Karlsruher Institut für Technologie

Module Handbook
Information Systems M.Sc.

SPO 2019

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KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT / KIT DEPARTMENT OF INFORMATICS

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1 General information

Welcome to the new module handbook of your study program! We are delighted that you have decided to study at the KIT Department of Economics and Management and wish you a good start into the new semester! In the following we would like to give you a short introduction to the most important terms and rules that are important in connection with the choice of modules, courses and examinations.

1.1 Structural elements

The program exists of several **subjects** (e.g. business administration, economics, operations research). Every subject is split into **modules** and every module itself consists of one or more interrelated **module component exams**. The extent of every module is indicated by credit points (CP), which will be credited after the successful completion of the module. Some of the modules are **obligatory**. According to the interdisciplinary character of the program, a great variety of **individual specialization and deepening possibilities** exists for a large number of modules. This enables the student to customize content and time schedule of the program according to personal needs, interest and job perspective. The **module handbook** describes the modules belonging to the program. It describes particularly:

- the structure of the modules
- the extent (in CP),
- the dependencies of the modules,
- the learning outcomes,
- the assessment and examinations.

The module handbook serves as a necessary orientation and as a helpful guide throughout the studies. The module handbook does not replace the **course catalog**, which provides important information concerning each semester and variable course details (e.g. time and location of the course).

1.2 Begin and completion of a module

Each module and each examination can only be selected once. The decision on the assignment of an examination to a module (if, for example, an examination in several modules is selectable) is made by the student at the moment when he / she is registered for the appropriate examination. A module is completed or passed when the module examination is passed (grade 4.0 or better). For modules in which the module examination is carried out over several partial examinations, the following applies: The module is completed when all necessary module partial examinations have been passed. In the case of modules which offer alternative partial examinations, the module examination is concluded with the examination with which the required total credit points are reached or exceeded. The module grade, however, is combined with the weight of the predefined credit points for the module in the overall grade calculation.

1.3 Module versions

It is not uncommon for modules to be revised due to, for example, new courses or cancelled examinations. As a rule, a new module version is created, which applies to all students who are new to the module. On the other hand, students who have already started the module enjoy confidence and remain in the old module version. These students can complete the module on the same conditions as at the beginning of the module (exceptions are regulated by the examination committee). The date of the student's "`binding declaration"' on the choice of the module in the sense of §5(2) of the Study and Examination Regulation is decisive. This binding declaration is made by registering for the first examination in this module.

In the module handbook, all modules are presented in their current version. The version number is given in the module description. Older module versions can be accessed via the previous module handbooks in the archive at http://www.wiwi.kit.edu/Archiv_MHB.php.

1.4 General and partial examinations

Module examinations can be either taken in a general examination or in partial examinations. If the module examination is offered as a general examination, the entire learning content of the module will be examined in a single examamination. If the module examination is subdivided into partial examinations, the content of each course will be examined in corresponding partial examinations. Registration for examinations can be done online at the campus management portal. The following functions can be accessed on https://campus.studium.kit.edu/:

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

For further and more detailed information, https://studium.kit.edu/Seiten/FAQ.aspx.

1.5 Types of exams

Exams are split into written exams, oral exams and alternative exam assessments. Exams are always graded. Non exam assessments can be repeated several times and are not graded.

Caution: exam type dependent on further pandemic developments

Due to the current situation, online formats are also available for examinations that are typically offered as **presence examinations**, depending on the circumstances.
All assessments that are announced in the modules as a written exam (written exam/sP according to SPO § 4 Abs. 2, Pkt. 1) can therefore also be offered as an alternative exam assessment/PLaA (according to SPO § 4 Abs. 2, Pkt. 3) depending on further pandemic developments. And vice versa. As alternative examination formats, **a) online examinations with video supervision** (sP) and optionally a face-to-face examination in the same examination period are offered. Or **b)** the **Online Open Book exam** (PLaA) format.
This option applies to all modules and assessments listed in the module handbook, regardless of whether or not corresponding references are already made to them there. It is also at the discretion of the responsible examiners whether they allow a 'free shot' for their examination when determining the type of examination.

1.6 Repeating exams

Principally, a failed written exam, oral exam or alternative exam assessment can repeated only once. If the repeat examination (including an eventually provided verbal repeat examination) will be failed as well, the examination claim is lost. A request for a second repetition has to be made in written form to the examination committee two months after loosing the examination claim. A counseling interview is mandatory.

For further information see http://www.wiwi.kit.edu/hinweiseZweitwdh.php.

1.7 Examiners

The examination committee has appointed the KIT examiners and lecturers listed in the module handbook for the modules and their courses as examiners for the courses they offer.

1.8 Additional accomplishments

Additional accomplishments are voluntarily taken exams, which have no impact on the overall grade of the student and can take place on the level of single courses or on entire modules. It is also mandatory to declare an additional accomplishment as such at the time of registration for an exam. Additional accomplishments with at most 30 CP may appear additionally in the certificate.

1.9 Further information

For current information about studying at the KIT Department of Economics and Management, please visit our website www.wiwi.kit.edu as well as Instagram, LinkedIn, and YouTube. Please also see current notices and announcements for students at: https://www.wiwi.kit.edu/studium.php.
Information around the legal and official framework of the study program can be found in the respective study and examination regulations of your study program. These are available under the Official Announcements of KIT (http://www.sle.kit.edu/amtlicheBekanntmachungen.php).

More detailed information about the legal and general conditions of the program can be found in the examination regulation of the program (http://www.sle.kit.edu/amtlicheBekanntmachungen.php).

1.10 Contact persons

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2 Study plan

The Master's programme in Information Systems has a standard duration of four semesters and comprises 120 credit points. Depending on personal interests and goals, the specialist knowledge acquired in the Bachelor's programme can be expanded and deepened within the scope of the study plan.

Figure 2 shows the subject and module structure with the allocation of credit points (LP) and, as an example, a possible distribution of modules over the semesters.

<table>
<tr><th>Semester</th><th>Leistungs-punkte</th><th>Wirtschaftsinformatik</th><th>Informatik</th><th>Wirtschaftswissenschaften</th><th>Rechtswissenschaften</th><th>Seminare</th><th>Masterarbeit</th></tr>
<tr><td>1</td><td>33</td><td rowspan="2">Wirtschaftsinformatik
9 LP</td><td>Informatik
4 LP</td><td rowspan="2">Wirtschafts-wissenschaften
9 LP</td><td>Rechtswissenschaften
9 LP</td><td rowspan="3">Seminarmodul

Wirtschafts-informatik

Informatik

Wirtschafts-wissenschaften

Rechts-wissenschaften

3 LP + 3 LP*</td><td rowspan="3"></td></tr>
<tr><td></td><td>Informatik
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<tr><td>2</td><td>27</td><td></td><td>Informatik
8 LP</td><td></td><td>Rechtswissenschaften
9 LP</td><td></td><td></td></tr>
<tr><td>3</td><td>30</td><td>Wirtschaftsinformatik
9 LP</td><td>Informatik
6 LP</td><td>Wirtschafts-wissenschaften
9 LP</td><td rowspan="2"></td><td></td><td></td></tr>
<tr><td>4</td><td>30</td><td></td><td></td><td></td><td></td><td></td><td>Masterarbeit
30 LP</td></tr>
<tr><td></td><td>120</td><td>18</td><td>30</td><td>18</td><td>18</td><td>6</td><td>30</td></tr>
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* In Summe sind 2 Seminare zu wählen. Die Vermittlung von überfachlichen Qualifikationen erfolgt integrativ im Rahmen der fachwissenschaftlichen Module.

Figure 2: Structure of the Master's programme in Information Systems (german)

Within the scope of the master's programme, modules from the subjects of Information Systems, Informatics, Economics and Law are to be completed and a master's thesis is to be written.

In the subject Informatics, modules with a total volume of 30 credit points are to be taken. In the remaining subjects Information Systems, Economics and Law, modules with a total of 18 credit points must be proven.
In the subjects Information Systems, Informatics, Economics and Management and Law, two seminars of 3 LP each must be completed. The seminars have to be chosen from different subjects.

It is up to the individual study plan (taking into account the relevant requirements in the study and examination regulations as well as any module regulations) in which subject semester the selected module examinations are started or completed. However, it is recommended that all other academic achievements of the Master's examination be proven before the start of the Master's thesis.

All modules including options within the modules are described in the module handbook. WiWi seminars that can be attended as part of the seminar modules will be published on the Wiwi portal at https://portal.wiwi.kit.edu/Seminare.

3 Qualification goals

The KIT graduates of the interdisciplinary, four-semester Master's program in Information Systems have an in-depth research-oriented expertise in Information Systems and the related disciplines of Informatics, Economics and Law. This specialist knowledge is supplemented by subject-independent competences that can be applied across several disciplines. Depending on their profile, their qualifications are particularly suitable for interdisciplinary activities as IT managers, management consultants, technology entrepreneurs, process managers, company founders and for a further scientific career (scientist).

KIT business IT specialists are characterized by their interdisciplinary methodological competence and their innovative ability in shaping the digital transformation of business and society.

By combining their knowledge and competencies, they are able to independently recognize economic and information technology conditions as well as innovative development potentials for the digitization of processes, products and services and to implement them within the legal framework.

KIT business IT specialists design and develop interdisciplinary information goods and information systems from a socio-technical perspective with the aim of creating social and economic value through the digitisation of economy and society.

They are able to analyse and structure complex subject-relevant problems and requirements and develop tailor-made solutions and options for action.

They know how to identify the advantages and disadvantages of existing processes, models, technologies and approaches, compare them with alternatives, evaluate them critically and transfer them to new areas of application.

According to their needs, they can also combine, adapt or independently develop new solutions and implement them using innovative information and communication technologies. They can make and justify their decisions in a scientifically sound manner, taking into account social and ethical aspects.

They know how to critically interpret, validate, document and present the results obtained.

Graduates will be able to communicate with representatives at a scientific level and take on outstanding responsibility in a team.

4 Field of study structure

Mandatory	
Master's Thesis	30 CR
Information Systems	18 CR
Informatics	30 CR
Economics and Management	18 CR
Law	18 CR
Seminars	6 CR

4.1 Master's Thesis

Credits
30

Mandatory		
M-WIWI-104833	Module Master's Thesis	30 CR

4.2 Information Systems

Credits
18

Information Systems (Election:)		
M-WIWI-104814	Information Systems: Analytical and Interactive Systems	9 CR
M-WIWI-104812	Information Systems: Engineering and Transformation	9 CR
M-WIWI-104813	Information Systems: Internet-Based Markets and Services	9 CR

4.3 Informatics

Credits
30

Optional Modules Informatics (Election:)		
M-INFO-103046	Access Control Systems: Foundations and Practice	5 CR
M-INFO-100795	Algorithm Engineering	5 CR
M-INFO-101173	Algorithms II	6 CR
M-INFO-102093	Algorithms for Ad-Hoc and Sensor Networks	5 CR
M-INFO-100031	Algorithms for Routing	5 CR
M-INFO-102094	Algorithms for Visualization of Graphs	5 CR
M-INFO-100797	Algorithms in Cellular Automata	5 CR
M-INFO-102110	Computational Geometry	6 CR
M-INFO-100762	Algorithmic Graph Theory	5 CR
M-INFO-100754	Computational Cartography	5 CR
M-INFO-102400	Algorithmic Methods for Network Analysis	5 CR
M-INFO-102226	Applied Differential Geometry	5 CR
M-INFO-103294	Wearable Robotic Technologies	4 CR
M-WIWI-105366	Artificial Intelligence	9 CR
M-INFO-104447	Automated Planning and Scheduling	5 CR
M-INFO-100826	Automated Visual Inspection and Image Processing	6 CR
M-INFO-100814	Biologically Inspired Robots	3 CR
M-INFO-102968	Biometric Systems for Person Identification	3 CR
M-INFO-100856	Computer Graphics	6 CR
M-WIWI-104403	Critical Digital Infrastructures	9 CR
M-INFO-100739	Data and Storage Management	4 CR
M-INFO-105799	Data Science I	5 CR
M-INFO-105801	Data Science II	3 CR
M-INFO-104045	Data Privacy: From Anonymization to Access Control	3 CR
M-INFO-101662	Practical Course: Database Systems	4 CR
M-INFO-100780	Deployment of Database Systems	5 CR
M-INFO-105724	Database as a Service	5 CR
M-INFO-105334	Decentralized Systems: Fundamentals, Modeling, and Applications	6 CR
M-INFO-105753	Deep Learning for Computer Vision I: Basics	3 CR
M-INFO-105755	Deep Learning for Computer Vision II: Advanced Topics	3 CR
M-INFO-104460	Deep Learning and Neural Networks	6 CR
M-INFO-105882	Digital Accessibility and Assistive Technologies	3 CR
M-INFO-100803	Real-Time Systems	6 CR
M-INFO-100736	Introduction to Video Analysis	3 CR
M-INFO-106189	Introduction to Hybrid Quantum Machine Learning Algorithms neu	3 CR
M-INFO-101885	Energy Informatics 1	5 CR
M-INFO-103044	Energy Informatics 2	5 CR
M-INFO-100798	Empirical Software Engineering	4 CR
M-INFO-100831	Design and Architectures of Embedded Systems (ES2)	3 CR
M-WIWI-101477	Development of Business Information Systems	9 CR
M-INFO-102731	Advanced Data Structures	5 CR
M-INFO-100799	Formal Systems	6 CR
M-INFO-100841	Formal Systems II: Theory	5 CR
M-INFO-100744	Formal Systems II: Application	5 CR
M-INFO-105378	Research Project Autonomous Learning Robots	6 CR
M-INFO-105413	Practical Course on Network Security Research	3 CR
M-INFO-100725	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy	3 CR
M-INFO-100730	Geometric Optimization	3 CR
M-INFO-100753	Design Principles for Interactive Real-Time Systems	3 CR

M-INFO-100847	Principles of Automatic Speech Recognition	6 CR
M-INFO-100758	Graph Partitioning and Graph Clustering in Theory and Practice	5 CR
M-INFO-101573	Hands-on Bioinformatics Practical	3 CR
M-INFO-100822	Heterogeneous Parallel Computing Systems	3 CR
M-WIWI-104520	Human Factors in Security and Privacy	9 CR
M-INFO-100895	Information Processing in Sensor Networks	6 CR
M-INFO-100791	Innovative Concepts for Programming Industrial Robots	4 CR
M-WIWI-101456	Intelligent Systems and Services	9 CR
M-INFO-100747	Integrated Network and Systems Management	4 CR
M-INFO-100732	Interactive Computer Graphics	5 CR
M-INFO-100800	Internet of Everything	4 CR
M-INFO-100749	Introduction to Bioinformatics for Computer Scientists	3 CR
M-INFO-100786	IT-Security Management for Networked Systems	5 CR
M-INFO-100819	Cognitive Systems *First usage possible until 9/30/2024.*	6 CR
M-INFO-101575	Computational Complexity Theory, with a View Towards Cryptography	6 CR
M-INFO-100728	Context Sensitive Systems	5 CR
M-INFO-100742	Cryptographic Voting Schemes	3 CR
M-INFO-100837	Curves and Surfaces in CAD I	5 CR
M-INFO-101231	Curves and Surfaces for Geometric Design	5 CR
M-INFO-101213	Curves and Surfaces in CAD III	5 CR
M-INFO-100840	Localization of Mobile Agents	6 CR
M-INFO-100807	Low Power Design	3 CR
M-INFO-100848	Machine Translation	6 CR
M-WIWI-103356	Machine Learning	9 CR
M-INFO-105778	Machine Learning - Foundations and Algorithms	5 CR
M-INFO-100729	Human Computer Interaction	6 CR
M-INFO-100824	Human-Machine-Interaction in Anthropomatics: Basics	3 CR
M-INFO-100785	Mobile Communication	4 CR
M-INFO-100828	Models of Parallel Processing	5 CR
M-INFO-100741	Model-Driven Software Development	3 CR
M-INFO-100825	Pattern Recognition	6 CR
M-INFO-100812	Meshes and Point Clouds	3 CR
M-INFO-100782	Network Security: Architectures and Protocols	4 CR
M-INFO-100784	Next Generation Internet	4 CR
M-INFO-100830	Optimization and Synthesis of Embedded Systems (ES1)	3 CR
M-INFO-100808	Parallel Computer Systems and Parallel Programming	4 CR
M-INFO-100796	Parallel Algorithms	5 CR
M-INFO-100731	Photorealistic Rendering	5 CR
M-INFO-104164	Access Control Systems Lab	4 CR
M-INFO-105870	Practical Course: Advanced Topics in High Performance Computing, Data Management and Analytics	6 CR
M-INFO-104699	Practical Course: Hot Research Topics in Computer Graphics	6 CR
M-INFO-102072	Laboratory Course Algorithm Engineering	6 CR
M-INFO-102807	Practical Course: Analysis of Complex Data Sets	4 CR
M-INFO-103166	Application Security Lab	4 CR
M-INFO-102411	Practical Course Automatic Speech Recognition	3 CR
M-INFO-105495	Practical Course: Biologically Inspired Robots	6 CR
M-INFO-105632	Practical Course: Data Science	6 CR
M-INFO-102353	Practical Course Circuit Design with Intel Galileo	3 CR
M-INFO-103047	Practical Course Decentralized Systems and Network Services	4 CR

M-INFO-102570	Practical Course: Digital Design & Test Automation Flow	3 CR
M-INFO-101667	Practical Course: Discrete Freeform Surfaces	6 CR
M-INFO-103506	Lab: Efficient Parallel C++	6 CR
M-INFO-105740	Practical Course: Customized Embedded Processor Design	4 CR
M-INFO-102661	Practical Course FPGA Programming	3 CR
M-INFO-100724	Practical Course: General-Purpose Computation on Graphics Processing Units	3 CR
M-INFO-101666	Practical Course: Geometric Modeling	3 CR
M-INFO-103302	Lab: Graph Visualization in Practice	5 CR
M-INFO-105384	Praktikum: Graphics and Game Development	6 CR
M-INFO-104254	Practical: Course Engineering Approaches to Software Development	6 CR
M-INFO-103706	Lab: Internet of Things (IoT)	4 CR
M-INFO-103128	Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data	4 CR
M-INFO-101559	Laboratory in Cryptoanalysis	3 CR
M-INFO-101558	Laboratory in Cryptography	3 CR
M-INFO-104031	Lab: Low Power Design and Embedded Systems	4 CR
M-INFO-101579	Practical Course Model-Driven Software Development	6 CR
M-INFO-103143	Practical Course: Neural Network Exercises	3 CR
M-INFO-102414	Natural Language Dialog Systems	6 CR
M-INFO-104895	Penetration Testing Lab	4 CR
M-INFO-101889	Practical Course Applied Telematics	3 CR
M-INFO-101537	Practical Course: Programme Verification	3 CR
M-INFO-102092	Practical Course Protocol Engineering	4 CR
M-INFO-101560	Laboratory in Security	4 CR
M-INFO-103235	Practical Course: Smart Data Analytics	6 CR
M-INFO-105997	Lab Project: Speech Translation neu	6 CR
M-INFO-101567	Practical Course: Visual Computing 2	6 CR
M-INFO-101635	Practical Course: Web Applications and Service-Oriented Architectures (II)	5 CR
M-INFO-104357	Practical Introduction to Hardware Security	6 CR
M-INFO-105037	Research Project (Project, 1st Semester)	10 CR
M-INFO-105038	Research Project (Project, 2nd Semester)	10 CR
M-INFO-100985	Multicore Programming in Practice: Tools, Models, Languages	6 CR
M-INFO-102966	Practical Course Computer Vision for Human-Computer Interaction	6 CR
M-INFO-104072	Lab Course Heterogeneous Computing	6 CR
M-INFO-105792	Humanoid Robotics Laboratory	6 CR
M-INFO-102383	Project Lab: Image Analysis and Fusion	6 CR
M-INFO-105958	Practical Course: Machine Learning and Intelligent Systems	8 CR
M-INFO-102224	Practical Project Robotics and Automation I (Software)	6 CR
M-INFO-102230	Practical Project Robotics and Automation II (Hardware)	6 CR
M-INFO-101891	Practical Course Software Defined Networking	6 CR
M-INFO-104894	Reinforcement Learning and Neural Networks in Robotics	3 CR
M-INFO-101853	Rationale Splines	5 CR
M-INFO-101857	Rationale Splines	3 CR
M-INFO-100794	Randomized Algorithms	5 CR
M-INFO-100818	Computer Architecture	6 CR
M-INFO-100721	Reconfigurable and Adaptive Systems	3 CR
M-INFO-100850	Reliable Computing I	3 CR
M-INFO-100763	Requirements Engineering	3 CR
M-INFO-105620	Research Focus Class: Blockchain & Payment Channel Networks	6 CR
M-INFO-102522	Robotics - Practical Course	6 CR
M-INFO-100893	Robotics I - Introduction to Robotics	6 CR

