200, WS 24/25, 2 SWS, Open in study portal
Seminar (S)
On-Site

Content
Registration information and the content of the seminar will be announced on the WIWI-portal. Only bachelor students are allowed to attend this seminar.

V **Seminar Linked Data and the Semantic Web (Bachelor)**
2513312, WS 24/25, 3 SWS, Language: German/English, Open in study portal
Seminar (S)
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)**
2513314, WS 24/25, 3 SWS, Language: German/English, Open in study portal
On-Site

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)**
2513315, WS 24/25, 3 SWS, Language: German/English, Open in study portal
On-Site

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 Knowledge Discovery and Data Mining (Bachelor)

2513308, SS 2025, 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 (Bachelor)

2513310, SS 2025, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

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 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

2513500, SS 2025, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

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.

T 7.221 Course: Seminar in Mathematics (Bachelor) [T-MATH-102265]

Responsible: Prof. Dr. Günter Last
Dr. Franz Nestmann
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	1

T 7.222 Course: Seminar in Operations Research (Bachelor) [T-WIWI-103488]

Responsible:	Prof. Dr. Stefan Nickel Prof. Dr. Steffen Rebennack Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / On-Site	Stein, Beck, Schwarze
WT 24/25	2550461	Seminar on Trending Topics in Optimization and Machine Learning (Bachelor)	2 SWS	Seminar / Blended	Rebennack, Warwicker, Kandora
WT 24/25	2550472	Seminar on Energy and Power Systems Optimization (Bachelor)	2 SWS	Seminar / Blended	Rebennack, Warwicker, Kandora
WT 24/25	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / Blended	Nickel, Mitarbeiter
ST 2025	2500028	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / Blended	Nickel, Mitarbeiter, Pomes
ST 2025	2550131	Seminar on Methodical Foundations of Operations Research (BA)	2 SWS	Seminar / On-Site	Stein, Beck, Schwarze, Neussel
ST 2025	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / On-Site	Stein, Beck, Schwarze, Neussel
ST 2025	2550461	Seminar: Trending Topics in Machine Learning and Optimization (Bachelor)	2 SWS	Seminar / Blended	Rebennack, Warwicker, Kandora
ST 2025	2550472	Seminar: Energy and Power Systems Optimization (Bachelor)	2 SWS	Seminar / Blended	Rebennack, Warwicker, Kandora
ST 2025	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / Blended	Nickel, Mitarbeiter

Exams			
WT 24/25	7900011_WS2425	Seminar in Operations Research B (Bachelor)	Stein
WT 24/25	7900012_WS2425	Seminar in Operations Research A (Master)	Stein
WT 24/25	7900113	Seminar Trending Topics in Optimization and Machine Learning (Bachelor)	Rebennack
WT 24/25	7900313	Seminar on Power Systems Optimization (Bachelor)	Rebennack
WT 24/25	7900342	Seminar Modern OR and Innovative Logistics	Nickel
ST 2025	7900347	Seminar on Power Systems Optimization (Bachelor)	Rebennack

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
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.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
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 events related to this course:

V	**Seminar on Methodical Foundations of Operations Research (B)** 2550131, WS 24/25, 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: Modern OR and Innovative Logistics** 2550491, WS 24/25, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
Anmeldezeitraum: 11.09.24 bis 30.09.24 im Wiwi Portal

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V Seminar: Modern OR and Innovative Logistics

2500028, SS 2025, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
Anmeldung erfolgt über das Wiwi-Portal. Nähere Informationen hierzu finden Sie hier zu einem späteren Zeitpunkt.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V Seminar on Methodical Foundations of Operations Research (BA)

2550131, SS 2025, 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: Modern OR and Innovative Logistics

2550491, SS 2025, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:

If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:

The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Organizational issues
wird auf der Homepage dol.ior.kit.edu bzw. auf dem WiWi-Portal bekannt gegeben

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

T 7.223 Course: Seminar in Statistics (Bachelor) [T-WIWI-103489]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	25000111	Statistics and Epidemics		Seminar / 🗣	Bracher
WT 24/25	2500018		2 SWS	Seminar / 🗣	Grothe, Kaplan, Liu
WT 24/25	2500047	Advanced Topics in Econometrics, Statistics and Data Science	2 SWS	Seminar	Schienle, Krüger, Buse, Rüter, Bracher, Sobolová
WT 24/25	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Rüter
ST 2025	2500208	Statistics and Large Language Models	2 SWS	Seminar	Krüger, Eberl
ST 2025	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Buse, Rüter, Bracher, Eberl
ST 2025	2550560	Spezielle Themen zu Statistik, Datenanalyse und maschinellem Lernen	2 SWS	Seminar / 🗣	Grothe, Liu
Exams					
WT 24/25	79000111	Statistics and Epidemics			Bracher
WT 24/25	7900144	Topics in Econometrics			Schienle
WT 24/25	7900299	Seminar in Statistics (Bachelor)			Grothe

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
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.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
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 events related to this course:

V **Statistics and Epidemics**
25000111, WS 24/25, 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/8223

Application time frame: July 20th, 2024 to September, 30th, 2024.

V **Advanced Topics in Econometrics, Statistics and Data Science**
2500047, WS 24/25, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

V **Topics in Econometrics**
2521310, WS 24/25, 2 SWS, Language: German, Open in study portal

Seminar (S)

Organizational issues

Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V

Advanced Topics in Econometrics
2521310, SS 2025, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

T 7.224 Course: Seminar Production Technology [T-MACH-109062]

Responsible: 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-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2025	2149665	Seminar Production Technology	1 SWS	Seminar /	Fleischer, Lanza, Schulze, Zanger
Exams					
WT 24/25	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze
ST 2025	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze, Zanger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Annotation
The specific topics are published on the homepage of the wbk Institute of Production Science.

Workload
90 hours

Below you will find excerpts from events related to this course:

V Seminar Production Technology

2149665, SS 2025, 1 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

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 7.225 Course: Seminar: Legal Studies I [T-INFO-101997]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / On-Site	Reussner, Raabe, Werner, Müller-Quade
WT 24/25	2400184	EU Digital Regulatory Framework	2 SWS	Seminar / On-Site	Zufall
WT 24/25	2400203	(Smart) City in and as a Network	2 SWS	Seminar / On-Site	Kasper
WT 24/25	2400209	Rechtliche Herausforderungen für die Europäische Datenökonomie	2 SWS	Seminar / On-Site	Sattler
WT 24/25	2400216	(Generative) KI und Recht	2 SWS	Seminar / Blended	Boehm, Vettermann
WT 24/25	2513214	Seminar Information security and Data protection (Bachelor)	2 SWS	Seminar / On-Site	Volkamer, Raabe, Schiefer, Hennig, Werner, Ullrich
ST 2025	2400005	Governance, Risk & Compliance	2 SWS	Seminar / On-Site	Herzig, Siddiq
ST 2025	2400171	Regulating AI: from ethics to law	2 SWS	Seminar / On-Site	Gil Gasiola
ST 2025	2400177	Designing Data Governance of Digital Systems (en)	2 SWS	Seminar / On-Site	Pathak
ST 2025	2400190	EU Digital Regulatory Framework	2 SWS	Seminar / On-Site	Zufall
ST 2025	2400204	(Generative) KI und Recht	2 SWS	Seminar / Blended	Boehm
ST 2025	2400207	Rechtlicher Rahmen für die Europäische Datenökonomie	2 SWS	Seminar / On-Site	Sattler
ST 2025	2400208	Rechtlicher Rahmen für Künstliche Intelligenz	2 SWS	Seminar / On-Site	Sattler
ST 2025	24820	Current Issues in Patent Law	2 SWS	Seminar / On-Site	Melullis
Exams					
WT 24/25	7500035	Seminar: Legal Studies II			Zufall
WT 24/25	7500182	Seminar: Legal Studies II			Boehm, Raabe, Sattler
WT 24/25	7500232	Seminar Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection			Reussner
WT 24/25	7500249	Seminar: IT- Security Law			Zufall
ST 2025	7500140	Seminar: Legal Studies I			Raabe, Melullis, Boehm, Sattler
ST 2025	7500159	Seminar: Legal Studies I			Zufall
ST 2025	7500237	Seminar: Law and Legal Studies			Zufall

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V EU Digital Regulatory Framework

2400184, WS 24/25, 2 SWS, Language: English, Open in study portal

Seminar (S)
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 **Regulating AI: from ethics to law**
2400171, SS 2025, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Credit points = ECTS

3 ECTS

Language:

English

Competency Goals:

Students comprehend the role of technology regulation.

They are able to identify different types of regulation and their impact on different stakeholders.

They know the main aspects of the regulation of AI systems.

They understand the foundations of the AI Act of the EU.

They know the content of AI principles and are able to assess their implementation in specific projects.

Content:

This seminar will provide an overview of the regulation of technologies and in particular the regulation of AI systems. After an introduction to forms of regulation, students will explore the different regulatory instruments from the perspective of the consolidated principles of AI: fairness, transparency, privacy, security and accountability. This will allow students to discuss how the principles and rules governing AI can be implemented in concrete cases. The seminar will cover the following topics:

- Introduction to technology regulation
- Objectives of regulation
- Types of regulation
- Challenges in regulating new / disruptive technologies
- Specific challenges in regulating AI
- Fragmented/vertical regulation of AI
- AI Act
- AI principles: fairness, transparency, privacy, security, and accountability
- The role of principles in regulating AI
    - Dealing with principles when developing and implementing AI systems

Competency certificate:

The assessment of this course is carried out by the following aspects, which will be considered in the grading (§ 4 Abs. 2 Nr. 3 SPO): term paper (approx. 5 pages), presentation (approx. 20 min.) and discussion.

The grading scale will be announced in the course. Students may redraw from the examination during the first two weeks after the topic has been communicated.

Organizational issues
Anmeldungen für das Seminar bitte NUR! über das WiWi-Portal!
***Für die Prüfung bitte NUR über CAS (Campus-Portal) anmelden!**

*ErläuterungNach 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).

Blockseminar im SoSe 2025 (2 Termine): Termine und Uhrzeit:

Donnerstag, 24.04.2025, 13:30 - 17:30 Uhr

Donnerstag, 10.07.2025, 13:30 - 17:30 Uhr.