M-INFO-102756	Robotics II - Humanoid Robotics	3 CR
M-INFO-104897	Robotics III - Sensors and Perception in Robotics	3 CR
M-INFO-100820	Medical Robotics	3 CR
M-INFO-105622	Practical SAT Solving (extended)	6 CR
M-INFO-105780	Scientific Methods to Design and Analyze Secure Decentralized Systems	5 CR
M-INFO-105959	Seminar Laboratory: Machine Learning and Intelligent Systems	3 CR
M-INFO-100834	Security *First usage possible until 9/30/2024.*	6 CR
M-INFO-100823	Signals and Codes	3 CR
M-INFO-100844	Software Architecture and Quality	3 CR
M-INFO-102998	Software Lab Parallel Numerics	6 CR
M-INFO-100802	Software Development for Modern, Parallel Platforms	3 CR
M-INFO-105471	Software Product Line Engineering	3 CR
M-INFO-100833	Software Engineering II	6 CR
M-INFO-100719	Software-Evolution	3 CR
M-INFO-100829	Stochastic Information Processing	6 CR
M-INFO-100735	Natural Language Processing and Software Engineering	3 CR
M-INFO-100853	Symmetric Encryption	3 CR
M-INFO-100801	Telematics	6 CR
M-INFO-100851	Testing Digital Systems I	3 CR
M-INFO-102962	Testing Digital Systems II	3 CR
M-INFO-105584	Theoretical Foundations of Cryptography	6 CR
M-INFO-100789	Ubiquitous Computing	5 CR
M-WIWI-101458	Ubiquitous Computing	9 CR
M-INFO-100839	Fuzzy Sets	6 CR
M-INFO-101863	Subdivision Algorithms	3 CR
M-INFO-101864	Subdivision Algorithms	5 CR
M-INFO-105999	Natural Language Processing neu	6 CR
M-INFO-100761	Distributed Computing	4 CR
M-INFO-100738	Visualization	5 CR
M-WIWI-105368	Web and Data Science	9 CR
M-INFO-100734	Web Applications and Service-Oriented Architectures (II)	4 CR
M-WIWI-101455	Web Data Management	9 CR

4.4 Economics and Management

Credits
18

Business Administration (Election:)		
M-WIWI-105659	Advanced Machine Learning and Data Science	9 CR
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-103117	Data Science: Data-Driven Information Systems	9 CR
M-WIWI-103118	Data Science: Data-Driven User Modeling	9 CR
M-WIWI-101647	Data Science: Evidence-based Marketing	9 CR
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	9 CR
M-WIWI-104080	Designing Interactive Information Systems	9 CR
M-WIWI-102808	Digital Service Systems in Industry	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-WIWI-101409	Electronic Markets	9 CR
M-WIWI-101451	Energy Economics and Energy Markets	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101488	Entrepreneurship (EnTechnon)	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research	9 CR
M-WIWI-101471	Industrial Production II	9 CR
M-WIWI-101412	Industrial Production III	9 CR
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-WIWI-101507	Innovation Management	9 CR
M-WIWI-101446	Market Engineering	9 CR
M-WIWI-105312	Marketing and Sales Management	9 CR
M-WIWI-101506	Service Analytics	9 CR
M-WIWI-101503	Service Design Thinking	9 CR
M-WIWI-102754	Service Economics and Management	9 CR
M-WIWI-102806	Service Innovation, Design & Engineering	9 CR
M-WIWI-101448	Service Management	9 CR
M-WIWI-103119	Advanced Topics in Strategy and Management	9 CR
Economics (Election:)		
M-WIWI-101453	Applied Strategic Decisions	9 CR
M-WIWI-101504	Collective Decision Making	9 CR
M-WIWI-101505	Experimental Economics	9 CR
M-WIWI-101478	Innovation and Growth	9 CR
M-WIWI-101514	Innovation Economics	9 CR
M-WIWI-101500	Microeconomic Theory	9 CR
M-WIWI-101406	Network Economics	9 CR
M-WIWI-101502	Economic Theory and its Application in Finance	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
M-WIWI-101468	Environmental Economics	9 CR
M-WIWI-101485	Transport Infrastructure Policy and Regional Development	9 CR
M-WIWI-101511	Advanced Topics in Public Finance	9 CR
M-WIWI-101496	Growth and Agglomeration	9 CR
Operations Research (Election:)		
M-WIWI-101473	Mathematical Programming	9 CR
M-WIWI-102832	Operations Research in Supply Chain Management	9 CR

M-WIWI-102805	Service Operations	9 CR
M-WIWI-103289	Stochastic Optimization	9 CR
Statistics (Election:)		
M-WIWI-101637	Analytics and Statistics	9 CR
M-WIWI-101638	Econometrics and Statistics I	9 CR
M-WIWI-101639	Econometrics and Statistics II	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR

4.5 Law

Credits
18

Compulsory Elective Module in Law (Election:)		
M-INFO-104810	European and National Technology Law	9 CR
M-INFO-101217	Public Business Law	9 CR
M-INFO-101216	Private Business Law	9 CR
M-INFO-101215	Intellectual Property Law	9 CR

4.6 Seminars

Credits
6

Election notes
In the subjects Information Systems, Informatics, Economics and Management and Law, two seminars of 3 LP each must be completed. The seminars have to be chosen from different subjects.

Seminars (Election: at most 2 items)		
M-INFO-102822	Seminar Module Informatics	3 CR
M-INFO-101218	Seminar Module Law	3 CR
M-WIWI-104815	Seminar Information Systems	3 CR
M-WIWI-102736	Seminar Module Economic Sciences	3 CR

5 Modules

M 5.1 Module: Access Control Systems Lab [M-INFO-104164]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	Grade to a tenth	Each summer term	1 term	German/English	4	2

Mandatory			
T-INFO-108611	Access Control Systems Lab	4 CR	Hartenstein

Content
An information security model defines access rights that express for a given system which subjects are allowed to perform which actions on which objects. A system is said to be secure with respect to a given information security model, if it enforces the corresponding access rights. Thus, access control modeling and access control systems represent the fundamental building blocks of secure services, be it on the Web or in the Internet of Everything.

In this master-level course, we thoroughly investigate the evolution of access control models (access control matrix, role-based access control, attribute access control) and describe usage control models as a unified framework for both access control and digital rights management. The students experiment with real-world access control protocols and technologies and thus apply the contents of the lecture "Access Control Systems: Foundations and Practice" in a real-world context.

Workload
Lab Sessions: 6 x 2h = 12h

Lab Tasks: 6 x 10h = 60h

Lab Reports: 6 x 4h = 24h

Buffer: 6 x 2h = 12h

Final Presentation: 12h

Σ = 120h = 4 ECTS

M 5.2 Module: Access Control Systems: Foundations and Practice [M-INFO-103046]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106061	Access Control Systems: Foundations and Practice	5 CR	Hartenstein

M 5.3 Module: Advanced Data Structures [M-INFO-102731]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-INFO-105687	Advanced Data Structures	4 CR	Sanders
T-INFO-111849	Advanced Data Structures Project/Experiment	1 CR	Sanders

M 5.4 Module: Advanced Machine Learning and Data Science [M-WIWI-105659]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

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

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

Prerequisites
see T-WIWI-106193 "Advanced Machine Learning and Data Science".

Competence Goal
After a successful project, the students can:

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

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

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

Recommendation
None

M 5.5 Module: Advanced Topics in Public Finance [M-WIWI-101511]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	7

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

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

Competence Goal
The student

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

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

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

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

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

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

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

M 5.6 Module: Advanced Topics in Strategy and Management [M-WIWI-103119]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

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

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
Students

- are able to analyze business strategies and derive recommendations using appropriate frameworks
- learn to express their position through compelling reasoning in structured discussions
- are qualified to critically examine recent research topics in the field of strategic management
- can derive own conclusions from less structured information by using interdisciplinary knowledge

Content
The module is divided into three main topics:

The students

- analyze and discuss a wide range of business strategies on the basis of collectively selected case studies.
- participate in a business wargaming workshop and analyze strategic interactions.
- write a paper about current topics in the field of strategic management theory.

Annotation
This course is admission restricted. After being admitted to one course of this module, the participation at the other courses will be guaranteed.

Every course of this module will be at least offered every second term. Thus, it will be possible to complete the module within two terms.

Recommendation
None

M 5.7 Module: Algorithm Engineering [M-INFO-100795]

Responsible: Prof. Dr. Peter Sanders
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-INFO-101332	Algorithm Engineering	4 CR	Sanders, Wagner
T-INFO-111856	Algorithm Engineering Pass	1 CR	Sanders, Wagner

M 5.8 Module: Algorithmic Graph Theory [M-INFO-100762]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103588	Algorithmic Graph Theory	5 CR	Wagner

M 5.9 Module: Algorithmic Methods for Network Analysis [M-INFO-102400]

Responsible: Dr. rer. nat. Torsten Ueckerdt
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104759	Algorithmic Methods for Network Analysis	5 CR	Ueckerdt, Wagner

Workload
150 h

M 5.10 Module: Algorithms for Ad-Hoc and Sensor Networks [M-INFO-102093]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104388	Algorithms for Ad-Hoc and Sensor Networks	5 CR	Wagner

M 5.11 Module: Algorithms for Routing [M-INFO-100031]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-100002	Algorithms for Routing	5 CR	Wagner

M 5.12 Module: Algorithms for Visualization of Graphs [M-INFO-102094]

Responsible: Dr. rer. nat. Torsten Ueckerdt
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104390	Algorithms for Visualization of Graphs	5 CR	Wagner

M 5.13 Module: Algorithms II [M-INFO-101173]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-102020	Algorithms II	6 CR	Sanders

M 5.14 Module: Algorithms in Cellular Automata [M-INFO-100797]

Responsible: Thomas Worsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101334	Algorithms in Cellular Automata	5 CR	Worsch

M 5.15 Module: Analytics and Statistics [M-WIWI-101637]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Statistics)

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

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

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 "*Advanced Statistics*" is compulsory.

Competence Goal
A Student

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

Content

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

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

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

M 5.16 Module: Application Security Lab [M-INFO-103166]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106289	Application Security Lab	4 CR	Geiselmann, Müller-Quade

M 5.17 Module: Applied Differential Geometry [M-INFO-102226]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111000	Applied Differential Geometry - Practical	2 CR	Prautzsch
T-INFO-109924	Applied Differential Geometry	3 CR	Prautzsch

M 5.18 Module: Applied Strategic Decisions [M-WIWI-101453]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Mandatory			
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
Supplementary Courses (Election: between 4,5 and 5 credits)			
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
T-WIWI-102862	Predictive Mechanism and Market Design	4,5 CR	Reiß
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken

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

Competence Goal
Students

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

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

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

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

Recommendation
Basic knowledge in game theory is assumed.

M 5.19 Module: Artificial Intelligence [M-WIWI-105366]

Responsible: Dr.-Ing. Michael Färber
Organisation: KIT Department of Economics and Management
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	1

Compulsory Elective Courses (Election: at least 2 items)			
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB

Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- understands the koncepts behind Semantic Web and Linked Data technologies
- develops ontologies to be employed in semantic web-based applications and chooses suitable representation languages,
- is familiar with approaches in the area of knowledge representation and modelling,
- is able to transfer the methods and technologies of semantic web technologies to new application sectors,
- evaluates the potential of semantic web for new application sectors,
- understands the challenges in the areas of Data and system integration on the web is able to develop solutions.
- know the basics of machine learning, data mining and knowledge discovery
- can design, train and evaluate systems that are capable of learning
- carry out knowledge discovery projects, taking into account algorithms, representations and applications.

Content
The focus of the module is on Semantic Web Technologies as well as machine learning and data mining methods for knowledge acquisition from large databases.

The goal of the semantic web is the meaning (semantics) of data on the web for intelligent systems, e.g. in e-commerce and to make Internet portals usable. The representation of knowledge in the form of RDF and ontologies, the provision of data as Linked Data, as well as the request of data using SPARQL. In this lecture the basics of knowledge representation and processing for the corresponding technologies and application examples are presented.

The lecture "Knowledge Discovery" gives an overview of approaches of machine learning and data mining for knowledge extraction from large data sets. These are examined especially with regard to algorithms, applicability to different data representations and the use in real application scenarios.
Knowledge Discovery is an established research area with a large community that investigates methods for discovering patterns and regularities in large amounts of data, including unstructured text. A variety of methods exist to extract patterns and provide previously unknown insights. This information can be predictive or descriptive.
The lecture gives an overview of Knowledge Discovery. Specific techniques and methods, challenges and current and future research topics in this research area will be taught.
Contents of the lecture cover the entire machine learning and data mining process with topics on supervised and unsupervised learning and empirical evaluation. Covered learning methods range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

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

M 5.20 Module: Automated Planning and Scheduling [M-INFO-104447]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-109085	Automated Planning and Scheduling	5 CR	Sanders

M 5.21 Module: Automated Visual Inspection and Image Processing [M-INFO-100826]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101363	Automated Visual Inspection and Image Processing	6 CR	Beyerer

M 5.22 Module: Biologically Inspired Robots [M-INFO-100814]

Responsible: Prof. Dr.-Ing. Rüdiger Dillmann
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101351	Biologically Inspired Robots	3 CR	Rönnau

M 5.23 Module: Biometric Systems for Person Identification [M-INFO-102968]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-105948	Biometric Systems for Person Identification	3 CR	Stiefelhagen

M 5.24 Module: Business & Service Engineering [M-WIWI-101410]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102848	Personalization and Services	4,5 CR	Sonnenbichler
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-WIWI-102641	Service Innovation	4,5 CR	Satzger
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 student should

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

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

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 .

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

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

Recommendation
None

M 5.25 Module: Cognitive Systems [M-INFO-100819]

Responsible: Prof. Dr. Gerhard Neumann
Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: Informatics (Usage until 9/30/2024)

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

Mandatory			
T-INFO-101356	Cognitive Systems	6 CR	Neumann, Waibel

M 5.26 Module: Collective Decision Making [M-WIWI-101504]

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

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

Compulsory Elective Courses (Election:)			
T-WIWI-102740	Public Management	4,5 CR	Wigger
T-WIWI-102859	Social Choice Theory	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 the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

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

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

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

M 5.27 Module: Computational Cartography [M-INFO-100754]

Responsible: Dr. Martin Nöllenburg
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101291	Computational Cartography	5 CR	Nöllenburg, Wagner

M 5.28 Module: Computational Complexity Theory, with a View Towards Cryptography [M-INFO-101575]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103014	Computational Complexity Theory, with a View Towards Cryptography	6 CR	Hofheinz, Müller-Quade

M 5.29 Module: Computational Geometry [M-INFO-102110]

Responsible: TT-Prof. Dr. Thomas Bläsius
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Irregular	1 term	German	4	2

Mandatory			
T-INFO-104429	Computational Geometry	6 CR	Wagner

M 5.30 Module: Computer Architecture [M-INFO-100818]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101355	Computer Architecture	6 CR	Karl

M 5.31 Module: Computer Graphics [M-INFO-100856]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101393	Computer Graphics	6 CR	Dachsbacher
T-INFO-104313	Computer Graphics Pass	0 CR	Dachsbacher

M 5.32 Module: Context Sensitive Systems [M-INFO-100728]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-INFO-107499	Context Sensitive Systems	5 CR	Beigl

M 5.33 Module: Critical Digital Infrastructures [M-WIWI-104403]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: Informatics

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

Mandatory			
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-110144	Emerging Trends in Digital Health	4,5 CR	Sunyaev
T-WIWI-110143	Emerging Trends in Internet Technologies	4,5 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development	4,5 CR	Sunyaev
T-WIWI-111126	Advanced Lab Blockchain Hackathon (Master)	4,5 CR	Sunyaev
T-WIWI-109251	Selected Issues in Critical Information Infrastructures	4,5 CR	Sunyaev

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 9 credits.
The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

Prerequisites
None

Competence Goal
The students ...

- have foundational knowledge about the design and operation of critical digital infrastructures
- have in-depth methodological knowledge in design science research and related scientific domains
- can distinguish between the challenges and opportunities of critical digital infrastructures in different domains
- can evaluate and improve sociotechnical systems
- combine theoretical and practical contents of the courses in the module to solve existing problems in the domain of critical digital infrastructures

Content
Critical digital infrastructures are sociotechnical systems comprising essential software components and information systems with pivotal impact on individuals, organizations, governments, economies, and society. Critical information infrastructures require careful design, development, and evaluation to ensure reliable, secure, and purposeful operation. This module features a strong focus on different subject areas, including, but not limited to, internet technologies, health care, and information privacy. The lectures in the module introduce students to a domain relevant to critical digital infrastructures and the labs allow to gain hands-on experience in this interesting domain.

Annotation
This new module can be chosen from summer term 2018.

Workload
30 hours per ECTS
Total workload for 9 ECTS: approx. 270 hours
The exact allocation is made according to the credit points of the courses.

Recommendation
The courses in the module may be held in English. Participants should be well versed in written and spoken English.
The courses can be visited independently. Participants can start the module in the winter as well as in the summer term.
Programming skills may be required in some courses.
Experience in writing scientific papers is helpful but not required.

M 5.34 Module: Cross-Functional Management Accounting [M-WIWI-101510]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	10

Mandatory			
T-WIWI-102885	Advanced Management Accounting	4,5 CR	Wouters
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-102835	Marketing Strategy Business Game	1,5 CR	Klarmann
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	1,5 CR	Klarmann
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-108651	Extraordinary additional course in the module Cross-Functional Management Accounting	4,5 CR	Wouters

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 "Advanced Management Accounting" is compulsory.