Raum: jeweils im Seminarraum Nr. 313 (Geb. 07.08)**English:**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 2024 (2 dates):

Dates and time:

Thursday, 24th April 2025, 13:30 - 17:30 h

Thursday, 10th July 2025, 13:30 - 17:30 h.

Room:each time in seminar room no. 313 (building 07.08)

V **Designing Data Governance of Digital Systems (en)**
2400177, SS 2025, 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
Anmeldungen für das Seminar bitte NUR! über das WiWi-Portal! (Anmeldezeitraum für das Seminar: 01.03.2025 - 28.03.2025).
***Für die Prüfung bitte NUR über CAS (Campus-Portal) anmelden!**

*ErläuterungNach 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).

English: 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).

Kick-off:

Friday, 11th April 2025: 10:00 - 12:00 h.

Room Nr. 313, building 07.08 (Vincenz-Prießnitz-Str. 3, KA)

Date for the final-presenations is not yet defined (as per 25.02.2025, sf).

V **EU Digital Regulatory Framework**
2400190, SS 2025, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Note:
This class is mainly intended for Bachelor and Master students in Business Informatics and those wth Law as a minor subject, but also open interested students from other disciplines.

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 (proposal), 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

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).

Termine im SoSe **2025:**

Mittwoch, den 7. Mai 2025, 16-19 Uhr (Kick-off)

Donnerstag, den 17. Juli 2025, 14:00 - 18:00 Uhr (Präsentationen).

Raum:

jeweils im Seminarraum Nr. 313, Geb. 07.08.

English:

Please register for the seminar ONLY via the WiWi-Portal!

**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 Campus System (necessary for recording the grade of the seminar papers).*

Dates in summer term 2025:

Wednesday, 7 May 2025, 16-19h (kick-off)

Thursday, 17th July 2025, 14:00 - 18:00 h (presentations).

Room:

In seminar room no. 313, building 07.08.

T 7.226 Course: Signals and Systems [T-ETIT-112860]

Responsible: Dr.-Ing. Mathias Kluwe
Prof. Dr.-Ing. Sander Wahls

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-ETIT-106372 - Signals and Systems

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	7	Grade to a third	Each winter term	1 terms	1

Events					
WT 24/25	2302109	Signals and Systems	3 SWS	Lecture /	Wahls, Kluwe
WT 24/25	2302111	Signals and Systems (Tutorial to 2302109)	2 SWS	Practice /	Wahls, Leven, Illerhaus
Exams					
WT 24/25	7302109	Signals and Systems			Wahls, Kluwe

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment of success takes place in the form of a written examination lasting 180 minutes. The module grade is the grade of the written examination.

Prerequisites
none

T 7.227 Course: Signals and Systems - Workshop [T-ETIT-112861]

Responsible: Prof. Dr.-Ing. Sander Wahls
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-106372 - Signals and Systems

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each summer term	1 terms	2

Events					
ST 2025	2302905	Signals and Systems - Workshop	1 SWS	Practical course / Blended	Wahls, Jin
Exams					
ST 2025	7302314	Signals and Systems - Workshop			Wahls

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Prerequisites
none

T 7.228 Course: Simulation of Coupled Systems [T-MACH-105172]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Exams			
WT 24/25	76T-MACH-105172	Simulation of Coupled Systems	Geimer

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at very ordinary examination date.

A registration in mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines*. In case of too many applications, attendance will be granted based on pre-qualification.

Prerequisites
Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108888 must have been passed.

Recommendation

- Knowledge of ProE (ideally in actual version)
- Basic kniwledge of Matlab/Simulink
- Basic knowledge of dynamics of machnies
- Basic knowledge of hydraulics

Annotation
After completion of course, students are able to:

- build a coupled simulation
- parametrize models
- perform simulations
- conduct troubleshooting
- check results for plausibility

The number of participants is limited.

Content:

- Basics of multi-body and hydralics simulation programs
- Possibilities of coupled simulations
- Modelling and Simulation of Mobile Machines using a wheel loader
- Documentation of the result in a short report

Literature:

Software guide books (PDFs)

Information about wheel-type loader specifications

Workload
120 hours

T 7.229 Course: Simulation of Coupled Systems - Advance [T-MACH-108888]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Competence Certificate
Preparation of semester report

Prerequisites
none

T 7.230 Course: Social Science A (WiWi) [T-GEISTSOZ-109048]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 24/25	5011011	Artificial intelligence in the research process	2 SWS	Seminar /	Banisch
WT 24/25	5011014	Advanced module:Technology and Future: Theories of prospective knowledge	2 SWS	Seminar /	Lösch
ST 2025	5000048	Socio-scientific Theories of Technology Assessment	2 SWS	Proseminar (/	Lösch
ST 2025	5011013	Experience of Violence at Universities	2 SWS	Seminar /	Mäs
ST 2025	5011019	Fake news in the crosshairs: strategies to protect society	2 SWS	Seminar /	Mäs
Exams					
WT 24/25	7400041	Social Science A (WiWi)			Nollmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V Artificial intelligence in the research process

5011011, WS 24/25, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

ChatGPT und andere Large Language Models (LLMs) transformieren unsere Gesellschaft auf vielen Ebenen. Auch Studium und Wissenschaft stehen vor tiefgreifenden Veränderungen. Im Seminar „Künstliche Intelligenz im Forschungsprozess“ nähern wir uns diesen neuen Technologien und erproben, wie sie sinnvoll eingesetzt werden können, um aktuelle Forschungsfragen zu adressieren. Wir orientieren uns dabei an den Methoden und Fragestellungen der Computer-gestützen Sozialwissenschaft (Computational Social Science) mit besonderem Fokus auf die Extraktion komplexer Bedeutungsmuster (z.B. Meinungen, Argumente, Narrative, etc.). Das Seminar ist als Blockseminar mit zwei Blöcken konzipiert (voraussichtlich Januar and März). Gemeinsam erarbeiten wir Themen für Miniprojekte, die zwischen den beiden Blöcken von den Studierenden bearbeitet werden. Im Vorfeld wird es eine online-Sitzung geben.

Organizational issues

Diese Veranstaltung wird als Blockseminar angeboten.

06.03.2025; 10-18 Uhr

14.03.2025; 10-17 Uhr

15.03.2025; 10-17 Uhr

V Experience of Violence at Universities

5011013, SS 2025, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

In recent years, awareness of experiences of violence has changed significantly. Movements such as #MeToo and the International Day for the Elimination of Violence against Women have drawn attention to abuses worldwide. Much is also being done at universities such as KIT to educate people, create contact points and promote an organizational culture that does not tolerate violence. Nevertheless, the actual extent of the problem remains unclear.

In this seminar, we will use an online survey of students to explore the extent and nature of experiences of violence and their consequences at KIT. What experiences do students have themselves? Do they observe violence in others and how do they experience it?

Workload:

2 ECTS points can be earned. Participants must attend regularly, actively participate in the creation of an online questionnaire and prepare a final report in group work.

Lecturer:

Michael Mäs is a proud sociologist. His research deals with complex systems such as social networks on the Internet, which he investigates using formal approaches and quantitative methods of social research (surveys, network analysis, laboratory and field experiments). He has published in the fields of sociology, economics, physics, biology and computer science, among others.

T 7.231 Course: Social Science B (WiWi) [T-GEISTSOZ-109049]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 24/25	5011011	Artificial intelligence in the research process	2 SWS	Seminar /	Banisch
WT 24/25	5011014	Advanced module:Technology and Future: Theories of prospective knowledge	2 SWS	Seminar /	Lösch
ST 2025	5000048	Socio-scientific Theories of Technology Assessment	2 SWS	Proseminar (/	Lösch
Exams					
WT 24/25	7400046	Social Science B (WiWi)			Nollmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V Artificial intelligence in the research process

5011011, WS 24/25, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

ChatGPT und andere Large Language Models (LLMs) transformieren unsere Gesellschaft auf vielen Ebenen. Auch Studium und Wissenschaft stehen vor tiefgreifenden Veränderungen. Im Seminar „Künstliche Intelligenz im Forschungsprozess“ nähern wir uns diesen neuen Technologien und erproben, wie sie sinnvoll eingesetzt werden können, um aktuelle Forschungsfragen zu adressieren. Wir orientieren uns dabei an den Methoden und Fragestellungen der Computer-gestützen Sozialwissenschaft (Computational Social Science) mit besonderem Fokus auf die Extraktion komplexer Bedeutungsmuster (z.B. Meinungen, Argumente, Narrative, etc.). Das Seminar ist als Blockseminar mit zwei Blöcken konzipiert (voraussichtlich Januar and März). Gemeinsam erarbeiten wir Themen für Miniprojekte, die zwischen den beiden Blöcken von den Studierenden bearbeitet werden. Im Vorfeld wird es eine online-Sitzung geben.

Organizational issues

Diese Veranstaltung wird als Blockseminar angeboten.

06.03.2025; 10-18 Uhr

14.03.2025; 10-17 Uhr

15.03.2025; 10-17 Uhr

T 7.232 Course: Special Topics in Information Systems [T-WIWI-109940]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101434 - eBusiness and Service Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Competence Certificate
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

Recommendation
None

Annotation
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 7.233 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

Responsible: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics
M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 24/25	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture	Heller
Exams					
WT 24/25	7900011	Statistical Modeling of Generalized Regression Models			Heller
WT 24/25	7900146 (WS23/24)	Statistical Modeling of generalized regression models			Heller

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Below you will find excerpts from events related to this course:

V Statistical Modeling of Generalized Regression Models

2521350, WS 24/25, 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

7.234 Course: Statistics I [T-WIWI-102737]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-100950 - Preliminary Exam
M-WIWI-101432 - Introduction to Statistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2600008	Statistics I	4 SWS	Lecture /	Krüger
ST 2025	2600009	Tutorien zu Statistik I	2 SWS	Tutorial (	Krüger, Becker, N.N., Biegert
Exams					
WT 24/25	7900022	Statistics I			Grothe, Lerch
ST 2025	7900104	Statistics I			Krüger, Lerch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate

Success is assessed in the form of a written examination (120 minutes). The examination is offered towards the end of the lecture period or at the beginning of the lecture-free period. The repeat examination is offered in the following semester.