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

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

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

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

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

Recommendation
None

M 5.35 Module: Cryptographic Voting Schemes [M-INFO-100742]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101279	Cryptographic Voting Schemes	3 CR	Müller-Quade

M 5.36 Module: Curves and Surfaces for Geometric Design [M-INFO-101231]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-102041	Curves and Surfaces for Geometric Design II	5 CR	Prautzsch

M 5.37 Module: Curves and Surfaces in CAD I [M-INFO-100837]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101374	Curves and Surfaces in CAD I	5 CR	Prautzsch

M 5.38 Module: Curves and Surfaces in CAD III [M-INFO-101213]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-102006	Curves and Surfaces in CAD II	5 CR	Prautzsch

M 5.39 Module: Data and Storage Management [M-INFO-100739]

Responsible: Prof. Dr. Bernhard Neumair
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101276	Data and Storage Management	4 CR	Neumair

M 5.40 Module: Data Privacy: From Anonymization to Access Control [M-INFO-104045]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-108377	Data Privacy: From Anonymization to Access Control	3 CR	Böhm

M 5.41 Module: Data Science I [M-INFO-105799]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	4	2

Mandatory			
T-INFO-111622	Data Science I	5 CR	Böhm, Fouché

Competence Goal
At the end of this course, participants should have a good understanding of the data-science process, i.e., the process of generating practical insights from large data sets, and of the different steps of this process. They should be able to explain and compare approaches for the analysis and management of large data sets in terms of their effectiveness and applicability. Participants should understand which problems are currently open in the field of Data Science and have gained insights into the current state of the art.

Content
Our intention is to devote more attention to the Data Science process and to explicitly address the steps of this process. – Techniques for analyzing large data sets are attracting great interest among users. The spectrum is broad and includes classic industries such as banks and insurance companies, but also newer players, such as Internet companies, social media, natural sciences and engineering. In all cases, the desire is to extract interesting patterns from very large data sets with as little effort as possible, and to monitor the behavior or systems. This lecture deals with the steps to extract knowledge from data, ranging from techniques to preprocess data to fundamental models to extract knowledge from data, e.g., in the form of statistics, association rules, clusters or systematic predictions.

M 5.42 Module: Data Science II [M-INFO-105801]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111626	Data Science II	3 CR	Böhm, Fouché

M 5.43 Module: Data Science: Data-Driven Information Systems [M-WIWI-103117]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election:)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-106187	Business Data Strategy	4,5 CR	Weinhardt
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-110918	Introduction to Bayesian Statistics for Analyzing Data	4,5 CR	Scheibehenne
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CR	Weinhardt
T-WIWI-106207	Practical Seminar: Data-Driven Information Systems	4,5 CR	Mädche, Satzger, Setzer, Weinhardt

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.

Prerequisites
None.

Competence Goal
The student

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

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

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

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

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

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

Texteintrag

Annotation
The course „Business Data Strategy“ can be chosen from winter term 2016 on.

Recommendation
Basic knowledge of Information Management, Operations Research, Descriptive Statistics, and Inferential Statistics is assumed.

M 5.44 Module: Data Science: Data-Driven User Modeling [M-WIWI-103118]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CR	Weinhardt
T-WIWI-108765	Practical Seminar: Advanced Analytics	4,5 CR	Weinhardt

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

Prerequisites
None

Competence Goal
Students of this module

- learn methods for planning empirical studies, in particular laboratory experiments,
- acquire theoretical knowledge and practical skills in analysing empirical data,
- familiarize with different ways of modelling user behaviour, are able to critically discuss, and to evaluate them

Content
Understanding and supporting user interactions with applications better plays an increasingly large role in the design of business applications. This applies both to interfaces for customers and to internal information systems. The data that is generated during user interactions can be channelled straight into business processes, for instance by analysing and decomposing purchase decisions, and by feeding this data into product design processes.

The Crowd Analytics section considers the analysis of data from online platforms, particularly of those following crowd- or peer-to-peer based business models. This includes platforms like Airbnb, Kickstarter and Amazon Mechanical Turk.

Theoretical models of user (decision) behaviour help analyzing the empirically observed user behaviour in a systematic fashion. Testing these models and their predictions in controlled experiments (primarily in the lab) in turn helps refine theory and to generate practically relevant design recommendations. Analyses are carried out using advanced analytic methods.

Students learn fundamental theoretical models for user behaviour in systems and apply them to cases. Students are also taught methods and skills for conceptualizing and planning empirical studies and for analyzing the resulting data.

Recommendation
Basic knowledge of Information Management, Operations Research, Descriptive Statistics, and Inferential Statistics is assumed.

M 5.45 Module: Data Science: Evidence-based Marketing [M-WIWI-101647]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

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

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
Keine.

Competence Goal
Students

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

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

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

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

Recommendation
None

M 5.46 Module: Data Science: Intelligent, Adaptive, and Learning Information Services [M-WIWI-105661]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-109921	Advanced Machine Learning	4,5 CR	Geyer-Schulz, Nazemi
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-102762	Business Dynamics	4,5 CR	Geyer-Schulz, Glenn
T-WIWI-111267	Intelligent Agent Architectures	4,5 CR	Geyer-Schulz
T-WIWI-110915	Intelligent Agents and Decision Theory	4,5 CR	Geyer-Schulz
T-WIWI-102848	Personalization and Services	4,5 CR	Sonnenbichler
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz

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
The student

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

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

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

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

Recommendation
None

M 5.47 Module: Database as a Service [M-INFO-105724]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111400	Database as a Service	5 CR	Böhm

Competence Goal
At the end of the lecture the participants shall be able to explain what is specific to database functionality in the cloud, and what the advantages and disadvantages are. They shall have understood how cloud-enabled database technology differs from conventional technology of this kind, but also where the commonalities reside. Participants shall be able to explain the core ideas and approaches that define cloud-enabled database technology and discern them from each other.

Content
We currently witness owners of large data sets, be they big organizations, be they startups, to rent database functionality to a significant extent, rather than providing it themselves. The total costs of ownership just happen to be much lower in many cases. This lecture features database technology that facilitates exactly this. This concerns you if you want to make use of such services at some time in the future, but is also is of interest if you will have to do with 'conventional' database technology.

According to my perspective, the following features of "cloud-enabled" database technology are key, and the lecture will cover them:

- Fully automated tuning of individual database – the option to interact with a database administrator does not exist any more!
- Approximate query results suddenly are attractive. The monetary costs of evaluating a query are commensurate with the necessary effort – on the other side, high fixed costs that typically occur with owner-operated databases do not incur any more.
- Multi-tenancy. I.e., how to ensure tenants that are completely independent from each other to have a DBMS for their applications available, not only without interfering with each other, but also with performance guarantees for each tenant individually?
- Secure storage. Administering data and evaluating queries shall take place in the cloud. At the same time, the cloud provider must not be allowed to see the data. Both objectives in full beauty currently are incompatible – we will discuss possible compromises.

In this setting, conventional, established concepts like distributed transactions and distributed data management and query processing play an important role as well, and the lecture will address them equally.

Literature
Will be made available in the lecture. The following books cover foundations and specifics of at least some chapters of the lecture:

- Database Systems Implementation, by Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom.
- Concurrency Control and Recovery in Database Systems, by Philip A. Bernstein, Vassos Hadzilacos, and Nathan Goodman.
- Principles of Distributed Database Systems Tamer Özsu, Patrick Valduriez

M 5.48 Module: Decentralized Systems: Fundamentals, Modeling, and Applications [M-INFO-105334]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-110820	Decentralized Systems: Fundamentals, Modeling, and Applications	6 CR	Hartenstein

Recommendation
Prior knowledge in Foundations of IT-Security and Computer Networks is recommended.

M 5.49 Module: Deep Learning and Neural Networks [M-INFO-104460]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-109124	Deep Learning and Neural Networks	6 CR	Waibel

M 5.50 Module: Deep Learning for Computer Vision I: Basics [M-INFO-105753]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111491	Deep Learning for Computer Vision I: Basics	3 CR	Stiefelhagen

Competence Goal
Students should be able to grasp the underlying concepts in the field of deep learning and its various applications.

- Understand the theoretical basis of deep learning
- Understand the Convolutional Neural Networks (CNN)
- Develop basis for the concepts and algorithms used in building and training the CNNs.
- Able to apply deep learning in different computer vision applications.

Content
In recent years tremendous progress has been made in analysing and understanding image and video content. The dominant approach in Computer Vision today are deep learning approaches, in particular the usage of Convolutional Neural Networks.

The lecture introduces the basics, as well as advanced aspects of deep learning methods and their application for a number of computer vision tasks. The following topics will be addressed in the lecture:

- Introduction to Deep Learning
- Convolutional Neural Networks (CNN): Background
- CNNs: basic architectures and learning algorithms
- Object Recognition with CNN
- Image Segmentation with CNN
- Recurrent Neural Networks
- Generating image descriptions (Image Captioning)
- Automatic question answering (Visual Question Answering)
- Generative Adversarial Networks (GAN) and their applications
- Deep Learning platforms and tools

Annotation
The course is partially given in German and English.

M 5.51 Module: Deep Learning for Computer Vision II: Advanced Topics [M-INFO-105755]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111494	Deep Learning for Computer Vision II: Advanced Topics	3 CR	Stiefelhagen

M 5.52 Module: Deployment of Database Systems [M-INFO-100780]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101317	Deployment of Database Systems	5 CR	Böhm

M 5.53 Module: Design and Architectures of Embedded Systems (ES2) [M-INFO-100831]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101368	Design and Architectures of Embedded Systems (ES2)	3 CR	Henkel

M 5.54 Module: Design Principles for Interactive Real-Time Systems [M-INFO-100753]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101290	Design Principles for Interactive Real-Time Systems	3 CR	Beyerer

M 5.55 Module: Designing Interactive Information Systems [M-WIWI-104080]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-110851	Designing Interactive Systems	4,5 CR	Mädche
T-WIWI-110877	Engineering Interactive Systems	4,5 CR	
Supplementary Courses (Election: at most 1 item)			
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	4,5 CR	Mädche

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.

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

Competence Goal
The student

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

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

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

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

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

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

M 5.56 Module: Development of Business Information Systems [M-WIWI-101477]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: Informatics

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

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
Supplementary Courses (Election: at most 1 item)			
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CR	Oberweis
T-WIWI-102667	Management of IT-Projects	4,5 CR	Schätzle
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-102669	Strategic Management of Information Technology	4,5 CR	Wolf

Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course *Datenbanksysteme und XML* or the course *Software Quality Management* must be examined.

Competence Goal
Students

- describe the structure and the components of enterprise information systems,
- explain functionality and architecture of the enterprise information system components ,
- choose and apply relevant components to solve given problems in a methodic approach,
- describe roles, activities and products in the field of software engineering management,
- compare process and quality models and choose an appropriate model in a concrete situation,
- write scientific theses in the areas of enterprise information system components and software engineering management and find own solutions for given problems and research questions.

Content
An enterprise information system contains the complete application software to store and process data and information in an organisation including design and management of databases, workflow management and strategic information planning.

Due to global networking and geographical distribution of enterprises as well as the increasing acceptation of eCommerce the application of distributed information systems becomes particular important.

This module teaches concepts and methods for design and application of information systems.

Annotation
The course T-WIWI-102759 "Requirements Analysis and Requirements Management" will no longer be offered in the module as of winter semester 2018/2019.

Workload
See German version

M 5.57 Module: Digital Accessibility and Assistive Technologies [M-INFO-105882]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111830	Digital Accessibility and Assistive Technologies	3 CR	Stiefelhagen

Content

Digital accessibility is a topic that affects us all. Accessing information digitally, from childhood to old age. Assistive technologies, such as smartphones, tablets, smartwatches, wearables in general have become a part of our everyday life. Exactly these things should be operable and usable by all people. Regardless of any barriers.

But what are the details behind this? What are the rights and foundations for this? What all has to be done to be "barrier-free"?

This can all be best illustrated by the example of "visual impairment".

According to the World Health Organization, there are approximately 285 million people with visual impairments worldwide, including approximately 39 million people who are blind. The partial or complete loss of vision significantly restricts blind and visually impaired people in their working and social lives. It is difficult for blind and visually impaired people to orient themselves and move around in public spaces without assistance. The reasons for this are problems in perceiving obstacles and landmarks as well as the resulting fear of accidents and orientation difficulties. Other problems in everyday life are: reading texts, recognizing banknotes, food, clothes or finding objects in the household.

For support, blind and visually impaired people can already rely on a number of technical aids. For example, digitized texts can be made accessible through speech output or Braille output devices. There are also various devices made specifically for the blind. The most important aid for improving mobility is by far the cane for the blind. In recent years, some electronic aids for obstacle detection or orientation support have also been developed, but these offer only very limited functionality at a relatively high price and are therefore rather rarely in use.

The lecture gives an overview of IT-based Assistive Technologies (AT) by example and includes the following topics:

- Legal basics
- Basics of visual impairments, their causes and effects
- Existing assistive technologies for different fields of application
- AT for information access
- Accessible software development
- Accessible design of websites
- Accessible documents
- Use of machine learning methods
- Feedback systems and their basics
- Insights into current research topics around the topic of digital accessibility

For the latest information, visit http://cvhci.anthropomatik.kit.edu/

M 5.58 Module: Digital Service Systems in Industry [M-WIWI-102808]

Responsible: Prof. Dr. Wolf Fichtner
Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	7

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr
T-WIWI-107043	Liberalised Power Markets	3 CR	Fichtner
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CR	Nickel
T-WIWI-106563	Practical Seminar Digital Service Systems	4,5 CR	Mädche, Satzger
T-WIWI-102641	Service Innovation	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
This module can only be assigned as an elective module.

Competence Goal
Students

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

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

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

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

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

Recommendation
None

M 5.59 Module: Distributed Computing [M-INFO-100761]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101298	Distributed Computing	4 CR	Streit

M 5.60 Module: Econometrics and Statistics I [M-WIWI-101638]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Statistics)

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

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

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

Prerequisites
The course "Applied Econometrics" [2520020] is compulsory and must be examined.

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

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

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

M 5.61 Module: Econometrics and Statistics II [M-WIWI-101639]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Statistics)

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

Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-103126	Non- and Semiparametrics	4,5 CR	Schienle
T-WIWI-103127	Panel Data	4,5 CR	Heller
T-WIWI-103128	Portfolio and Asset Liability Management	4,5 CR	Safarian
T-WIWI-110868	Predictive Modeling	4,5 CR	Krüger
T-WIWI-111387	Probabilistic Time Series Forecasting Challenge	4,5 CR	Krüger
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-103129	Stochastic Calculus and Finance	4,5 CR	Safarian
T-WIWI-110939	Financial Econometrics II	4,5 CR	Schienle

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

Prerequisites
This module can only be passed if the module *"Econometrics and Statistics I"* has been finished successfully before.

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

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

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

M 5.62 Module: Economic Theory and its Application in Finance [M-WIWI-101502]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Compulsory Elective Courses (Election: 1 item)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
Supplementary Courses (Election: 1 item)			
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
T-WIWI-109050	Corporate Risk Management	4,5 CR	Ruckes
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes

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 exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

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

Competence Goal
The students

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

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

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

M 5.63 Module: eEnergy: Markets, Services and Systems [M-WIWI-103720]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CR	Weinhardt
T-WIWI-107504	Smart Grid Applications	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 single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
The student

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

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

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

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

M 5.64 Module: Electronic Markets [M-WIWI-101409]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	6

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-102762	Business Dynamics	4,5 CR	Geyer-Schulz, Glenn
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
T-WIWI-105946	Price Management	4,5 CR	Geyer-Schulz, Glenn
T-WIWI-102713	Telecommunication and Internet Economics	4,5 CR	Mitusch

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

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

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

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

Topics include

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

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

Recommendation
None

M 5.65 Module: Empirical Software Engineering [M-INFO-100798]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101335	Empirical Software Engineering	4 CR	Gerking

M 5.66 Module: Energy Economics and Energy Markets [M-WIWI-101451]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	8

Mandatory			
T-WIWI-107043	Liberalised Power Markets	3 CR	Fichtner
Supplementary Courses (Election: at least 6 credits)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-112151	Energy Trading and Risk Management	3 CR	N.N.
T-WIWI-108016	Simulation Game in Energy Economics	3 CR	Genoese
T-WIWI-107446	Quantitative Methods in Energy Economics	3 CR	Plötz
T-WIWI-102712	Regulation Theory and Practice	4,5 CR	Mitusch

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

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

Prerequisites
The lecture Liberalised Power Markets has to be examined.

Competence Goal
The student

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

Content
Liberalised Power Markets: The European liberalisation process, energy markets, pricing, market failure, investment incentives, market power
Energy Trade and Risk Management: trade centres, trade products, market mechanisms, position and risk management
Simulation Game in Energy Economics: Simulation of the German electricity system

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

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

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102793	Efficient Energy Systems and Electric Mobility	3,5 CR	Jochem
T-WIWI-102650	Energy and Environment	4,5 CR	Karl
T-WIWI-102830	Energy Systems Analysis	3 CR	Ardone, Fichtner
T-WIWI-107464	Smart Energy Infrastructure	3 CR	Ardone, Pustisek
T-WIWI-102695	Heat Economy	3 CR	Fichtner

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

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

Prerequisites
None

Competence Goal
The student

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

Content
Heat Economy: district heating, heating technologies, reduction of heat demand, statutory provisions
Energy Systems Analysis: Interdependencies in energy economics, energy systems modelling approaches in energy economics
Energy and Environment: emission factors, emission reduction measures, environmental impact
Efficient Energy Systems and Electric Mobility: concepts and current trends in energy efficiency, Overview of and economical, ecological and social impacts through electric mobility

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

M 5.68 Module: Energy Informatics 1 [M-INFO-101885]

Responsible: Prof. Dr. Veit Hagenmeyer
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German/English	4	2

Mandatory			
T-INFO-103582	Energy Informatics 1	5 CR	Hagenmeyer
T-INFO-110356	Energy Informatics 1 - Preliminary Work	0 CR	Hagenmeyer

M 5.69 Module: Energy Informatics 2 [M-INFO-103044]

Responsible: Prof. Dr. Veit Hagenmeyer
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106059	Energy Informatics 2	5 CR	Hagenmeyer

M 5.70 Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	12

Mandatory part (Election: 1 item)			
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management	3 CR	Terzidis
T-WIWI-102865	Business Planning	3 CR	Terzidis
T-WIWI-110374	Firm creation in IT security	3 CR	Terzidis
T-WIWI-110985	International Business Development and Sales	6 CR	Casenave , Klarmann, Terzidis
T-WIWI-109064	Joint Entrepreneurship Summer School	6 CR	Terzidis
T-WIWI-111561	Startup Experience	6 CR	Terzidis
Supplementary Courses (Election: between 0 and 1 items)			
T-WIWI-102894	Entrepreneurship Research	3 CR	Terzidis
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
T-WIWI-102612	Managing New Technologies	3 CR	Reiß
T-WIWI-102853	Roadmapping	3 CR	Koch

Competence Certificate
See German version.

Prerequisites
None

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

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

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

Recommendation
None

M 5.71 Module: Environmental Economics [M-WIWI-101468]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

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

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 exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

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

Prerequisites
None

Competence Goal
The students

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

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

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

Recommendation
Knowledge in the area of microeconomics and of the content of the course*Economics I: Microeconomics*[2600012], respectively, is required.

M 5.72 Module: European and National Technology Law [M-INFO-104810]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Law

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

Mandatory			
T-INFO-109824	European and National Technology Law	9 CR	Dreier, Matz

M 5.73 Module: Experimental Economics [M-WIWI-101505]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-102862	Predictive Mechanism and Market Design	4,5 CR	Reiß
T-WIWI-102863	Topics in Experimental Economics	4,5 CR	Reiß

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
None.

Competence Goal
Students

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

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

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

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

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

M 5.74 Module: Finance 1 [M-WIWI-101482]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

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

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
The student

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

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

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

M 5.75 Module: Finance 2 [M-WIWI-101483]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-110513	Advanced Empirical Asset Pricing	4,5 CR	Thimme
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-110995	Bond Markets	4,5 CR	Uhrig-Homburg
T-WIWI-110997	Bond Markets - Models & Derivatives	3 CR	Uhrig-Homburg
T-WIWI-110996	Bond Markets - Tools & Applications	1,5 CR	Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
T-WIWI-109050	Corporate Risk Management	4,5 CR	Ruckes
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102900	Financial Analysis	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technology Change	1,5 CR	Ruckes
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-110933	Web App Programming for Finance	4,5 CR	Thimme

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
It is only possible to choose this module in combination with the module *Finance 1*. The module is passed only after the final partial exam of *Finance 1* is additionally passed.

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

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

Annotation
The courses *eFinance: Information Engineering and Management for Securities Trading* [2540454] and *Financial Analysis* [2530205] can be chosen from summer term 2015 on.

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

M 5.76 Module: Finance 3 [M-WIWI-101480]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-110513	Advanced Empirical Asset Pricing	4,5 CR	Thimme
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-110995	Bond Markets	4,5 CR	Uhrig-Homburg
T-WIWI-110997	Bond Markets - Models & Derivatives	3 CR	Uhrig-Homburg
T-WIWI-110996	Bond Markets - Tools & Applications	1,5 CR	Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
T-WIWI-109050	Corporate Risk Management	4,5 CR	Ruckes
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102900	Financial Analysis	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technology Change	1,5 CR	Ruckes
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-110933	Web App Programming for Finance	4,5 CR	Thimme

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
It is only possible to choose this module in combination with the module *Finance 1*and *Finance 2*. The module is passed only after the final partial exams of *Finance 1 and Finance 2* are additionally passed.

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

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

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

M 5.77 Module: Formal Systems [M-INFO-100799]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101336	Formal Systems	6 CR	Beckert

M 5.78 Module: Formal Systems II: Application [M-INFO-100744]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101281	Formal Systems II: Application	5 CR	Beckert

M 5.79 Module: Formal Systems II: Theory [M-INFO-100841]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101378	Formal Systems II: Theory	5 CR	Beckert

M 5.80 Module: Foundations for Advanced Financial -Quant and -Machine Learning Research [M-WIWI-105894]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	see Annotations	1 term	English	4	1

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

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

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

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

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

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

Annotation

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

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

M 5.81 Module: Fuzzy Sets [M-INFO-100839]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101376	Fuzzy Sets	6 CR	Hanebeck

M 5.82 Module: Geometric Optimization [M-INFO-100730]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101267	Geometric Optimzation	3 CR	Prautzsch

M 5.83 Module: Graph Partitioning and Graph Clustering in Theory and Practice [M-INFO-100758]

Responsible: Prof. Dr. Peter Sanders
Dr. rer. nat. Torsten Ueckerdt
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-INFO-101295	Graph Partitioning and Graph Clustering in Theory and Practice	4 CR	Sanders, Ueckerdt
T-INFO-110999	Graph Partitioning and Graph Clustering in Theory and Practice - Practical	1 CR	Sanders, Ueckerdt

M 5.84 Module: Growth and Agglomeration [M-WIWI-101496]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-103107	Spatial Economics	4,5 CR	Ott
T-WIWI-111318	Growth and Development	4,5 CR	Ott

Competence Certificate
The assessment is carried out as partial written exams (see the lectures descriptions).

The overall grade for the module is the average of the grades for each course weighted by the credits.

Prerequisites
None

Competence Goal
The student

- gains deepened knowledge of micro-based general equilibrium models
- understands how based on individual optimizing decisions aggregate phenomena like economic growth or agglomeration (cities / metropolises) result
- is able to understand and evaluate the contribution of these phenomena to the development of economic trends
- can derive policy recommendations based on theory

Content
The module includes the contents of the lectures *Endogenous Growth Theory*, *Spatial Economics* and *Dynamic Macroeconomics*. While the first lecture focuses on dynamic programming in modern macroeconomics, the other two lectures are more formal and analytical.

The common underlying principle of all three lectures in this module is that, based on different theoretical models, economic policy recommendations are derived.

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

Recommendation
Attendance of the course *Introduction Economic Policy* [2560280] is recommended.

Successful completion of the courses*Economics I: Microeconomics*and*Economics II: Macroeconomics*is required.

M 5.85 Module: Hands-on Bioinformatics Practical [M-INFO-101573]

Responsible: Prof. Dr. Alexandros Stamatakis
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103009	Hands-on Bioinformatics Practical	3 CR	Stamatakis

M 5.86 Module: Heterogeneous Parallel Computing Systems [M-INFO-100822]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101359	Heterogeneous Parallel Computing Systems	3 CR	Karl

M 5.87 Module: Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy [M-INFO-100725]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101262	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy	3 CR	Asfour, Spetzger

M 5.88 Module: Human Computer Interaction [M-INFO-100729]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101266	Human-Machine-Interaction	6 CR	Beigl
T-INFO-106257	Human-Machine-Interaction Pass	0 CR	Beigl

M 5.89 Module: Human Factors in Security and Privacy [M-WIWI-104520]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: Informatics

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

Mandatory			
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer

Competence Certificate
The module examination is carried out in the form of partial examinations on the selected courses of the module, with which the minimum requirement at creditpoints is fulfilled. The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

Prerequisites
None

Competence Goal
Students ...

- know why many existing security and privacy mechanisms are not usable and why many awareness/education/training approaches are not effective
- can explain for concrete examples why these are not usable / not effective including why people are likely to face problems with these
- can explain what mental models are, why they are important and how they can be identified
- know how to conduct a cognitive walkthrough to identify problems with existing mechanisms and approaches
- know how to conduct semi-structured interviews
- know how user studies in the security context differ from those conducted in other contexts
- can explain the process of human centered security / privacy by design
- know the advantages and disadvantages of various graphical password schemes
- know concepts such as just in time and place security interventions

Content
The history of information security and privacy has taught us that it takes more than technological innovation to develop effective security and privacy mechanisms: Many aspects of information security and privacy actually depend on both technical and human factors. As a result of focusing on the technical factors, we are seeing a persistent gap between theoretical security and actual security in real world which becomes an increasing problem in the age of digitalization. The gap is mainly caused by strong and actually unrealistic assumptions regarding the users' knowledge and behavior.

Human factors in security and privacy research addresses several types of security and privacy mechanisms, e.g., authentication mechanisms including text and graphical passwords, security and privacy indicators (such as the icons in the address bar of nowadays web browsers) and security and privacy interventions like warning messages, permission dialogs and security and privacy policies as well as corresponding configuration interfaces. Besides security and privacy mechanisms, human factors in security and privacy researchers deal with security and privacy awareness, education, and training approaches.

'Human factors in security & privacy' research areas are:

- identifying users' mental models using techniques such as (semi-)structured interviews or focus groups,
- evaluating existing approaches regarding their effectiveness in supporting their users in making secure decisions / informed decisions in the context of privacy using techniques such as cognitive walkthroughs, lab user studies or even field studies,
- proposing improved / new approaches and evaluating their effectiveness using the so called human-centered security / privacy by design approach.

This module discusses the various problems of existing security and privacy mechanisms and security and privacy awareness/ education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note,the main part of the exercise is replicating an interview based study. The main focus of the lab will be to replicate a quantitative based user study.

Annotation
This new module can be chosen from winter term 2018/2019.

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

M 5.90 Module: Human-Machine-Interaction in Anthropomatics: Basics [M-INFO-100824]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101361	Human-Machine-Interaction in Anthropomatics: Basics	3 CR	Beyerer, Geisler

M 5.91 Module: Humanoid Robotics Laboratory [M-INFO-105792]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German/English	4	2

Mandatory			
T-INFO-111590	Humanoid Robotics Laboratory	6 CR	Asfour

Competence Goal

- Students will be able to independently understand, structure, analyze, and solve a complex humanoid robotics problem using existing programming skills, alone or in a small team.
- Students can convey complex technical content in a presentation.

Content
In this practical course, a is worked on alone or in small teams with up to 3 students. Questions of humanoid robotics are dealt with, such as semantic scene interpretation, active perception, planning of grasping and manipulation tasks, action representation with motion primitives, and programming by demonstration.

The project work (alone or in groups) is performed largely independently but supported by scientific staff of the H2T. At the end of the practical course, the work has to be documented and presented in a scientific talk.

Annotation

- Internship dates are always by arrangement with the supervising staff member.
- An extension work of the topic as a master thesis is possible in principle.
- The number of participants in this practical course is generally **limited** and varies with the number of available research projects at the institute.

Workload
Practical course with 4 SWS, 6 LP.
6 LP corresponds to ca. 180 hours, thereof
ca. 10h Attendance time in project discussion meetings
ca. 10h Preparation and follow-up of the above
ca. 150h Self-study to work on the topic
ca. 10h Preparation and giving of a scientific presentation

Recommendation

- Very good programming skills in at least one high-level programming language are strongly recommended.
- Attendance of the lectures Robotics 1, Robotics 2, Robotics 3, as well as the robotics practical course are recommended.
- Project-specific recommendations (knowledge of C++, Python, ...) will be announced in the individual project descriptions

M 5.92 Module: Incentives, Interactivity & Decisions in Organizations [M-WIWI-105923]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	1

Elective Offer (Election:)			
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-111912	Advanced Topics in Digital Management	3 CR	Nieken
T-WIWI-111913	Advanced Topics in Human Resource Management	3 CR	Nieken
T-WIWI-111806	Behavioral Lab Exercise	4,5 CR	Nieken, Scheibehenne
T-WIWI-110851	Designing Interactive Systems	4,5 CR	Mädche
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CR	Weinhardt
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt

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

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

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

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

M 5.93 Module: Industrial Production II [M-WIWI-101471]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Mandatory			
T-WIWI-102631	Planning and Management of Industrial Plants	5,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CR	Bosch, Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CR	Schultmann
T-WIWI-102828	Supply Chain Management in the Automotive Industry	3,5 CR	Heupel, Lang
T-WIWI-103134	Project Management	3,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-112103	Global Manufacturing	3,5 CR	Sasse
T-WIWI-112155	Life Cycle Assessment and Global Forecasts	3,5 CR	Schultmann

Competence Certificate
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course *Planning and Managing of Industrial Plants* [2581952] 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 *Planning and Managing of Industrial Plants* [2581952] and at least one additional activity are compulsory and must be examined.

Competence Goal

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

Content

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

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

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

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

M 5.94 Module: Industrial Production III [M-WIWI-101412]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Mandatory			
T-WIWI-102632	Production and Logistics Management	5,5 CR	Schultmann
Supplementary Courses from Module Industrial Production II (Election: at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-112103	Global Manufacturing	3,5 CR	Sasse
T-WIWI-112155	Life Cycle Assessment and Global Forecasts	3,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CR	Bosch, Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CR	Schultmann
T-WIWI-102828	Supply Chain Management in the Automotive Industry	3,5 CR	Heupel, Lang
T-WIWI-103134	Project Management	3,5 CR	Schultmann

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

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

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

Competence Goal

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

Content

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

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

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

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

M 5.95 Module: Information Processing in Sensor Networks [M-INFO-100895]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101466	Information Processing in Sensor Networks	6 CR	Hanebeck

M 5.96 Module: Information Systems in Organizations [M-WIWI-104068]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-110851	Designing Interactive Systems	4,5 CR	Mädche
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	4,5 CR	Mädche

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
None

Competence Goal
The student

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

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

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

Annotation
New module starting summer term 2018.

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

M 5.97 Module: Information Systems: Analytical and Interactive Systems [M-WIWI-104814]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Information Systems

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	7

Compulsory Elective Area (Election:)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-INFO-111622	Data Science I	5 CR	Böhm, Fouché
T-INFO-101317	Deployment of Database Systems	5 CR	Böhm
T-INFO-111400	Database as a Service	5 CR	Böhm
T-WIWI-110851	Designing Interactive Systems	4,5 CR	Mädche
T-WIWI-111267	Intelligent Agent Architectures	4,5 CR	Geyer-Schulz
T-WIWI-110915	Intelligent Agents and Decision Theory	4,5 CR	Geyer-Schulz
T-INFO-107499	Context Sensitive Systems	5 CR	Beigl
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-INFO-101326	Ubiquitous Computing	5 CR	Beigl

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO 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
The students

- are familiar with design principles of selected classes of modern analytical and interactive information systems and associated technologies
- know modern database concepts and application scenarios of modern database systems, understand the necessity of concepts for data analysis and can assess and compare approaches for the administration and analysis of large databases with regard to their effectiveness and applicability.
- know methods and techniques for designing analytical systems in the specific area of customer relationship management
- have knowledge of the basics and advanced methods and techniques of interactive information systems, especially context-sensitive and ubiquitous systems.

Content
In the module "Information Systems: Analytical and Interactive Systems" students learn about central design principles of selected classes of modern information systems and associated technologies. The module focuses on analytical and interactive information systems.

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 5.98 Module: Information Systems: Engineering and Transformation [M-WIWI-104812]

Responsible: Prof. Dr. Sebastian Abeck
Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: Information Systems

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

Compulsory Elective Area (Election:)			
T-INFO-106061	Access Control Systems: Foundations and Practice	5 CR	Hartenstein
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-110877	Engineering Interactive Systems	4,5 CR	
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-INFO-101337	Internet of Everything	4 CR	Zitterbart
T-INFO-101323	IT-Security Management for Networked Systems	5 CR	Hartenstein
T-INFO-101319	Network Security: Architectures and Protocols	4 CR	Zitterbart
T-INFO-101300	Requirements Engineering	3 CR	Koziolek
T-INFO-101381	Software Architecture and Quality	3 CR	Reussner
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
T-INFO-101271	Web Applications and Service-Oriented Architectures (II)	4 CR	Abeck

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO 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
The student

- learns techniques and procedures for the systematic development of high-quality software.
- can apply software quality assessment methods, evaluate results, and compare certification models.
- can reflect the content of the key concepts and technologies required to develop service-oriented Web applications and model appropriate architectures, implement Web applications and assess their service characteristics.
- knows proven and novel concepts for the evaluation and analysis of (critical) IT infrastructures.
- knows methods and tools to successfully shape the digital transformation of companies under pursuit of a socio-technical paradigm.

Content
The module "Information Systems: Engineering and Transformation" deals with the systematic development and management of software, information systems/infrastructures and Internet-based services.

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 5.99 Module: Information Systems: Internet-Based Markets and Services [M-WIWI-104813]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Information Systems

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

Compulsory Elective Area (Election:)			
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-110877	Engineering Interactive Systems	4,5 CR	
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
T-WIWI-102641	Service Innovation	4,5 CR	Satzger

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO 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
The student

- understands the importance and potential of digitizing products and services
- can design digital markets and services with the associated business models.
- knows methods and tools to successfully design the digital transformation of products and services.
- acquires specific competencies for the digitization of domain-specific services, including healthcare and energy.

Content
The module "Information Systems: Internet-based Markets and Services" focuses on the design of Internet-based services and markets from an economic and technical point of view.

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

Workload
Total 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 5.100 Module: Innovation and Growth [M-WIWI-101478]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102840	Innovation Theory and Policy	4,5 CR	Ott
T-WIWI-111318	Growth and Development	4,5 CR	Ott

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.

Prerequisites
None

Competence Goal
Students shall be given the ability to

- know the basic techniques for analyzing static and dynamic optimization models that are applied in the context of micro- and macroeconomic theories
- understand the important role of innovation to the overall economic growth and welfare
- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Content
The module includes courses that deal with issues of innovation and growth in the context of micro-and macroeconomic theories. The dynamic analysis makes it possible to analyze the consequences of individual decisions over time, and sheds light on the tension between static and dynamic efficiency in particular. In this context is also analyzed, which policy is appropriate to carry out corrective interventions in the market and thus increase welfare in the presence of market failure.

Workload
Total expenditure of time for 9 credits: 270 hours

Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

The exact distribution is subject to the credits of the courses of the module.

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

M 5.101 Module: Innovation Economics [M-WIWI-101514]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-102840	Innovation Theory and Policy	4,5 CR	Ott
T-WIWI-102906	Methods in Economic Dynamics	1,5 CR	Ott
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
T-WIWI-102789	Seminar in Economic Policy	3 CR	Ott

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
Students shall be given the ability to

- understand the important role of innovation for economic growth and welfare
- understand the relevance of alternative incentive mechanisms for the emergence and dissemination of innovations
- know basic terms of product and innovation concepts
- know fundamental concepts of innovation management
- work with fundamental theoretical innovation models and to implement them in appropriate computer algebra systems
- query appropriate data sources and to analyse and visualise them using statistical methods

Content
The module provides students with knowledge about implications of technological and organizational changes.

Addressed economic issues are incentives for developing innovations, diffusion processes, and associated effects. In this context the module analyses appropriate policies in the presence of market failures to take corrective action on the market process and thus to increase the dynamic efficiency of economies.

Furthermore, the module offers the possibility to learn about different aspects of theoretical modelling of innovation-based growth as a part of the seminar and the methods-workshop. This includes the implementation of formal models in computer algebra systems as well as recording, processing and econometric analysis of related data from relational databases (concerning for example patents or trademarks). Moreover, methods of network theory are applied.

Finally, the module emphasises the business perspective: Issues of all stages of innovation processes will be discussed, from innovation strategies up to the market commercialisation.

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

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012] and Economics II [2600014]. Further, it is assumed that students have interest in using quantiative-mathematical methods.

M 5.102 Module: Innovation Management [M-WIWI-101507]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Mandatory			
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
Compulsory Elective Courses (Election: 1 item)			
T-WIWI-110867	The negotiation of open innovation	3 CR	Beyer
T-WIWI-108875	Digital Transformation and Business Models	3 CR	Koch
T-WIWI-112143	Development of Sustainable Business Models	3 CR	Weissenberger-Eibl
T-WIWI-111823	Successful Transformation Through Innovation	3 CR	Busch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-111822	Globalization of Innovation – Innovation for Globalization: Methods and Analyses	3 CR	Schneider
T-WIWI-112157	Innovation & Space	3 CR	Beyer
T-WIWI-108774	Analyzing and Evaluating Innovation Processes	3 CR	Beyer
T-WIWI-110234	Innovation Processes Live	3 CR	Beyer
T-WIWI-110263	Methods in Innovation Management	3 CR	Koch
T-WIWI-102853	Roadmapping	3 CR	Koch
T-WIWI-110987	Seminar Methods along the Innovation process	3 CR	Beyer
T-WIWI-110986	Strategic Foresight China	3 CR	Weissenberger-Eibl
T-WIWI-109932	A Closer Look at Social Innovation	3 CR	Beyer
T-WIWI-102858	Technology Assessment	3 CR	Koch
T-WIWI-102854	Technologies for Innovation Management	3 CR	Koch
Supplementary Courses (Election: 1 item)			
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-110867	The negotiation of open innovation	3 CR	Beyer
T-WIWI-108875	Digital Transformation and Business Models	3 CR	Koch
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management	3 CR	Terzidis
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
T-WIWI-111823	Successful Transformation Through Innovation	3 CR	Busch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-111822	Globalization of Innovation – Innovation for Globalization: Methods and Analyses	3 CR	Schneider
T-WIWI-112157	Innovation & Space	3 CR	Beyer
T-WIWI-108774	Analyzing and Evaluating Innovation Processes	3 CR	Beyer
T-WIWI-110234	Innovation Processes Live	3 CR	Beyer
T-WIWI-110263	Methods in Innovation Management	3 CR	Koch
T-WIWI-102853	Roadmapping	3 CR	Koch
T-WIWI-110987	Seminar Methods along the Innovation process	3 CR	Beyer
T-WIWI-110986	Strategic Foresight China	3 CR	Weissenberger-Eibl
T-WIWI-109932	A Closer Look at Social Innovation	3 CR	Beyer
T-WIWI-102854	Technologies for Innovation Management	3 CR	Koch
T-WIWI-102858	Technology Assessment	3 CR	Koch

Competence Certificate
See German version.