Bonus: It is planned that, from the summer semester 2025, a grade bonus for the Statistics I exam can be earned through successful participation in the tutorials. If the grade of the written exam is between 4.0 and 1.3, the bonus will generally improve 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 lecture.

Prerequisites

None

Below you will find excerpts from events related to this course:

V Statistics I

2600008, SS 2025, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

Learning objectives:

Students understand and apply

- basic concepts of statistical data exploration as well as
- basic definitions and theorems of probability theory.

Content:

A. Descriptive Statistics: univariate und bivariate analysis

B. Probability Theory: probability space, conditional and product probabilities

C. Random variables: location and shape parameters, dependency measures, concrete distribution models

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 60 hours

Preparation and follow-up: 90 hours

Literature

Skript: Kurzfassung Statistik I. Dieses enthält ausführliche Angaben zu weiterführender Literatur.

T 7.235 Course: Statistics II [T-WIWI-102738]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101432 - Introduction to Statistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2610020	Statistics II	4 SWS	Lecture / 🗣	Schienle
WT 24/25	2610021		2 SWS	Tutorial (	Krüger, Lerch, Becker
WT 24/25	2610022	PC-Praktikum zu Statistik II	2 SWS		Grothe, Lerch
Exams					
WT 24/25	7900001	Statistics II			Schienle, Lerch
ST 2025	7900082	Statistics II			Schienle, Lerch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Success is assessed in the form of a written examination (120 minutes). The examination is offered towards the end of the lecture period or at the beginning of the lecture-free period. The repeat examination is offered in the following semester.
Bonus: It is planned that from the winter semester 2025/2026, a grade bonus for the Statistics II exam can be earned through successful participation in the tutorials. If the grade of the written examination is between 4.0 and 1.3, the bonus will generally improve 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 lecture.

Prerequisites
None

Recommendation
It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2610020].

Below you will find excerpts from events related to this course:

V Statistics II
2610020, WS 24/25, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives:

The student

- understands and applies the basic definitions and theorems of probability theory,
- transfers these theoretical foundations to problems in parametrical mathematical statistics.

Content:

D. Sampling and Estimation Theory: Sampling distributions, estimators, point and interval estimation
E. Test Theory: General Principles of Hypothesis Testing, Concrete 1- and 2-Sampling Tests
F. Regression analysis: Simple and multiple linear regression, statistical inference

Requirements:

It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2600020].

Workload:

Total workload: 150 hours (5.0 Credits).

Attendance: 30 hours

Preparation and follow-up: 90 hours

Literature
Skriptum: Kurzfassung Statistik II

Weiterführende Literatur:

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

T 7.236 Course: Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation [T-MACH-113372]

Responsible: Martin Benfer
Prof. Dr.-Ing. Gisela Lanza

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	4

Events					
ST 2025	2150658	Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation	2 SWS	Lecture / 🗣	Lanza, Benfer
Exams					
ST 2025	76-T-MACH-113372	Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation			Lanza

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment takes the form of an examination with a different type of success check (in accordance with §4(2), 3 SPO). Here, the project work, the milestone-based presentation of the results in presentation form and a final presentation are included in the assessment

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110991 - Global Production must have been passed.

Recommendation
Participation in the following lectures:
Introduction to Operations Research I [2550040] + II [2530043]

Workload
120 hours

Below you will find excerpts from events related to this course:

V **Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation** — **Lecture (V) On-Site**
2150658, SS 2025, 2 SWS, Language: English, Open in study portal

Content

The lecture "Strategic Decision Making in the Design of Global Production Networks: A Seminar in 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 7.237 Course: Strategic Management [T-WIWI-113090]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101425 - Strategy and Organization

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2025	2577900	Strategic Management	2 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 24/25	7900199	Strategic Management			Lindstädt
ST 2025	7900067	Strategic Management			Lindstädt

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) taking place at the beginn of the recess period (according to §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

Below you will find excerpts from events related to this course:

V Strategic Management
2577900, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

Students learn central concepts of strategic management along the ideal-typical strategy process. An overview of fundamental frameworks and models will be provided and an action-oriented integration performance will be achieved through the transfer of theory to practical issues.

Through intensive exposure to real-world case studies, students will be encouraged to learn and apply strategic measures in a targeted manner in the real business world. The course features an action-oriented approach and provides students with a realistic understanding of the possibilities and limitations of rational design approaches.

Content in Keywords:

- Corporate governance and strategic management: concepts, levels, process.
- Strategic analysis: internal and external analysis
- Competitive strategy: formulation, evaluation and selection of strategic action alternatives at business unit level
- Strategic interaction and strategic commitment
- Corporate strategy: diversification strategy, M&A and management of the corporate portfolio
- Implementation of strategies in companies

Structure:

Lectures in the course are available to students online as recordings, while class dates are reserved for active discussion of real-world case studies.