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

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

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

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

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

Recommendation
None

M 5.103 Module: Innovative Concepts for Programming Industrial Robots [M-INFO-100791]

Responsible: Prof. Dr.-Ing. Björn Hein
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101328	Innovative Concepts for Programming Industrial Robots	4 CR	Hein

M 5.104 Module: Integrated Network and Systems Management [M-INFO-100747]

Responsible: Prof. Dr. Bernhard Neumair
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101284	Integrated Network and Systems Management	4 CR	Neumair

Recommendation
Siehe Teilleistung

M 5.105 Module: Intellectual Property Law [M-INFO-101215]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Law

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

Intellectual Property Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-101308	Copyright	3 CR	Dreier
T-INFO-101313	Trademark and Unfair Competition Law	3 CR	Matz
T-INFO-101307	Internet Law	3 CR	Dreier
T-INFO-108462	Selected Legal Issues of Internet Law	3 CR	Dreier
T-INFO-111403	Seminar: Patent Law	3 CR	Dammler

Prerequisites
None

M 5.106 Module: Intelligent Systems and Services [M-WIWI-101456]

Responsible: Dr.-Ing. Michael Färber
Organisation: KIT Department of Economics and Management
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	8

Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-106423	Information Service Engineering	4,5 CR	Sack
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer

Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Algorithms for Internet Applications [T-WIWI-102658]: The examination will be offered latest until summer term 2017 (repeaters only).

Prerequisites
None

Competence Goal
Students

- know the different machine learning procedures for the supervised as well as the unsupervised learning,
- identify the pros and cons of the different learning methods,
- apply the discussed network learning methods in specific scenarios,
- compare the practicality of methods and algorithms with alternative approaches.

Content
In the broader sense learning systems are understood as biological organisms and artificial systems which are able to change their behavior by processing outside influences. Network leaning methods based on symbolic, statistic and neuronal approaches are the focus of Computer Sciences.

In this module the most important network learning methods are introduced and their applicability is discussed with regard to different information sources such as data texts and images considering especially procedures for knowledge acquirement via data and text mining, natural analogue procedures as well as the application of organic learning procedures within the finance sector.

Annotation
Detailed information on the recognition of examinations in the field of Informatics can be found at http://www.aifb.kit.edu/web/Auslandsaufenthalt.

M 5.107 Module: Interactive Computer Graphics [M-INFO-100732]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101269	Interactive Computer Graphics	5 CR	Dachsbacher

M 5.108 Module: Internet of Everything [M-INFO-100800]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101337	Internet of Everything	4 CR	Zitterbart

M 5.109 Module: Introduction to Bioinformatics for Computer Scientists [M-INFO-100749]

Responsible: Prof. Dr. Alexandros Stamatakis
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101286	Introduction to Bioinformatics for Computer Scientists	3 CR	Stamatakis

M 5.110 Module: Introduction to Hybrid Quantum Machine Learning Algorithms [M-INFO-106189]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-112571	Introduction to Hybrid Quantum Machine Learning Algorithms	3 CR	Fischer, Kühn

M 5.111 Module: Introduction to Video Analysis [M-INFO-100736]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101273	Introduction to Video Analysis	3 CR	Beyerer

M 5.112 Module: IT-Security Management for Networked Systems [M-INFO-100786]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101323	IT-Security Management for Networked Systems	5 CR	Hartenstein

M 5.113 Module: Lab Course Heterogeneous Computing [M-INFO-104072]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-108447	Lab Course Heterogeneous Computing	6 CR	Karl

Prerequisites
None

M 5.114 Module: Lab Project: Speech Translation [M-INFO-105997]

Responsible: Prof. Dr. Jan Niehues
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-112175	Lab Project: Speech Translation	6 CR	Niehues

M 5.115 Module: Lab: Efficient Parallel C++ [M-INFO-103506]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106992	Lab: Efficient Parallel C++	6 CR	Sanders

M 5.116 Module: Lab: Graph Visualization in Practice [M-INFO-103302]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106580	Lab: Graph Visualization in Practice	5 CR	Wagner

M 5.117 Module: Lab: Internet of Things (IoT) [M-INFO-103706]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-107493	Lab: Internet of Things (IoT)	4 CR	Henkel

Prerequisites
None

M 5.118 Module: Lab: Low Power Design and Embedded Systems [M-INFO-104031]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-108323	Lab: Low Power Design and Embedded Systems	4 CR	Henkel

M 5.119 Module: Laboratory Course Algorithm Engineering [M-INFO-102072]

Responsible: Prof. Dr. Peter Sanders
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104374	Laboratory Course Algorithm Engineering	6 CR	Sanders, Ueckerdt, Wagner

M 5.120 Module: Laboratory in Cryptoanalysis [M-INFO-101559]

Responsible: Prof. Dr. Dennis Hofheinz
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-102990	Laboratory in Cryptoanalysis	3 CR	Hofheinz, Müller-Quade

M 5.121 Module: Laboratory in Cryptography [M-INFO-101558]

Responsible: Prof. Dr. Dennis Hofheinz
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-102989	Laboratory in Cryptography	3 CR	Hofheinz, Müller-Quade

M 5.122 Module: Laboratory in Security [M-INFO-101560]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-102991	Laboratory in Security	4 CR	Hofheinz, Müller-Quade

M 5.123 Module: Localization of Mobile Agents [M-INFO-100840]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101377	Localization of Mobile Agents	6 CR	Hanebeck

M 5.124 Module: Low Power Design [M-INFO-100807]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101344	Low Power Design	3 CR	Henkel

M 5.125 Module: Machine Learning [M-WIWI-103356]

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

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

Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-106340	Machine Learning 1 - Basic Methods	4,5 CR	Zöllner
T-WIWI-106341	Machine Learning 2 – Advanced Methods	4,5 CR	Zöllner
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	4,5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	4,5 CR	Zöllner

Competence Certificate
The module examination is carried out in the form of partial examinations on the selected courses of the module, with which the minimum requirement at creditpoints is fulfilled. The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

Prerequisites
None

Competence Goal

- Students gain knowledge of the basic methods in the field of machine learning.
- Students understand advanced concepts of machine learning and their application.
- Students can classify, formally describe and evaluate methods of machine learning.
- Students can use their knowledge to select suitable models and methods for selected problems in the field of machine learning.

Content
The subject area of ??machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 1" covers both symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as subsymbolic techniques such as neural networks, support vector machines, genetics Algorithms and reinforcement learning. The lecture introduces the basic principles as well as fundamental structures of learning systems and the learning theory and examines the previously developed algorithms. The design and operation of learning systems is presented and explained in some examples, especially in the fields of robotics, autonomous mobile systems and image processing.

The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

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

M 5.126 Module: Machine Learning - Foundations and Algorithms [M-INFO-105778]

Responsible: Prof. Dr. Gerhard Neumann
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111558	Machine Learning - Foundations and Algorithms	5 CR	Neumann

M 5.127 Module: Machine Translation [M-INFO-100848]

Responsible: Prof. Dr. Jan Niehues
Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101385	Machine Translation	6 CR	Niehues, Waibel

M 5.128 Module: Management Accounting [M-WIWI-101498]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	English	4	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
The total workload for this module is approximately 270 hours. For further information see German version.

M 5.129 Module: Market Engineering [M-WIWI-101446]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Mandatory			
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CR	Weinhardt
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CR	Weinhardt

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 *Market Engineering: Information in Institutions* [2540460] is compulsory and must be examined.

Competence Goal
The students

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

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

Annotation
The course "Computational Economics" [2590458] will not be offered any more in this module from winter term 2015/2016 on. The examination will be offered latest until summer term 2016 (repeaters only).

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

Recommendation
None

M 5.130 Module: Marketing and Sales Management [M-WIWI-105312]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CR	Klarmann, Konhäuser
T-WIWI-110985	International Business Development and Sales	6 CR	Casenave , Klarmann, Terzidis
T-WIWI-102835	Marketing Strategy Business Game	1,5 CR	Klarmann
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	1,5 CR	Klarmann
T-WIWI-102891	Price Negotiation and Sales Presentations	1,5 CR	Klarmann, Schröder
T-WIWI-111246	Pricing Excellence	1,5 CR	Bill, Klarmann

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. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

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

Prerequisites
None

Competence Goal
Students

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

Content
The aim of this module is to deepen central marketing contents in different areas.

Annotation
Please note that only one of the listed 1,5-ECTS courses can be chosen in the module.

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

M 5.131 Module: Mathematical Programming [M-WIWI-101473]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Operations Research)

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

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-103638	Global Optimization I and II	9 CR	Stein
T-WIWI-102856	Convex Analysis	4,5 CR	Stein
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CR	Stein
T-WIWI-102855	Parametric Optimization	4,5 CR	Stein
Supplementary Courses (Election: at most 2 items)			
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-102727	Global Optimization II	4,5 CR	Stein
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CR	Grothe
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-102725	Nonlinear Optimization II	4,5 CR	Stein
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

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
At least one of the courses "Mixed Integer Programming I", "Parametric Optimization", "Convex Analysis", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.

Competence Goal
The student

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous and mixed integer decision variables.

Annotation
The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

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

M 5.132 Module: Medical Robotics [M-INFO-100820]

Responsible: Jun.-Prof. Dr. Franziska Mathis-Ullrich
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101357	Medical Robotics	3 CR	Kröger, Mathis-Ullrich

M 5.133 Module: Meshes and Point Clouds [M-INFO-100812]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101349	Meshes and Point Clouds	3 CR	Prautzsch

M 5.134 Module: Microeconomic Theory [M-WIWI-101500]

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

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
T-WIWI-102859	Social Choice Theory	4,5 CR	Puppe
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken

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

Prerequisites
None

Competence Goal
Students

- are able to model practical microoeconomic problems mathematically and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs.

An example of a positive question is: which regulation policy results in which firm decistions under imperfect competition? An example of a normative question is: which voting rule has appealing properties?

Content
The student should gain an understanding of advanced topics in economic theory, game theory and welfare economics. Core topics are, among others, strategic interactions in markets, cooperative and non-cooperative bargaining (Advanced Game Theory), allocation under asymmetric information and general equilibrium over time (Advanced Topics in Economic Theory), voting and the aggregation of preferences and judgements (Social Choice Theory).

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

M 5.135 Module: Mobile Communication [M-INFO-100785]

Responsible: Prof. Dr. Oliver Waldhorst
Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101322	Mobile Communication	4 CR	Waldhorst, Zitterbart

M 5.136 Module: Model-Driven Software Development [M-INFO-100741]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101278	Model Driven Software Development	3 CR	Reussner

Prerequisites
None

M 5.137 Module: Models of Parallel Processing [M-INFO-100828]

Responsible: Thomas Worsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101365	Models of Parallel Processing	5 CR	Worsch

Recommendation
Siehe Teilleistung

M 5.138 Module: Module Master's Thesis [M-WIWI-104833]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan des KIT-Studienganges

Organisation: KIT Department of Economics and Management

Part of: Master's Thesis

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

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

Competence Certificate
At least one of the examiners must be a member of one of the two KIT departments Economics and Management or Informatics. The examiner has to be involved in the degree programme. Involved in the degree programme are the persons that coordinate a module or a lecture of the degree programme.

Prerequisites
Regulated in §14 of the examination regulation.

Competence Goal
The student can independently handle a complex and unfamiliar subject based on scientific criteria and the current state of research.

He/she is in a position to critically analyze and structure the researched information as well as derive principles and regularities. He/she knows how to apply the thereby achieved results to solve the task at hand. Taking into account this knowledge and his/her interdisciplinary knowledge, he/she can draw own conclusions, derive improvement potentials, propose and implement science-based decisions.

This is basically also done under consideration of social and/or ethical aspects.

He/she can interpret, evaluate and if required, graphically present the obtained results.

He/she is in a position to sensibly structure a research paper, document results and clearly communicate the results in scientific form.

Content

- The master thesis shows that the candidate can autonomously investigate a problem from his discipline with scientific methods according to the state-of-the-art of the discipline within a specified time period.
- The master thesis can be written in German or English.
- The topic of a master thesis can be accepted or chosen by each of the examiners according to examination regulation. The examiner accepting a topic for a master thesis acts as the first supervisor of this thesis.
- Writing a master thesis with a supervisor who is not a member of the two faculties participating in the degree programme (Departement of Informatics, Department of Economics and Management) requires acceptance by the examination board of the degree programme. The candidate must have an opportunity to make suggestions for the topic of the master thesis.
- Candidates can write a master thesis in teams. However, this requires that the contribution and performance of each candidate to the thesis is identifiable according to objective criteria which allow a unique delineation of each candidate's contribution. The contribution of each candidate regarded in isolation must fulfill the requirements a individual master thesis.
- In exceptional cases and upon request of the candidate, the chairman of the examination board chooses a supervisor and requests that this supervisor provides the candidate with a topic for the master thesis within 4 weeks after the request. In this case, the candidate is informed by the chairman of the examination board about the topic selected.
- Topic, specification of research tasks and the volume of the master thesis should be limited by the supervisor, so that the master thesis can be written with the assigned workload of 30 credits (750-900h).
- The master thesis must contain the following declaration of the candidate: “I truthfully assure that I have autonomously written this master thesis. I have quoted all sources used precisely and completely. I have labelled everything which has been taken from the work of others with or without change.” A master thesis without this declaration will not be accepted.
- The date of the assignment of the topic to a candidate as well as the date of delivery of the master thesis should be registered at the examination board. The candidate can return a topic for the master thesis only one time and only within a period of two month after he has received the topic. Upon a request of the candidate with reasons supporting an extension, the examination board may extend the deadline for the delivery of the master thesis by a maximum of three months. A master thesis not delivered within time is graded as “fail” except when the candidate is not responsible for this delay (e.g. protection of motherhood).
- The master thesis is reviewed and graded by the supervisor and the additional examiner. The team of supervisor and examiner must represent both faculties participating in the degree programme (Department of Informatics, Department of Economics and Management). At least one of the two must be professor or junior professor. If the grades of the supervisor and the examiner differ, the examination board sets the mark within this limit.
- Reviewing and grading should be done within 8 weeks after delivery of the master thesis.

Workload
The total workload for this module is approximately 900 hours. For further information see German version.

M 5.139 Module: Multicore Programming in Practice: Tools, Models, Languages [M-INFO-100985]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101565	Multicore Programming in Practice: Tools, Models, Languages	6 CR	Tichy

M 5.140 Module: Natural Language Dialog Systems [M-INFO-102414]

Responsible: Prof. Dr. Jan Niehues
Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Irregular	1 term	German	4	2

Mandatory			
T-INFO-104780	Practical Course Natural Language Dialog Systems	6 CR	Niehues, Waibel

M 5.141 Module: Natural Language Processing [M-INFO-105999]

Responsible: Prof. Dr. Jan Niehues
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-112177	Natural Language Processing	6 CR	Niehues

M 5.142 Module: Natural Language Processing and Software Engineering [M-INFO-100735]

Responsible: Prof. Dr.-Ing. Anne Koziolek
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101272	Natural Language Processing and Software Engineering	3 CR	Koziolek

M 5.143 Module: Network Economics [M-WIWI-101406]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102712	Regulation Theory and Practice	4,5 CR	Mitusch
T-WIWI-102713	Telecommunication and Internet Economics	4,5 CR	Mitusch

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 exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

Prerequisites
None

Competence Goal
The students

- have acquired the basic knowledge for a future job in a network company or in a regulatory agency, ministry etc.
- recognize the specific characterizations of network sectors, know fundamental methods for an economic analysis of network sectors and recognize the interfaces for an interdisciplinary cooperation of economists, engineers and lawyers
- understand the interactions between infrastructures, control systems, and the users of networks, especially concerning their implications on investments, price setting and competitive behavior, and they can model or simulate exemplary applications
- can assess the necessity of regulation of natural monopolies and identify regulatory measures that are important for networks.

Content
The module is concerned with network or infrastructure industries in the economy, e.g. telecommunication, traffic and energy sectors. These sectors are characterized by close interdependencies of operators and users of infrastructure as well as on states. States intervene in various forms, by the public and regulation authorities, due to the importance of network industries and due to limited abilities of markets to work properly in these industries. The students are supposed to develop a broad knowledge of these sectors and of the political options available.

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

Recommendation
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

M 5.144 Module: Network Security: Architectures and Protocols [M-INFO-100782]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101319	Network Security: Architectures and Protocols	4 CR	Zitterbart

M 5.145 Module: Next Generation Internet [M-INFO-100784]

Responsible: Dr.-Ing. Roland Bless
Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101321	Next Generation Internet	4 CR	Bless, Zitterbart

M 5.146 Module: Operations Research in Supply Chain Management [M-WIWI-102832]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	8

Election notes
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
Supplementary Courses (Election: at most 1 item)			
T-MACH-112213	Applied material flow simulation	4,5 CR	Baumann
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Spieckermann
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-112109	Topics in Stochastic Optimization	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 "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.

Competence Goal
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of SCM and their respective optimization problems,
- is acquainted with classical location problem models (in planes, in networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

This module considers several areas of SCM. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of Supply Chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of supply chain management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Mangement, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Annotation
Some lectures and courses are offered irregularly.

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

Workload
Total effort for 9 credits: ca. 270 hours

- Presence time: 84 hours
- Preparation/Wrap-up: 112 hours
- Examination and examination preparation: 74 hours

Recommendation
Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

M 5.147 Module: Optimization and Synthesis of Embedded Systems (ES1) [M-INFO-100830]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101367	Optimization and Synthesis of Embedded Systems (ES1)	3 CR	Henkel

M 5.148 Module: Parallel Algorithms [M-INFO-100796]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	4	2

Mandatory			
T-INFO-101333	Parallel Algorithms	4 CR	Sanders
T-INFO-111857	Parallel Algorithms Pass	1 CR	Sanders

M 5.149 Module: Parallel Computer Systems and Parallel Programming [M-INFO-100808]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101345	Parallel Computer Systems and Parallel Programming	4 CR	Streit

M 5.150 Module: Pattern Recognition [M-INFO-100825]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-INFO-101362	Pattern Recognition	6 CR	Beyerer, Zander

M 5.151 Module: Penetration Testing Lab [M-INFO-104895]

Responsible: Dr.-Ing. Ingmar Baumgart
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-109929	Penetration Testing Lab	4 CR	Baumgart, Müller-Quade

M 5.152 Module: Photorealistic Rendering [M-INFO-100731]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101268	Photorealistic Rendering	5 CR	Dachsbacher

M 5.153 Module: Practical Course Applied Telematics [M-INFO-101889]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	Grade to a tenth	Each winter term	1 term	German	4	2

Mandatory			
T-INFO-103585	Practical Course Applied Telematics	3 CR	Zitterbart

M 5.154 Module: Practical Course Automatic Speech Recognition [M-INFO-102411]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104775	Practical Course Automatic Speech Recognition	3 CR	Waibel

M 5.155 Module: Practical Course Circuit Design with Intel Galileo [M-INFO-102353]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-105580	Practical Course Circuit Design with Intel Galileo	3 CR	Tahoori

M 5.156 Module: Practical Course Computer Vision for Human-Computer Interaction [M-INFO-102966]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-105943	Practical Course Computer Vision for Human-Computer Interaction	6 CR	Stiefelhagen

M 5.157 Module: Practical Course Decentralized Systems and Network Services [M-INFO-103047]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106063	Practical Course Decentralized Systems and Network Services	4 CR	Hartenstein

M 5.158 Module: Practical Course FPGA Programming [M-INFO-102661]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-105576	Practical Course FPGA Programming	3 CR	Tahoori

M 5.159 Module: Practical Course Model-Driven Software Development [M-INFO-101579]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103029	Practical Course Model-Driven Software Development	6 CR	Reussner

M 5.160 Module: Practical Course on Network Security Research [M-INFO-105413]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-110938	Practical Course on Network Security Research	3 CR	Hock, Zitterbart

M 5.161 Module: Practical Course Protocol Engineering [M-INFO-102092]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104386	Practical Course Protocol Engineering	4 CR	Zitterbart

M 5.162 Module: Practical Course Software Defined Networking [M-INFO-101891]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103587	Practical Course Software Defined Networking	6 CR	Zitterbart

M 5.163 Module: Practical Course: Advanced Topics in High Performance Computing, Data Management and Analytics [M-INFO-105870]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111803	Practical Course: Advanced Topics in High Performance Computing, Data Management and Analytics	6 CR	Streit

M 5.164 Module: Practical Course: Analysis of Complex Data Sets [M-INFO-102807]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	pass/fail	Irregular	1 term	English	4	1

Mandatory			
T-INFO-105796	Practical Course: Analysis of Complex Data Sets	4 CR	Böhm

M 5.165 Module: Practical Course: Biologically Inspired Robots [M-INFO-105495]

Responsible: Prof. Dr.-Ing. Rüdiger Dillmann
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111039	Practical Course: Biologically Inspired Robots	6 CR	Rönnau

M 5.166 Module: Practical Course: Customized Embedded Processor Design [M-INFO-105740]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111457	Practical Course: Customized Embedded Processor Design	4 CR	

M 5.167 Module: Practical Course: Data Science [M-INFO-105632]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	pass/fail	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-111262	Practical Course: Data Science	6 CR	Böhm

M 5.168 Module: Practical Course: Database Systems [M-INFO-101662]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	pass/fail	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-103201	Practical Course: Database Systems	4 CR	Böhm

M 5.169 Module: Practical Course: Digital Design & Test Automation Flow [M-INFO-102570]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-105565	Practical Course Digital Design & Test Automation Flow	3 CR	Tahoori

M 5.170 Module: Practical Course: Discrete Freeform Surfaces [M-INFO-101667]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103208	Practical Course: Discrete Freeform Surfaces	6 CR	Prautzsch

M 5.171 Module: Practical Course: General-Purpose Computation on Graphics Processing Units [M-INFO-100724]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-109914	Practical Course: General-Purpose Computation on Graphics Processing Units	3 CR	

M 5.172 Module: Practical Course: Geometric Modeling [M-INFO-101666]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103207	Practical Course: Geometric Modeling	3 CR	Prautzsch

M 5.173 Module: Practical Course: Hot Research Topics in Computer Graphics [M-INFO-104699]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-109577	Practical Course: Hot Research Topics in Computer Graphics	6 CR	Dachsbacher

Competence Goal
Students study scientific publications on currently hot topics of computer graphics, implement and evaluate state of the art methods, and compare them to newly developed approaches. The results of the practical course will be documented in the form of a scientific paper.

Content
Students in this practical course are introduced to theoretical and practical aspects of current research topics at the chair of computer graphics.

M 5.174 Module: Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data [M-INFO-103128]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	pass/fail	Irregular	1 term	English	4	1

Mandatory			
T-INFO-106219	Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data	4 CR	Böhm

M 5.175 Module: Practical Course: Machine Learning and Intelligent Systems [M-INFO-105958]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-112104	Practical Course: Machine Learning and Intelligent Systems	8 CR	Fennel, Hanebeck

M 5.176 Module: Practical Course: Neural Network Exercises [M-INFO-103143]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106259	Practical Course: Neural Network Exercises	3 CR	Waibel

M 5.177 Module: Practical Course: Programme Verification [M-INFO-101537]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-102953	Practical Course: Programme Verification	3 CR	Beckert

M 5.178 Module: Practical Course: Smart Data Analytics [M-INFO-103235]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-106426	Practical Course: Smart Data Analytics	6 CR	Beigl

M 5.179 Module: Practical Course: Visual Computing 2 [M-INFO-101567]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103000	Practical Course: Visual Computing 2	6 CR	Dachsbacher

M 5.180 Module: Practical Course: Web Applications and Service-Oriented Architectures (II) [M-INFO-101635]

Responsible: Prof. Dr. Sebastian Abeck
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-INFO-103121	Practical Course: Web Applications and Service-Oriented Architectures (II)	5 CR	Abeck

M 5.181 Module: Practical Introduction to Hardware Security [M-INFO-104357]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-108920	Practical Introduction to Hardware Security	6 CR	Tahoori

M 5.182 Module: Practical Project Robotics and Automation I (Software) [M-INFO-102224]

Responsible: Prof. Dr.-Ing. Björn Hein
Prof. Dr.-Ing. Thomas Längle
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104545	Practical Project Robotics and Automation I (Software)	6 CR	Hein, Längle

M 5.183 Module: Practical Project Robotics and Automation II (Hardware) [M-INFO-102230]

Responsible: Prof. Dr.-Ing. Björn Hein
Prof. Dr.-Ing. Thomas Längle
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104552	Practical Project Robotics and Automation II (Hardware)	6 CR	Hein, Längle

M 5.184 Module: Practical SAT Solving (extended) [M-INFO-105622]

Responsible: Prof. Dr. Carsten Sinz
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111254	Practical SAT Solving (extended)	6 CR	Iser, Sinz

M 5.185 Module: Practical: Course Engineering Approaches to Software Development [M-INFO-104254]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-108791	Practical Course Engineering Approaches to Software Development	6 CR	Reussner

M 5.186 Module: Praktikum: Graphics and Game Development [M-INFO-105384]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-110872	Praktikum: Graphics and Game Development	6 CR	Dachsbacher

M 5.187 Module: Principles of Automatic Speech Recognition [M-INFO-100847]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101384	Principles of Automatic Speech Recognition	6 CR	Waibel

M 5.188 Module: Private Business Law [M-INFO-101216]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Law

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

Private Business Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-111405	Seminar: Commercial and Corporate Law in the IT Industry	3 CR	Dreier, Nolte
T-INFO-101288	Corporate Compliance	3 CR	Herzig
T-INFO-102036	Computer Contract Law	3 CR	Menk
T-INFO-111436	Employment Law	3 CR	Hoff
T-INFO-111437	Tax Law	3 CR	Dietrich

Prerequisites
None

Competence Goal
The student

- has gained in-depth knowledge of German company law, commercial law and civil law;
- is able to analyze, evaluate and solve complex legal and economic relations and problems;
- is well grounded in individual labour law, collective labour law and commercial constitutional law, evaluates and critically assesses clauses in labour contracts;
- recognizes the significance of the parties to collective labour agreements within the economic system and has differentiated knowledge of labour disputes law and the law governing the supply of temporary workers and of social law;
- possesses detailed knowledge of national earnings and corporate tax law and is able to deal with provisions of tax law in a scientific manner and assesses the effect of these provisions on corporate decision-making.

Content
The module provides the student with knowledge in special matters in business law, like employment law, tax law and business law, which are essential for managerial decisions.

M 5.189 Module: Project Lab: Image Analysis and Fusion [M-INFO-102383]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-104746	Project Lab: Image Analysis and Fusion	6 CR	Beyerer

M 5.190 Module: Public Business Law [M-INFO-101217]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Law

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	6

Public Business Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-101309	Telecommunications Law	3 CR	
T-INFO-101312	European and International Law	3 CR	Brühann
T-INFO-111404	Seminar: IT- Security Law	3 CR	Schallbruch
T-INFO-111406	Data Protection Law	3 CR	

Competence Certificate
see course description.

M 5.191 Module: Randomized Algorithms [M-INFO-100794]

Responsible: Thomas Worsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101331	Randomized Algorithms	5 CR	Worsch

M 5.192 Module: Rationale Splines [M-INFO-101857]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103544	Rationale Splines	3 CR	Prautzsch

M 5.193 Module: Rationale Splines [M-INFO-101853]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103543	Rationale Splines	5 CR	Prautzsch

Prerequisites
one

M 5.194 Module: Real-Time Systems [M-INFO-100803]

Responsible: Prof. Dr.-Ing. Thomas Längle
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101340	Real-Time Systems	6 CR	Längle

M 5.195 Module: Reconfigurable and Adaptive Systems [M-INFO-100721]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101258	Reconfigurable and Adaptive Systems	3 CR	Henkel

M 5.196 Module: Reinforcement Learning and Neural Networks in Robotics [M-INFO-104894]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-109928	Reinforcement Learning and Neural Networks in Robotics	3 CR	Meißner

Competence Goal
You will get familiar with state-of-the-art data-driven representations and algorithms for controlling stationary and mobile robots. The first part covers basic concepts of Supervised and Imitation Learning of Deep Neural Networks by means of optimization techniques. In doing so, we dedicate an entire lecture to the practical application of networks in robotics. The second part expands on various approaches to Reinforcement Learning. Accompanying the lecture, we discuss case-studies from Robotics research.

Course objectives:
- Successful participants will have a basic understanding of Machine Learning and of the mathematical optimization techniques (gradient-based methods), used in this context.
- Successful participants will understand representations (Feed-Forward and Recurrent Networks) and algorithms (Back-propagation) in Deep Supervised and Imitation Learning. They will be able to deploy them on problems which are related to learning robot behaviors.
- Successful participants will gain a comprehensive insight in the terminology of Reinforcement Learning, its stochastic foundations (MDP), model-free learning methods (MC, TD, SARSA, Q-), policy-gradient approaches (Actor-Critic, TRPO, PPO) and model-based approaches (global and local models). On that basis, successful participants can develop solutions to learn robot motor skills.

Content
- Introduction and Foundations of Machine Learning
- Optimization for Machine Learning
- (Deep) Supervised Learning Introduction
- Guest Lecture - Innovative Practical Applications
- (Deep) Imitation Learning Introduction
- (Deep) Reinforcement Learning Introduction
- Markov Decision Processes and Dynamic Programming
- Monte-Carlo Learning and Time Difference
- Basic Policy Gradients
- Advanced Policy Gradients
- Model-based Reinforcement Learning

M 5.197 Module: Reliable Computing I [M-INFO-100850]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101387	Reliable Computing I	3 CR	Tahoori

M 5.198 Module: Requirements Engineering [M-INFO-100763]

Responsible: Prof. Dr.-Ing. Anne Koziolek
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101300	Requirements Engineering	3 CR	Koziolek

M 5.199 Module: Research Focus Class: Blockchain & Payment Channel Networks [M-INFO-105620]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111251	Research Focus Class: Blockchain & Payment Channel Networks	3 CR	Hartenstein
T-INFO-111252	Research Focus Class: Blockchain & Payment Channel Networks - Seminar	3 CR	Hartenstein

M 5.200 Module: Research Project (Project, 1st Semester) [M-INFO-105037]

Responsible: Prof. Dr. Bernhard Beckert
Prof. Dr.-Ing. Michael Beigl
Prof. Dr. Ralf Reussner

Organisation: KIT Department of Informatics

Part of: Informatics

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

Mandatory			
T-INFO-110218	Research Project (Project, 1st Semester) - Oral Exam	3 CR	Beckert
T-INFO-110219	Research Project (Project, 1st Semester) - Presentation	3 CR	Beckert
T-INFO-110220	Research Project (Project, 1st Semester) - Project Proposal	4 CR	Beckert

M 5.201 Module: Research Project (Project, 2nd Semester) [M-INFO-105038]

Responsible: Prof. Dr. Bernhard Beckert
Prof. Dr.-Ing. Michael Beigl
Prof. Dr. Ralf Reussner

Organisation: KIT Department of Informatics

Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
10	Grade to a tenth	Each term	2 terms	German	4	1

Mandatory			
T-INFO-110221	Research Project (Project, 2nd Semester) - Oral Exam	3 CR	Beckert
T-INFO-110222	Research Project (Project, 2nd Semester) - Presentation	3 CR	Beckert
T-INFO-110223	Research Project (Project, 2nd Semester) - Scientific Report	4 CR	Beckert

M 5.202 Module: Research Project Autonomous Learning Robots [M-INFO-105378]

Responsible: Prof. Dr. Gerhard Neumann
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-110861	Research Project Autonomous Learning Robots	6 CR	Neumann

M 5.203 Module: Robotics - Practical Course [M-INFO-102522]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-INFO-105107	Robotics - Practical Course	6 CR	Asfour

Competence Goal
The student knows concrete solutions for different problems in robotics. He/she uses methods of inverse kinematics, grasp and motion planning, and visual perception. The student can implement solutions in the programming language C++ with the help of suitable software frameworks.

Content
The practical course is offered as an accompanying course to the lectures Robotics I-III. Every week, a small team of students will work on solving a given robotics problem. The list of topics includes robot modeling and simulation, inverse kinematics, robot programming via statecharts, collision-free motion planning, grasp planning, and robot vision.

Recommendation
Attending the lectures Robotics I – Introduction to Robotics, Robotics II: Humanoid Robotics, Robotics III - Sensors and Perception in Robotics and Mechano-Informatics and Robotics is recommended.

M 5.204 Module: Robotics I - Introduction to Robotics [M-INFO-100893]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-108014	Robotics I - Introduction to Robotics	6 CR	Asfour

M 5.205 Module: Robotics II - Humanoid Robotics [M-INFO-102756]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	Grade to a tenth	Each summer term	1 term	German/English	4	2

Mandatory			
T-INFO-105723	Robotics II - Humanoid Robotics	3 CR	Asfour

Prerequisites
None

Competence Goal
The students have an overview of current research topics in autonomous learning robot systems using the example of humanoid robotics. They are able to classify and evaluate current developments in the field of cognitive humanoid robotics.

The students know the essential problems of humanoid robotics and are able to develop solutions on the basis of existing research.

Content
The lecture presents current work in the field of humanoid robotics that deals with the implementation of complex sensorimotor and cognitive abilities. In the individual topics different methods and algorithms, their advantages and disadvantages, as well as the current state of research are discussed.

The topics addressed are: Applications and real world examples of humanoid robots; biomechanical models of the human body, biologically inspired and data-driven methods of grasping, active perception, imitation learning and programming by demonstration; semantic representations of sensorimotor experience as well as cognitive software architectures of humanoid robots.

M 5.206 Module: Robotics III - Sensors and Perception in Robotics [M-INFO-104897]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-109931	Robotics III - Sensors and Perception in Robotics	3 CR	Asfour

Competence Goal
Students can name the main sensor principles used in robotics.

Students can explain the data flow from physical measurement through digitization to the use of the recorded data for feature extraction, state estimation and semantic scene understanding.

Students are able to propose and justify suitable sensor concepts for common tasks in robotics.

Content
The lecture supplements the lecture Robotics I with a broad overview of sensors used in robotics. The lecture focuses on visual perception, object recognition, simultaneous localization and mapping (SLAM) and semantic scene interpretation. The lecture is divided into two parts:

In the first part a comprehensive overview of current sensor technologies is given. A basic distinction is made between sensors for the perception of the environment (exteroceptive) and sensors for the perception of the internal state (proprioceptive).

The second part of the lecture concentrates on the use of exteroceptive sensors in robotics. The topics covered include tactile exploration and visual data processing, including advanced topics such as feature extraction, object localization, simultaneous localization and mapping (SLAM) and semantic scene interpretation.

M 5.207 Module: Scientific Methods to Design and Analyze Secure Decentralized Systems [M-INFO-105780]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111568	Scientific Methods to Design and Analyze Secure Decentralized Systems	5 CR	Hartenstein

Competence Goal
1. Science Theory
a. The student understands epistemological principles like the scientific and mathematical process, within the context of networked and decentralized systems. The student knows about the current limits of scientific research, especially in regards to the security of a given decentralized system.
2. Empirical Methods: Observation / Monitoring,
a. The student is able to construct setups to monitor system properties related to performance or security.. The student knows how to observe a decentralized system like an overlay network without interference, i.e., without impact on the behavior to measure as well as the overall system functionality.
3. Combined Empirical / Formal Methods
a. The student has a fundamental understanding of Discrete Event Simulations, as well as stochastic modelling and random number generation.
b. The student is able to conduct a simulation study consisting of observation, modelling, simulation, validation, and result analysis.
4. Formal Methods
a. The student knows how to apply formal methods like formal verification / model checking and model comparison / simulation-based proofs to decentralized systems.
b. The student understands tradeoffs between empirical and formal methods, and can choose suitable methods for given research tasks.
5. Applications in Research
a. The student understands how the methods of this lecture are applied to practical examples, and knows how to apply the methods on problems of a researcher's everyday life.

Content
Decentralized Systems (like blockchain-based systems) are systems controlled by multiple parties who make their own independent decisions to reach a common goal. However, not knowing which parties are trustworthy and which are betrayers requires a radically different way of thinking. Based on the lecture "Decentralized Systems: Fundamentals, Modeling, and Applications", in this lecture, we cover the necessary scientific methods to analyze existing and to create new decentralized systems. We treat both, selected empirical and formal methods and their tradeoffs, as well as the overarching science theory behind the research process. Together with its practical parts, this lecture provides the foundational scientific toolbox to work on the decentralized systems of the future.

Recommendation
Prior knowledge on the abstract concepts as well as concrete use cases of decentralized systems is strongly recommended. The "Decentralized Systems: Fundamentals, Modeling, and Applications" lecture covers all necessary aspects, but equivalent lectures and / or self-study can also be sufficient.

M 5.208 Module: Security [M-INFO-100834]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics (Usage until 9/30/2024)

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

Mandatory			
T-INFO-101371	Security	6 CR	Hofheinz, Müller-Quade

M 5.209 Module: Seminar Information Systems [M-WIWI-104815]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: Seminars

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

Mandatory			
T-WIWI-109827	Seminar in Information Systems (Master)	3 CR	Studiendekan der KIT-Fakultät für Informatik, Studiendekan des KIT-Studienganges

Competence Certificate
The assessment is done by a seminar with at least 3 CP.

The assessment of the seminar (following §4(2), 3 ER) is described at the course description.

Prerequisites
None.

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.

Content
The module consists of a seminar, that is related to the research field of economic sciences. A complete list of available seminars is published in the internet.

Annotation
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are publishedat the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

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

M 5.210 Module: Seminar Laboratory: Machine Learning and Intelligent Systems [M-INFO-105959]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-112105	Seminar Laboratory: Machine Learning and Intelligent Systems	3 CR	Fennel, Hanebeck

M 5.211 Module: Seminar Module Economic Sciences [M-WIWI-102736]

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

Credits	Grading scale	Language	Level	Version
3	Grade to a tenth	German	1	1

Compulsory Elective Courses (Election: 1 item)			
T-WIWI-103474	Seminar in Business Administration A (Master)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103478	Seminar in Economics A (Master)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103481	Seminar in Operations Research A (Master)	3 CR	Nickel, Rebennack, Stein
T-WIWI-103483	Seminar in Statistics A (Master)	3 CR	Grothe, Schienle

Competence Certificate
The assessment is done by a seminar with at least 3 CP.

The assessment of the seminar (following §4(2), 3 ER) is described at the course description.

Prerequisites
None.

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.

Content
The module consists of a seminar, that is related to the research field of economic sciences. A complete list of available seminars is published in the internet.