Learning Objectives:

Upon completion of the course, students will be able to,

- Prepare strategic decisions along the ideal strategic process in a practical setting,
- Identify sources of competitive advantage,
- Explain interrelationships of companies in competition,
- Evaluate the portfolio management of companies,
- To classify actions and decisions of companies strategically,
- Apply knowledge from theoretical frameworks to the analysis of real-life situations.

Recommendations:

None.

Workload:

Total workload for 3.5 credit hours: approximately 105 hours.

Attendance: 30 hours

Self-study: 75 hours

Verification:

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as an open-book examination (examination performance of another kind according to SPO § 4 Abs. 2, Pkt. 3), or as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1).

It is expected that the exam will take place at the beginning of the semester's lecture-free period.

The examination is offered every semester and can be repeated at any regular examination date.

Literature

- Pidun, U.: *Corporate Strategy: Theory and Practice*. Springer-Gabler, Wiesbaden 2019.
- Lindstädt, H.; Hauser, R.: *Strategische Wirkungsbereiche des Unternehmens*. Gabler, Wiesbaden 2004.
- Grant, R.M.: *Contemporary Strategy Analysis, 10. Aufl., Wiley 2018*.

Die relevanten Auszüge und zusätzliche Quellen werden in der Veranstaltung bekannt gegeben.

T 7.238 Course: Structural and Phase Analysis [T-MACH-102170]

Responsible: Dr.-Ing. Susanne Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Exams			
WT 24/25	76-T-MACH-102170	Structural and Phase Analysis	Wagner, Hinterstein
ST 2025	76-T-MACH-102170	Structural and Phase Analysis	Wagner

Competence Certificate
Oral examination

Prerequisites
none

T 7.239 Course: Supplement Applied Informatics [T-WIWI-110711]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate
The assessment of this course is a written or (if necessary) oral examination.

Depending on the particular course associated with this placeholder a bonus on the examination grade is possible.

Prerequisites
None

Annotation
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 7.240 Course: Sustainable Vehicle Drivetrains [T-MACH-111578]

Responsible: Prof. Dr. Thomas Koch
Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 24/25	2133132	Sustainable Vehicle Drivetrains	2 SWS	Lecture / 🗣	Toedter
Exams					
WT 24/25	76-T-MACH-105655	Sustainable Vehicle Drivetrains			Toedter

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam (approx. 20 minutes)

Prerequisites
none

Annotation
Starting in winter term 25/26, the course consists of a lecture (2h / week) and a tutorial (1 h / week).

Workload
120 hours

Below you will find excerpts from events related to this course:

V Sustainable Vehicle Drivetrains
2133132, WS 24/25, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Sustainability

Environmental balance

Legislation

Alternative fuels

BEV

Fuel cell

Hybrid drives

T 7.241 Course: Systematic Materials Selection [T-MACH-100531]

Responsible: Dr.-Ing. Stefan Dietrich
Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	5

Events					
ST 2025	2174576	Systematic Materials Selection	3 SWS	Lecture / 🗣	Dietrich
ST 2025	2174577	Excercises in Systematic Materials Selection	1 SWS	Practice / 🗣	Dietrich
Exams					
WT 24/25	76-T-MACH-100531	Systematic Materials Selection			Dietrich
ST 2025	76-T-MACH-100531	Systematic Materials Selection			Dietrich

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment is carried out as a written exam of 2 h.

Prerequisites
none

Recommendation
Basic knowledge in materials science, mechanics and mechanical design due to the lecture Materials Science I/II.

Workload
120 hours

Below you will find excerpts from events related to this course:

V Systematic Materials Selection

2174576, SS 2025, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are deeloped. The following topics are covered:

- Information and introduction
- Necessary basics of materials
- Selected methods / approaches of the material selection
- Examples for material indices and materials property charts
- Trade-off and shape factors
- Sandwich materials and composite materials
- High temperature alloys
- Regard of process influences
- Material selection for production lines
- Incorrect material selection and the resulting consequences
- Abstract and possibility to ask questions

learning objectives:
The students are able to select the best material for a given application. They are proficient in selecting materials on base of performance indices and materials selection charts. They can identify conflicting objectives and find sound compromises. They are aware of the potential and the limits of hybrid material concepts (composites, bimaterials, foams) and can determine whether following such a concept yields a useful benefit.
requirements:

WiIng SPO 2007 (B.Sc.)

The course Material Science I [21760] has to be completed beforehand.

WiIng (M.Sc.)

The course Material Science I [21760] has to be completed beforehand.

workload:

The workload for the lecture is 120 h per semester and consists of the presence during the lecture (30 h) as well as preparation and rework time at home (30 h) and preparation time for the oral exam (60 h).

Literature
Vorlesungsskriptum; Übungsblätter; Lehrbuch: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.);
Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen
Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006
ISBN: 3-8274-1762-7

Lecture notes; Problem sheets; Textbook: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.);
Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen
Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006
ISBN: 3-8274-1762-7

T 7.242 Course: Systems of Remote Sensing, Prerequisite [T-BGU-101637]

Responsible:	Prof. Dr. Jan Cermak Prof. Dr.-Ing. Stefan Hinz Dr.-Ing. Uwe Weidner
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	1

Events					
ST 2025	6020242	Remote Sensing Systems, Excercise	1 SWS	Practice / 🗣	Bork-Unkelbach

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

Workload
30 hours

T 7.243 Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-101421 - Supply Chain Management
M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2025	2550486	Tactical and operational SCM	3 SWS	Lecture / 🗣	Nickel
ST 2025	2550487	Übungen zu Taktisches und operatives SCM	1.5 SWS	Practice / 🗣	Pomes, Hoffmann
Exams					
WT 24/25	7900104	Tactical and Operational Supply Chain Management			Nickel

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the exam will be offered either as an open-book exam, or as a written exam (60 min).