Annotation
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are publishedat the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

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

M 5.212 Module: Seminar Module Informatics [M-INFO-102822]

Organisation: KIT Department of Informatics
KIT Department of Economics and Management

Part of: Seminars

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

Compulsory Elective Seminar in Informatics (Election: 1 item)			
T-INFO-104336	Seminar Informatics A	3 CR	Abeck
T-WIWI-103480	Seminar in Informatics B (Master)	3 CR	Professorenschaft des Instituts AIFB
T-INFO-111205	Seminar Informatics Master	3 CR	

M 5.213 Module: Seminar Module Law [M-INFO-101218]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Seminars

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

Mandatory			
T-INFO-101997	Seminar: Legal Studies I	3 CR	Dreier

M 5.214 Module: Service Analytics [M-WIWI-101506]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	8

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-112152	Practical Seminar: Artificial Intelligence in Service Systems	4,5 CR	Satzger
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 core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Prerequisites
None

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

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

Recommendation
The course Service Analytics A [2595501] should be taken.

M 5.215 Module: Service Design Thinking [M-WIWI-101503]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Mandatory			
T-WIWI-102849	Service Design Thinking	12 CR	Satzger

Competence Certificate
The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

Prerequisites
None

Competence Goal

- Deep knowledge of the innovation method Design Thinking, as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Learn to apply the method to a real innovation projects issued by industry partners.

Content

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (intern. Design Thinking network).
- Design Space Exploration: Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are in the focus of this phase.
- Funky Prototype: Integration of the individually tested and successful functions to several complete solution scenarios, which are further tested and developed.
- Functional Prototype: Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is lade out in detail and tested with users.
- Final Prototype: Implementing the functional prototype and presenting it to the customer.

Annotation
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

Workload
The total amount of work for this module is approx. 270 hours (9 credits). The workload for this course is comparably high as the course runs in cooperation with partner universities from around the world as well as partner companies. This causes overhead.

Recommendation
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

M 5.216 Module: Service Economics and Management [M-WIWI-102754]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
T-WIWI-102641	Service Innovation	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 the scientific basics of the management of digital services and corresponding systems
- gain a comprehensive insight in the importance and the most important features of information systems as an central component of the digitalization of business processes, products and services
- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully
- understand the OR methods in the sector of service management and apply them adequately
- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems
- are able to develop market-oriented coordination mechanisms and apply service systems.

Content
This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

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.

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

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

Recommendation
None

M 5.217 Module: Service Innovation, Design & Engineering [M-WIWI-102806]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-110877	Engineering Interactive Systems	4,5 CR	
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	4,5 CR	Mädche
T-WIWI-102641	Service Innovation	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
Dependencies between courses:

The course Practical Seminar Service Innovation cannot be applied in combination with the course Practical Seminar Digital Service Design.

Competence Goal
Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.
- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.
- are able to embed the concepts of innovation management, development and design of services into organisations
- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation
- elaborate concrete and problem-solving solutions for practical tasks in teams.

Content
This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

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.

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

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

Recommendation
Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].

Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

M 5.218 Module: Service Management [M-WIWI-101448]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	8

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-102641	Service Innovation	4,5 CR	Satzger

Competence Certificate
The assessment is carried out as partial exams, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal
The students

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- systematically use vast amounts of available data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

Content
The module service management addresses the basics of developing and managing IT-based services. The lectures contained in this module teach the basics of developing and managing IT-based services and the application of OR methods in the field of service management. Moreover, students learn to systematically analyze vast amounts of data for planning, operation and improvement for complex service offerings. These tools enhance operational and strategic decision support and help to analyze and understand the overall innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

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

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

Recommendation
None

M 5.219 Module: Service Operations [M-WIWI-102805]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Operations Research)

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

Election notes
At least one of the fourcourses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management orDiscrete-Event Simulation in Production and Logistics has to be assigned.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Spieckermann
T-WIWI-102884	Operations Research in Health Care Management	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-102716	Practical Seminar: Health Care Management (with Case Studies)	4,5 CR	Nickel
Supplementary Courses (Election: at most 1 item)			
T-MACH-112213	Applied material flow simulation	4,5 CR	Baumann
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr
T-WIWI-110971	Demand-Driven Supply Chain Planning	4,5 CR	Packowski

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
At least one of the fourcourses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management orDiscrete-Event Simulation in Production and Logistics has to be assigned.

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

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

Recommendation
The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.

M 5.220 Module: Signals and Codes [M-INFO-100823]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101360	Signals and Codes	3 CR	Müller-Quade

M 5.221 Module: Software Architecture and Quality [M-INFO-100844]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101381	Software Architecture and Quality	3 CR	Reussner

M 5.222 Module: Software Development for Modern, Parallel Platforms [M-INFO-100802]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101339	Software Development for Modern, Parallel Platforms	3 CR	Tichy

M 5.223 Module: Software Engineering II [M-INFO-100833]

Responsible: Prof. Dr.-Ing. Anne Koziolek
Prof. Dr. Ralf Reussner
Prof. Dr. Walter Tichy

Organisation: KIT Department of Informatics

Part of: Informatics

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

Mandatory			
T-INFO-101370	Software Engineering II	6 CR	Koziolek, Reussner, Tichy

Content
Requirements engineering, software development processes, software quality, software architectures, MDD, Enterprise Software Patterns software maintainability, software security, dependability, embedded software, middleware, domain-driven design

M 5.224 Module: Software Lab Parallel Numerics [M-INFO-102998]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each term	1 term	German/English	4	2

Mandatory			
T-INFO-105988	Software Lab Parallel Numerics	6 CR	Karl

M 5.225 Module: Software Product Line Engineering [M-INFO-105471]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111017	Software Product Line Engineering	3 CR	Kühn, Reussner

M 5.226 Module: Software-Evolution [M-INFO-100719]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101256	Software-Evolution	3 CR	Reussner

Prerequisites
None

M 5.227 Module: Statistics and Econometrics II [M-WIWI-105414]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)
Economics and Management (Statistics)

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

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 be passed: 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 5.228 Module: Stochastic Information Processing [M-INFO-100829]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101366	Stochastic Information Processing	6 CR	Hanebeck

M 5.229 Module: Stochastic Optimization [M-WIWI-103289]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	10

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CR	Grothe
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-106545	Optimization under Uncertainty	4,5 CR	Rebennack
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-112109	Topics in Stochastic Optimization	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 "Advanced Stochastic Optimization", "Large-scale Optimization" or "Introduction to Stochastic Optimization" has to be taken.

Competence Goal
The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,
- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content
The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

Annotation
The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

Recommendation
It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

M 5.230 Module: Subdivision Algorithms [M-INFO-101863]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103551	Subdivision Algorithms	3 CR	Prautzsch

M 5.231 Module: Subdivision Algorithms [M-INFO-101864]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-103550	Subdivision Algorithms	5 CR	Prautzsch

Prerequisites
None

M 5.232 Module: Symmetric Encryption [M-INFO-100853]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101390	Symmetric Encryption	3 CR	Müller-Quade

M 5.233 Module: Telematics [M-INFO-100801]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101338	Telematics	6 CR	Zitterbart

M 5.234 Module: Testing Digital Systems I [M-INFO-100851]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101388	Testing Digital Systems I	3 CR	Tahoori

M 5.235 Module: Testing Digital Systems II [M-INFO-102962]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-105936	Testing Digital Systems II	3 CR	Tahoori

M 5.236 Module: Theoretical Foundations of Cryptography [M-INFO-105584]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-111199	Theoretical Foundations of Cryptography	6 CR	Müller-Quade

M 5.237 Module: Transport Infrastructure Policy and Regional Development [M-WIWI-101485]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Economics)

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

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-103107	Spatial Economics	4,5 CR	Ott
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba

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 exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students

- understand the economic issues related to transport and regional development with a main focus on economic policy issues generated by the relationship of transport and regional development with the public sector
- are able to compare different considerations of politics, regulation and the private sector and to analyse and assess the respective decision problems both qualitatively and by applying appropriate methods from economic theory
- are prepared for careers in the public sector, particularly for public companies, politics, regulatory agencies, related consultancies, mayor construction companies or infrastructure project corporations

Content
The development infrastructure (e.g. transport, energy, telecommunications) has always been one of the most relevant factors for economic development and particularly influences the development of the regional economy. From the repertoire of state actions, investments into transport infrastructure are often regarded the most important measure to foster regional economic growth. Besides the direct effects of transport policy on passenger and freight transport, a variety of individual economic activities is significantly dependent on the available or potential transport options. Decisions on the planning, financing and realization of mayor infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs.

Through its combination of lectures the module reflects the complex interdependencies between infrastructure policy, transport industry and regional policy and provides its participants with a comprehensive understanding of the functionalities of one of the most important sectors of the economy and its relevance for economic policy.

Annotation
The courses *Assessment of Public Policies and Projects I* (winter term) and *Assessment of Public Policies and Projects II* (summer term) will no longer be part of this module. Student who have already had exams in this courses can integrate these exams in this module.

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

M 5.238 Module: Ubiquitous Computing [M-INFO-100789]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101326	Ubiquitous Computing	5 CR	Beigl

M 5.239 Module: Ubiquitous Computing [M-WIWI-101458]

Responsible: N.N.
Prof. Dr. Hartmut Schmeck
Organisation: KIT Department of Economics and Management
Part of: Informatics

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

Mandatory			
T-INFO-101326	Ubiquitous Computing	5 CR	Beigl
Supplementary Courses (Election: between 4 and 5 credits)			
T-WIWI-102761	Advanced Lab in Ubiquitous Computing	4 CR	Beigl, Schmeck
T-INFO-101323	IT-Security Management for Networked Systems	5 CR	Hartenstein

Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Prerequisites
See German version

Competence Goal
The student

- gets comprehensive knowledge about topics in the area of Ubiquitous Computing
- can design and evaluate ubiquitous systems in different application areas
- acquires appropriate knowledge for addressing specialized aspects in the area of ubiquitous computing

Content
Ubiquitous information technology (Ubiquitous Computing) addresses the ubiquitous (or pervasive) availability of information processing. The availability of these systems has the objective to facilitate the operational environment in technical scenarios or in daily life of humans and to enrich it with new capabilities. This module provides fundamentals of ubiquitous computing and further topics like network and Internet technologies, security aspects, the analysis of autonomously operating systems in Organic Computing and also the utilisation of information and communication technologies in highly decentralized energy systems.

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

M 5.240 Module: Visualization [M-INFO-100738]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101275	Visualization	5 CR	Dachsbacher

M 5.241 Module: Wearable Robotic Technologies [M-INFO-103294]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
4	Grade to a tenth	Each summer term	1 term	German/English	4	2

Mandatory			
T-INFO-106557	Wearable Robotic Technologies	4 CR	Asfour, Beigl

Competence Goal
The students have received fundamental knowledge about wearable robotic technologies and understand the requirements for the design, the interface to the human body and the control of wearable robots. They are able to describe methods for modelling the human neuromusculoskeletal system, the mechatronic design, fabrication and composition of interfaces to the human body. The students understand the symbiotic human–machine interaction as a core topic of Anthropomatics and have knowledge of state of the art examples of exoskeletons, ortheses and protheses.

Content
The lecture starts with an overview of wearable robot technologies (exoskeletons, prostheses and ortheses) and its potentials, followed by the basics of wearable robotics. In addition to different approaches to the design of wearable robots and their related actuator and sensor technology, the lecture focuses on modeling the neuromusculoskeletal system of the human body and the physical and cognitive human-robot interaction for tightly coupled hybrid human-robot systems. Examples of current research and various applications of lower, upper and full body exoskeletons as well as prostheses are presented.

M 5.242 Module: Web and Data Science [M-WIWI-105368]

Responsible: Dr.-Ing. Michael Färber
Organisation: KIT Department of Economics and Management
Part of: Informatics

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

Compulsory Elective Courses (Election: at least 2 items)			
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB

Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- know the basics of machine learning, data mining and knowledge discovery
- can design, train and evaluate systems that are capable of learning
- carry out knowledge discovery projects, taking into account algorithms, representations and applications.
- will look at current research topics in the field of Web Science and
- learn about the topics Small World Problem, Network Theory, Social Network Analysis, Bibliometrics, Link Analysis and Search,
- apply interdisciplinary thinking and
- apply technological approaches to social science problems.

Content
The module focuses on machine learning and data mining methods for knowledge acquisition from large databases as well as web phenomena and the available technologies.

The lecture Knowledge Discovery gives an overview of approaches of machine learning and data mining for knowledge acquisition from large data sets. These are examined especially with respect to algorithms, applicability to different data representations and the use in real application scenarios.
Knowledge Discovery is an established research area with a large community that investigates methods for discovering patterns and regularities in large amounts of data, including unstructured text. A variety of methods exist to extract patterns and provide previously unknown insights. This information can be predictive or descriptive.
The lecture gives an overview of Knowledge Discovery. Specific techniques and methods, challenges and current and future research topics in this research area will be taught.
Contents of the lecture cover the entire machine learning and data mining process with topics on supervised and unsupervised learning and empirical evaluation. Covered learning methods range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

The lecture "Web Science" offers an insight into the analysis of social networks and the metrics used in this context. Thereby especially web phenomena and the available technologies.
Web Science is the emerging study of the people and technologies, applications, processes and practices that make the world Wide Web and are shaped and embossed. Web Science aims to develop theories, methods and findings from the entire academic disciplines and work with industry, business, politics and civil society to create an understanding of the Web: The largest socio-technical infrastructure in the history of mankind.
The lecture gives an introduction to the basic concepts of Web Science. Essential theoretical foundations, Phenomena and methods are presented and explained. This lecture aims to give students a basic knowledge and understanding of the structure and analysis of selected web phenomena and technologies. The topics include the small world problem, Network theory, social network analysis, graph-based search and technologies / standards / architectures.

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

M 5.243 Module: Web Applications and Service-Oriented Architectures (II) [M-INFO-100734]

Responsible: Prof. Dr. Sebastian Abeck
Organisation: KIT Department of Informatics
Part of: Informatics

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

Mandatory			
T-INFO-101271	Web Applications and Service-Oriented Architectures (II)	4 CR	Abeck

Competence Certificate
Siehe Teilleistung

M 5.244 Module: Web Data Management [M-WIWI-101455]

Responsible: Dr.-Ing. Michael Färber
Organisation: KIT Department of Economics and Management
Part of: Informatics

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

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB

Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students

- develop ontologies for semantic web technologies und choose suitable representation languages,
- are able to provide data and applications via a cloud-based infrastructure
- transfer the methods and technologies of semantic web technologies and cloud computing to new application sectors,
- evaluate the potential of semantic web technologies and the cloud computing approaches for new application sectors.

Content
The module Web Data Management covers the basic principles, methods and applications for intelligent systems in the World Wide Web. Cloud Services are essential for the decentralized, scalable provision of data and applications as well as the methods of semantic web based on the description of data and services via metadata in form of so called ontologies.

Formal principles and practical aspects such as knowledge modeling and available representation language tools for ontologies are covered in detail. Methods for the realization of intelligent systems within the World Wide Web are treated and applications as in Web 2.0 or Service Science are discussed and evaluated.

Furthermore the application of modern Cloud technologies for the use of software and hardware as a service via internet is introduced. Cloud technologies allow the efficient implementation of applications on distributed computer clusters and permit a high scalability as well as new business models in the internet.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is based on the credits of the courses of the module. The workload for courses with 4.5 credits is about 135 hours.

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

6 Courses

T 6.1 Course: A Closer Look at Social Innovation [T-WIWI-109932]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation). The grade consists of an innovation plan (comparable to an exposé) (15%), a guideline interview (25%), a presentation of the results (20%) and a seminar paper (40%).

Prerequisites
None

Recommendation
The previous attendance of the lecture Innovation Management is recommended.

Annotation
The course will be discontinued in the winter semester 2022/23.

T 6.2 Course: Access Control Systems Lab [T-INFO-108611]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-104164 - Access Control Systems Lab

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

Events					
ST 2022	2400094	Practical Course Access Control Systems	2 SWS	Practical course / 🗣	Hartenstein, Westermeyer, Stengele
Exams					
ST 2022	7500095	Access Control Systems Lab			Hartenstein

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

Below you will find excerpts from events related to this course:

V Practical Course Access Control Systems

2400094, SS 2022, 2 SWS, Language: German/English, Open in study portal

Practical course (P)
On-Site

Content
An information security model defines access rights that express for a given system which subjects are allowed to perform which actions on which objects. A system is said to be secure with respect to a given information security model, if it enforces the corresponding access rights. Thus, access control modeling and access control systems represent the fundamental building blocks of secure services, be it on the Web or in the Internet of Everything.
In this master-level course, we thoroughly investigate the evolution of access control models (access control matrix, role-based access control, attribute access control) and describe usage control models as a unified framework for both access control and digital rights management. The students experiment with real-world access control protocols and technologies and thus apply the contents of the lecture "Access Control Systems: Foundations and Practice" in a real-world context.

Amount of Work

Lab Sessions: 6 x 2h = 12h
Lab Tasks: 6 x 10h = 60h
Lab Reports: 6 x 4h = 24h
Buffer: 6 x 2h = 12h
Final Presentation: 12h

Σ = 120h = 4 ECTS

Learning Objectives

The student is able to derive suitable access control models from scenario requirements and is able to specify concrete access control systems.

The student is aware of current access control frameworks and technologies.

The student is able to formulate a suitable system architecture for a given access control scenario.

The student is able to identify concrete technologies to implement an access control system securely and efficiently.

The student is able to evaluate the suitability of a given access control system architecture for a given scenario.

Organizational issues
We will hold all meetings for this seminar synchronously via video conferencing at the scheduled dates on Friday, 14:00 via Microsoft Teams.

Please register for the lab in the WiWi portal: https://portal.wiwi.kit.edu/

You will be notified via WiWi portal mail about access to MS Teams and ILIAS.

The current registration link can be found on our website: https://dsn.tm.kit.edu/teaching.php

T 6.3 Course: Access Control Systems: Foundations and Practice [T-INFO-106061]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-103046 - Access Control Systems: Foundations and Practice
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each term	2

Events					
ST 2022	2400111	Access Control Systems: Foundations and Practice	3 SWS	Lecture / Practice (/ 🗣	Hartenstein, Leinweber, Westermeyer
Exams					
ST 2022	7500247	Access Control Systems: Foundations and Practice			Hartenstein
ST 2022	7500296	Access Control Systems: Foundations and Practice			Hartenstein

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

T 6.4 Course: Advanced Data Structures [T-INFO-105687]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-102731 - Advanced Data Structures

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2022	2400164	Advanced Data Structures	3 SWS	Lecture / 🗣	Kurpicz, Sanders
Exams					
ST 2022	7500538	Advanced Data Structures			Sanders

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

T 6.5 Course: Advanced Data Structures Project/Experiment [T-INFO-111849]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-102731 - Advanced Data Structures

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

Events					
ST 2022	2400164	Advanced Data Structures	3 SWS	Lecture / 🗣	Kurpicz, Sanders
Exams					
ST 2022	7500213	Advanced Data Structures Project/Experiment			Sanders

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

T 6.6 Course: Advanced Empirical Asset Pricing [T-WIWI-110513]

Responsible: TT-Prof. Dr. Julian Thimme
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2530569	Advanced Empirical Asset Pricing	2 SWS	Lecture /	Thimme
WT 22/23	2530570	Übung zu Advanced Empirical Asset Pricing	1 SWS	Practice /	Thimme
Exams					
ST 2022	7900321	Advanced Empirical Asset Pricing			Thimme
WT 22/23	7900319	Advanced Empirical Asset Pricing			Thimme

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break. 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.