The exam takes place in every semester.

Prerequisite for admission to examination is the successful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Tactical and operational SCM
2550486, SS 2025, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The planning of material transport is an essential element of Supply Chain Management. By linking transport connections across different facilities, the material source (production plant) is connected with the material sink (customer). The general supply task can be formulated as follows (cf. Gudehus): For given material flows or shipments, 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. The main goal of the inventory management is the optimal determination of order quantities in terms of minimization of fixed and variable costs subject to resource constraints, supply availability and service level requirements. Similarly, the problem of lot sizing in production considers the determination of the optimal amount of products to be produced in a time slot. The course includes an introduction to basic terms and definitions of Supply Chain Management and a presentation of fundamental quantitative planning models for distribution, vehicle routing, inventory management and lot sizing. Furthermore, case
studies from practice will be discussed in detail.

Passing the online exercise is a prerequisite for admission to the exam.

Literature
Weiterführende Literatur

- Domschke: Logistik: Transporte, 5. Auflage, Oldenbourg, 2005
- Domschke: Logistik: Rundreisen und Touren, 4. Auflage, Oldenbourg, 1997
- Ghiani, Laporte, Musmanno: Introduction to Logistics Systems Planning and Control, Wiley, 2004
- Gudehus: Logistik, 3. Auflage, Springer, 2005
- Simchi-Levi, Kaminsky, Simchi-Levi: Designing and Managing the Supply Chain, 3rd edition, McGraw-Hill, 2008
- Silver, Pyke, Peterson: Inventory management and production planning and scheduling, 3rd edition, Wiley, 1998

T 7.244 Course: Team Project Management and Technology [T-WIWI-110968]

Responsible: Prof. Dr. Martin Klarmann
Prof. Dr. Alexander Mädche

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105440 - Team Project Management and Technology

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	9	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	2571176	Team Project Management and Technology	6 SWS	Project (P /	Klarmann, Mädche
ST 2025	2571176	Teamprojekt Wirtschaft und Technologie		Project (P /	Klarmann, Mädche
Exams					
WT 24/25	7900207	Team Project Management and Technology			Mädche, Klarmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The basis for grading is the documents produced, the presentations during the course of the project, the artifact to be produced (e.g. algorithm, method, model, software, component) and the final presentation.

Workload
270 hours

T 7.245 Course: Team Project Management and Technology (BUS/ENG) [T-WIWI-110977]

Responsible: Prof. Dr. Martin Klarmann
Prof. Dr. Alexander Mädche

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105447 - Team Project Management and Technology (BUS/ENG)

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	9	Grade to a third	Each term	1 terms	1

Events					
WT 24/25	2571176	Team Project Management and Technology	6 SWS	Project (P /	Klarmann, Mädche
ST 2025	2571176	Teamprojekt Wirtschaft und Technologie		Project (P /	Klarmann, Mädche
Exams					
WT 24/25	7900208	Team Project Management and Technology (BUS/ENG)			Mädche, Klarmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The basis for grading is the documents produced, the presentations during the course of the project, the artifact to be produced (e.g. algorithm, method, model, software, component) and the final presentation.

Workload
270 hours

T 7.246 Course: Tires and Wheel Development for Passenger Cars [T-MACH-102207]

Responsible: Prof. Dr.-Ing. Günter Leister
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2025	2114845	Tires and Wheel Development for Passenger Cars	2 SWS	Lecture / 🗣	Leister
Exams					
WT 24/25	76-T-MACH-102207	Tires and Wheel Development for Passenger Cars			Leister
ST 2025	76-T-MACH-102207	Tires and Wheel Development for Passenger Cars			Leister

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Workload
120 hours

Below you will find excerpts from events related to this course:

V Tires and Wheel Development for Passenger Cars

2114845, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. The role of the tires and wheels in a vehicle
2. Geometrie of Wheel and tire, Package, load capacity and endurance, Book of requirement
3. Mobility strategy, Minispare, runflat systems and repair kit.
4. Project management: Costs, weight, planning, documentation
5. Tire testing and tire properties
6. Wheel technology incuding Design and manifacturing methods, Wheeltesting
7. Tire presssure: Indirect and direct measuring systems
8. Tire testing subjective and objective

Learning Objectives:

The students are informed about the interactions of tires, wheels and chassis. They have an overview of the processes regarding the tire and wheel development. They have knowledge of the physical relationships.

Organizational issues
Voraussichtliche Termine, nähere Informationen und eventuelle Terminänderungen:

siehe Institutshomepage.

Literature
Manuskript zur Vorlesung

Manuscript to the lecture

T 7.247 Course: Topics in Human Resource Management [T-WIWI-111858]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105928 - HR Management & Digital Workplace
M-WIWI-106860 - Leadership & Sustainable HR-Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 24/25	2573015	Topics in Human Resource Management	2 SWS	Colloquium (K / 🗣	Nieken
ST 2025	2573015	Topics in Human Resource Management	2 SWS	Colloquium (K / 🗣	Nieken, Mitarbeiter

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment.

The grade is made up of the presentation of a given research topic and active participation in the discussions in the course. The weighting depends on the course and will be announced at the beginning of the course.

Prerequisites
This course cannot be combined with T-WIWI-102871 "Problem Solving, Communication and Leadership".

Recommendation
We recommend visiting the course "Human Resource Management" before taking this course.
The course is strongly recommended for students interested in empirical research in the areas HRM, personnel economics, and leadership.

Workload
90 hours

Below you will find excerpts from events related to this course:

V Topics in Human Resource Management
2573015, WS 24/25, 2 SWS, Language: German, Open in study portal

Colloquium (KOL)
On-Site

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.

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.
- 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.

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
Die Veranstaltung findet als Blockveranstaltung statt. Termine werden noch bekannt gegeben.

V **Topics in Human Resource Management**
2573015, SS 2025, 2 SWS, Language: German, Open in study portal

Colloquium (KOL)
On-Site

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.

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.
- 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.
-

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-12.1

T 7.248 Course: Welfare Economics [T-WIWI-102610]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	3

Events					
ST 2025	2520517	Welfare Economics	2 SWS	Lecture / 🗣	Puppe
ST 2025	2520518	Übung zur Wohlfahrtstheorie	1 SWS	Practice / 🗣	Puppe, Ammann
Exams					
ST 2025	7900257	Welfare Economics			Puppe

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.).

Prerequisites
The course *Economics I: Microeconomics* [2610012] has to be completed beforehand.

Recommendation
None

Annotation
The course only takes place every second summer semester, the next course is planned for summer semester 2025.

Below you will find excerpts from events related to this course:

V Welfare Economics
2520517, SS 2025, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

The lecture "Welfare economics" deals with the question of efficiency and distributional properties of economic allocations. The lecture covers different fairness concepts for the evaluation of economic allocations as well as the corresponding allocation mechanisms.

The first part of the lecture focuses on the efficiency and fairness of market equilibria. The two welfare theorems form the starting point of the first part: The 1st welfare theorem states that (under weak conditions) every competitive equilibrium is efficient. Conversely, according to the second welfare theorem (under stronger conditions), any efficient allocation can be obtained as a competitive equilibrium by choosing the appropriate initial endowment. Subsequently, concepts of fairness such as envy freeness, egalitarian equivalence, and others are defined and discussed in the context of general equilibrium theory.

The second part of the lecture deals with the efficiency and fairness of allocations that are the result of collective decisions. To this end, the concepts of the social welfare function and the social welfare functional are first introduced. In this part, special attention is paid to Arrow's famous impossibility theorem and the concept of axiomatic bargaining.

The third part of the lecture deals with the principle of "social justice" (i.e. distributional justice). The fundamental principles of Rawl's theory of justice, John Roemer's theory of equality of opportunity and other theories are explained and critically analyzed.

Learning objectives:

The student should learn

- to name different ideas of fairness and define them formally in mathematical terms.
- to determine efficient and fair allocations in the context of market equilibria and social welfare functionals.
- to describe, explain, and prove the interrelationships between the different ideas of fairness and efficiency in the context of market equilibria and social welfare functionals.
- to assess and discuss real economic allocations with regard to different ideas of fairness.

Workload:

Total workload for 4.5 credit points: approx. 135 hours
Attendance: 30 hours
Self-study: 105 hours

Literature

- Rawls, J. 1971. *A Theory of Justice*. Harvard University Press.
- Roemer, J. 1996. *Theories of Distributive Justice*. Harvard University Press.

T 7.249 Course: Workshop Mechatronical Systems and Products (mach/etit/wiwi) [T-MACH-112648]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106236 - Mechatronic Product Design

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2145162	Workshop Mechatronical Systems and Products	2 SWS	Practical course / 🗣	Matthiesen, Hohmann, Teltschik

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Workload
150 hours

8 Appendix

8.1 Definition - About this MHB

Basically, the program is divided into **subjects** (for example business administration, informatics or operations research). Each subject is in turn divided into **modules**. Each module consists of one or more interrelated **partial achievements**, which are completed by a **performance assessment**. The scope of each module is characterized by credit points, which are credited after successful completion of the module. Some modules are **compulsory**. Numerous modules offer numerous individual **elective and specialization options**. This gives students the opportunity to tailor the interdisciplinary degree program to their personal needs, interests and career prospects, both in terms of content and time. The module handbook describes the modules belonging to the degree program. It deals with

- the composition of the modules,
- the size of the modules (in CP),
- the interdependencies between the modules
- the qualification objectives of the modules,
- the type of assessment and
- how the grade of a module is calculated.

The module handbook thus provides the necessary orientation during your studies and is a helpful companion. However, the module handbook does not replace the **course catalog** which provides up-to-date information on the variable course dates (e.g. time and location of the course) for each semester.