A bonus can be acquired by submitting exercise solutions to 80% of the assigned exercise tasks. 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.

Recommendation
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course. In addition, prior participation in the Asset Pricing Master course is strongly recommended.

Annotation
New course from winter semester 2019/2020.

Below you will find excerpts from events related to this course:

V Advanced Empirical Asset Pricing

2530569, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this course we will discuss the fundamentals of Asset Pricing and how to test them. Although this is an Empirical Asset Pricing course, we deal with some concepts from Asset Pricing Theory that we can test afterwards (CAPM, ICAPM, CCAPM, recursive utility). Besides, the course will cover the most important empirical methods to do so. For that purpose, we will discuss the overarching tool *Generalized Method of Moments*, and the special cases of OLS and FMB regressions. Every second week, we will meet for a programing session, in which we will look at the data to draw our own conclusions. An introduction to the software MATLAB will be given at the beginning of the course. Students should bring a laptop to these sessions. Programing skills are not required but helpful.

We start with a review of the Stochastic Discount Factor, which is already known from the course „Asset Pricing“. We then derive the CAPM and the Consumption-CAPM as special cases from the general consumption-savings optimization problem of the rational investor. In the first part of the course we discuss the CAPM and, as natural extensions, models with multiple factors. Prominent phenomena such as the value premium and momentum are discussed. In the second part of the lecture we will study extensions of Consumption-CAPM and study the implications of exotic preferences.

Organizational issues
Veranstaltung findet montags um 9:45-11:15, aber nur in der ersten Semesterhälfte statt. Der Veranstaltungsort ist der Raum 320 im Geb. 09.21 (Blücherstraße).

Literature
Basisliteratur

Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

zur Vertiefung/ Wiederholung

Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.

The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

T 6.7 Course: Advanced Game Theory [T-WIWI-102861]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2500037	Advanced Game Theory	2 SWS	Lecture /	Puppe, Ammann
WT 22/23	2500038	Übung zu Advanced Game Theory	1 SWS	Practice /	Puppe, Ammann
Exams					
ST 2022	7990003	Advanced Game Theory			Reiß

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.

Prerequisites
None

Recommendation
Basic knowledge of mathematics and statistics is assumed.

Below you will find excerpts from events related to this course:

V Advanced Game Theory

2500037, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

T 6.8 Course: Advanced Lab Blockchain Hackathon (Master) [T-WIWI-111126]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures

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

Events					
WT 22/23	2512403	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course /	Sunyaev, Kannengießer, Sturm, Beyene
Exams					
ST 2022	7900172	Lab Blockchain Hackathon (Master)			Sunyaev
WT 22/23	7900141	Advanced Lab Blockchain Hackathon (Master)			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

T 6.9 Course: Advanced Lab in Ubiquitous Computing [T-WIWI-102761]

Responsible: Prof. Dr.-Ing. Michael Beigl
Prof. Dr. Hartmut Schmeck

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101458 - Ubiquitous Computing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Irregular	1

Competence Certificate
See German version

Prerequisites
None

Annotation
See German Version

T 6.10 Course: Advanced Lab Informatics (Master) [T-WIWI-110548]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101455 - Web Data Management
M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-101477 - Development of Business Information Systems
M-WIWI-105366 - Artificial Intelligence
M-WIWI-105368 - Web and Data Science

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

Events					
ST 2022	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course /	Schiefer, Schüler, Toussaint
ST 2022	2512207	Lab Automation in Everyday Life (Master)	3 SWS	Practical course /	Schiefer, Forell, Frister
ST 2022	2512401	Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course /	Sunyaev, Pandl, Goram
ST 2022	2512403	Advanced Lab Blockchain Hackathon (Master)		Practical course /	Sunyaev, Beyene, Kannengießer
ST 2022	2512500	Project Lab Machine Learning	3 SWS	Practical course /	Zöllner
ST 2022	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Mayer, Berens, Mossano, Düzgün, Hennig, Veit
ST 2022	2512603	Project Course Coding da Vinci - Cultural Heritage Hackathon (Master)	3 SWS	Practical course /	Sack, Bruns, Tietz
WT 22/23	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course /	Oberweis, Toussaint, Schiefer, Schüler
WT 22/23	2512401	Practical Course Sociotechnical Information Systems Development (Master)	3 SWS	Practical course /	Sunyaev, Pandl, Goram
WT 22/23	2512403	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course /	Sunyaev, Kannengießer, Sturm, Beyene
WT 22/23	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course /	Zöllner, Daaboul
WT 22/23	2512557	Practical Course Security (Master)	4 SWS	Practical course /	Baumgart, Volkamer, Mayer, Wressnegger
WT 22/23	2512600	Project lab Information Service Engineering (Master)	3 SWS	Practical course /	Sack

Exams			
ST 2022	7900020	Lab Automation in Everyday Life (Master)	Oberweis
ST 2022	7900030	Lab Coding da Vinci - Cultural Heritage Hackathon (Master)	Sack
ST 2022	7900086	Project Lab Machine Learning	Zöllner
ST 2022	7900148	Advanced Lab Realization of innovative services (Master)	Oberweis
ST 2022	7900172	Lab Blockchain Hackathon (Master)	Sunyaev
ST 2022	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)	Sunyaev
ST 2022	7900178	Practical Lab Security, Usability and Society (Master)	Volkamer
WT 22/23	7900046	Advanced Lab Security (Master)	Volkamer
WT 22/23	7900102	Advanced Lab Information Service Engineering (Master)	Sack

WT 22/23	7900107	Advanced Lab Cognitive Automobile and Robots (Master)	Zöllner
WT 22/23	7900141	Advanced Lab Blockchain Hackathon (Master)	Sunyaev
WT 22/23	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)	Sunyaev
WT 22/23	7900306	Advanced Lab Realization of Innovative Services (Master)	Oberweis
WT 22/23	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
- 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.

Below you will find excerpts from events related to this course:

V **Lab Realisation of innovative services (Master)**
2512205, SS 2022, 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).

Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V **Lab Automation in Everyday Life (Master)**
2512207, SS 2022, 3 SWS, Language: German, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
As part of the lab, various topics on everyday automation are offered. During the lab, the participants will gain an insight into problem-solving oriented project work and work on a project together in small groups.

Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V **Development of Sociotechnical Information Systems (Master)**
2512401, SS 2022, 3 SWS, Language: German/English, Open in study portal
Practical course (P)
Online

Content
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

V **Project Lab Machine Learning**
2512500, SS 2022, 3 SWS, Language: German/English, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V **Praktikum Security, Usability and Society (Master)** **Practical course (P)**
2512555, SS 2022, 3 SWS, Language: German/English, Open in study portal **Online**

Content
The internship 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 hte WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu before the kick-off. You can find a better description of the topics in ILIAS (link below). Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

ILIAS link: https://ilias.studium.kit.edu/goto.php?target=crs_1792110&client_id=produktiv

Important dates:

Kick-off: 19.04.2022, 9:00-10:00 CET Uhr Microsoft Teams - - Link

Report + code submission : 09.09.2022, 23:59 CET

Presentation deadline : 25.09.2022, 23:59 CET

Presentation day: 28.09.2022, 16:00 CET

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, 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.

- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Improving the PassSec+ browser extension by investigating a security vulnerability in Mozilla Firefox Relay
- Development of a tool for the automated search for tweets on the topic of "phishing"
- Hacking TORPEDO
- Restructuring TORPEDO
- Authenticating on AR glasses: Implementing an authentication scheme for the Google Glass

Designing Security User studies (online studies only)

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

- Investigate brainwaves authentication
- Replication and extension of "What is this URL's destination?"

Please, note that registration is not required to participate in the kick-off meeting.

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 **Project Course Coding da Vinci - Cultural Heritage Hackathon (Master)** **Practical course (P)**
2512603, SS 2022, 3 SWS, Language: English, Open in study portal **Blended (On-Site/Online)**

Content
Cultural heritage includes tangible and intangible heritage assets inherited from past generations. Cultural heritage data are usually stored in galleries, museums, archives and libraries (GLAM institutions) and in recent years, efforts by culture domain experts and computer scientists have begun to make this data more findable, accessible, interoperable and reusable by the general public, but also by researchers in the domains of history, social science, etc. This seminar follows up on these efforts by having student groups participate in the official **Coding da Vinci culture hackathon** with guidance and coaching by the course tutors.

The culture hackathon Coding da Vinci has brought together the cultural sector with creative technology communities to explore the creative potential of digital cultural heritage. Over a sprint of seven weeks the hackathon teams, together with representatives of cultural institutions, develop working prototypes that show surprising and inspiring new ways to make use of institutions' collections and artifacts in the digital age.

As part of this "Projektpraktikum", the students will take part in the official hackathon "**Coding da Vinci Baden-Württemberg**" (https://codingdavinci.de/index.php/de/events/baden-wuerttemberg-2022). They will form groups and implement their own interesting culture project by using the dataset(s) provided by Coding da Vinci. The goal is to create a project that is useful for the culture community and helps to explore and experience cultural heritage data in an interesting, innovative and fun way.

This "Projektpraktikum" is furthermore a chance to network with the community of culture enthusiasts and developers while creating a working application that adds value to the community. The groups will present their work at the official Codings da Vinci kick-off event and the award ceremony.

Contributions of the students:

The students will form groups of 3-4 people. They will be expected to first get familiar with datasets presented in the event, the technologies and methods they will utilize and will develop their own project idea. Each group will present their **project idea on May 07, 2022** at the Coding da Vinci BW kick-off and will officially start the implementation of their project. On **June 24, 2022**, each group will present their **final projec**t at the official Coding da Vinci BW award ceremony. Following the event, each group will prepare a scientific seminar paper of not more than 16 pages.

Implementation:

Each group will implement their project idea based on the datasets given in the event using open source software and will publish their code using an open license via github.

Learning Goals:

- Basic understanding of knowledge graphs and Natural Language Processing
- Independent and self-organized realization of a group project
- Planning and execution of design, implementation and quality assurance of the group project
- Preparation of a scientific seminar paper for the group project of 16 pages
- Presentation of the group project in a comprehensible and structured manner

Registration:

The registration period for this course lasts from 01.02.2022 until 22.04.2022. The places are expected to be allocated on 25.04.2022 and must be accepted by the student within two days.
If you have any questions regarding the registration or course content, please contact tabea.tietz@kit.edu and oleksandra.bruns@kit.edu .

Modules: Informatik

Timeline:

20.04.2022 Plenary meeting: Introduction and Course Organization

27.04.2022 Plenary meeting: Forming of student groups and discussion of datasets

07.05.2022 Official Coding da Vinci Kick-off Event: Presentation of group idea

11.05.2022 Individual group sessions: Fixing a project plan and timeline

18.05.2022 Individual group sessions: Weekly progress meeting

25.05.2022 Individual group sessions: Weekly progress meeting

01.06.2022 Individual group sessions: Weekly progress meeting

08.06.2022 Individual group sessions: Weekly progress meeting

15.06.2022 Individual group sessions: Weekly progress meeting

22.06.2022 Individual group sessions: Weekly progress meeting

24.06.2022 Official Coding da Vinci Award Ceremony: Final Presentation

17.08.2022 Seminar paper submission and finalization (and documentation) of the code

Organizational issues
Considering the then current pandemic situation and in coordination with the participants the course will mostly taking place as online course with potentially a few "live" events (cf further description below).

V

Lab Realisation of innovative services (Master)

2512205, WS 22/23, 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).

Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V

Practical Course Cognitive automobiles and robots (Master)

2512501, WS 22/23, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V

Practical Course Security (Master)

2512557, WS 22/23, 4 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab deals with the IT security of everyday utensils. Implemented security mechanisms are first theoretically investigated and put to the test with practical attacks. Finally, countermeasures and suggestions for improvement are worked out. The lab is offered within the competence center for applied security technologies (KASTEL) and is supervised by several institutes.

The success control takes the form of a final presentation, a thesis and the handing over of the developed code.

More information on ILIAS.

V

Project lab Information Service Engineering (Master)

2512600, WS 22/23, 3 SWS, Language: English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The ISE project lab is based on the summer semester lecture "Information Service Engineering". Goal of the course is to work on a given research problem in small groups (3-4 students) related to the ISE lecture topics, i.e. Natural Language Processing, Knowledge Graphs, and Machine Learning. The solution of the given research problem requires the development of a software implementation.

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

Required coursework includes:

- Mid term presentation (5-10 min)
- Final presentation (10-15 min)
- Course report (c. 20 pages)
- Participation and contribution of the students during the course
- Software development and delivery

Notes:

The ISE project lab can also be credited as a **seminar** (if necessary).

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

Participation will be restricted to 15 students.

Participation in the lecture "Information Service Engineering" (summer semester) is required. There are video recordings on our youtube channel.

ISE Tutor Team:

- M. Sc. Russa Biswas
- M. Sc. Genet Asefa Gesese
- M. Sc. Oleksandra Bruns
- M. Sc. Yiyi Chen
- M. Sc. Mary Ann Tan
- B. Sc. Tabea Tietz

Literature
ISE video channel on youtube: https://www.youtube.com/channel/UCjkkhNSNuXrJpMYZoeSBw6Q/

T 6.11 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-104520 - Human Factors in Security and Privacy

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2612554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course /	Volkamer, Strufe, Mayer, Berens, Mossano, Düzgün, Hennig, Veit
WT 22/23	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course /	Volkamer, Mayer, Berens, Mossano, Düzgün, Veit, Hennig
WT 22/23	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Mayer, Berens, Mossano, Düzgün, Veit, Hennig
Exams					
ST 2022	7900029	Practical lab Security, Usability and Society (Bachelor)			Volkamer
WT 22/23	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
WT 22/23	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 is expected to be offered from winter term 2018/2019.

Contents:

In the course of the programming lab, changing topics from the field of Human Factors in Security und Privacy will be worked on.

Learning goals:

The student

- can apply the basics of information security
- is able to implement appropriate measures to achieve different protection goals
- can structure a software project in the field of information security
- can use the Human Centred Security and Privacy by Design technique to develop user-friendly software
- can explain and present technical facts and the results of the programming lab in oral and written form

Below you will find excerpts from events related to this course:

V Practical lab Security, Usability and Society (Bachelor)

2612554, SS 2022, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Online

Content
The internship 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 hte WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu before the kick-off. You can find a better description of the topics in ILIAS (link below). Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

ILIAS link: https://ilias.studium.kit.edu/goto.php?target=crs_1792110&client_id=produktiv

Important dates:

Kick-off: 19.04.2022, 9:00-10:00 CET Uhr Microsoft Teams - - Link

Report + code submission : 09.09.2022, 23:59 CET

Presentation deadline : 25.09.2022, 23:59 CET

Presentation day: 28.09.2022, 16:00 CET

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, 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.

- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Improving the PassSec+ browser extension by investigating a security vulnerability in Mozilla Firefox Relay
- Development of a tool for the automated search for tweets on the topic of "phishing"
- Hacking TORPEDO
- Restructuring TORPEDO

Please, note that registration is not required to participate in the kick-off meeting.

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 (Bachelor)

2512554, WS 22/23, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Online

Content
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 anne.hennig@kit.edu . Topics are assigned first-come-first-served until all of them are filled. The deadline for the first round is 18.07.2022. Topics in italics have been already assigned.

Important dates:

Kick-off: 13.10.2022, 10:00 AM CET in Big Blue Button - Link
Report + code submission : 30.01.2023 23:59 CET
Presentation deadline : 30.01.2023, 23:59 CET

Presentation day: 01.02.2023

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, 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: Portfolio Graphical Recognition-Based PWDs with Gamepads
Number of students: 2 Bachelor or Master level
Description: Graphical passwords use graphical elements as passwords and they are usually easier to remember than textual passwords. Moreover, they can be combined with "portfolio authentication" techniques to make them shoulder surfing resistant. The goal of this topic is to implement a graphical portfolio authentication shceme for gamepads, based on previous textual schemes implementations.

Title: Development of a secure web interface with a ticket system for the Hashcat Password Cracker
Number of students: 2 Bachelor or Master level
Description: Hashcat is a console application which allows to crack passwords using a given wordlist or password pattern. In order to allow multiple not necessarily trustworthy users to register a password cracking job with the specified parameters in parallel, a web platform with a ticket system should be developed within the framework of this laboratory topic.Therefore a frontend and backend should be implemented separately and a clear description of the interface between is essential part of this work. Python with Flask Web Framework can be used to implement the backend. Good knowledge in programming, APIs and web security are required.

Designing Security User studies

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

Title: NoPhish Cardgame
Number of students: 1/2 Bachelor level
Description: Das NoPhish Konzept findet bereits in vielen Formen Anwendung. Es hilft dabei betrügerische Nachrichten von legitimen zu Unterscheiden. Die neueste Form ist ein Cardgame bei dem man spielerisch lernen kann Phishing zu erkennen. Hierbei wird sowohl grundlegendes Wissen, als auch konkretes Wissen vermittelt. Aufgabe: Erheben von Daten (Studiendesign ist bereits vorhanden) und Auswertung bestehender Daten mit neu erhobenen Daten

Title: Analysing the percetions on email subject extensions like 'Caution - This e-mail is sent from someone outside the company'
Number of students: 1/2 Bachelor or Master level
Description: Email subject extensions are used in myn organistions to reduce the risk to become a victim of a phishing email - why should your boss e.g. send you an external email? Likely to be a phish! The idea is to develope the study protocol and to collect first data which should be analysed.

Title: Benutzerstudie zur Erkennung von Angriffen auf die E-Mail Absicherung mit S/MIME-Zertifikaten
Number of students: 2 Bachelor or Master level
Description: Das KIT bietet den Beschäftigten und Studierenden die Möglichkeit, ihre E-Mail-Kommunikation mittels S/MIME-Zertifikaten abzusichern. Für die Nutzenden entsteht hierbei die Herausforderung, eingehende Nachrichten hinsichtlich gültiger Signatur und Verschlüsselung zu prüfen und mögliche Angriffe zu erkennen. Zielsetzung dieser Arbeit ist die Konzeption und Erstellung einer Nutzerstudie zur Evaluation von Schulungsmaterialien. Die Studie soll verschiedene Nutzungsszenarien bei der Erkennung von Angriffen (z.B. durch ungültige Zertifikate) und das Verhalten der Nutzenden innerhalb dieser Szenarien umfassen.

Title: Evaluation of the Sudoku Privacy Friendly App usability for users with rheumatoid arthritis (English only)
Number of students: 1 Bachelor or Master level
Description: The Privacy Friendly Apps are a set of applications developed by the SECUSO group that do not contain any advertisement or tracking mechanism, hence preserving the privacy of their users (https://secuso.aifb.kit.edu/english/105.php). One of these apps is "Sudoku", available for Android on both the Google Store and F-Droid. Although the app is friendlier to privacy that other alternatives, it requires multiple tactile interactions with the mobile device. This can be an issue for users with reduced hand mobility, such as those suffering from rheumatoid arthritis. To approximate the reduced mobility caused by reumatoid arthritis in healthy users, it is common to use arthritis simulation gloves (e.g., https://idarinstitute.com/products/arthritis-simulation-gloves). The task of the student is to design a lab study involving arthritis simulation gloves that evaluates the Sudoku app usability for users suffering from rheumatoid arthritis,.

Title: Replication and extension of “What is this URL’s destination?” (English only)
Number of students: 1 Bachelor level
Description: Replication of studies is a fundamental part of the scientific process: it allows to confirm or deny experimental results and can open new lines of research. This topic is a replication of the study presented in Albakry, S., Vaniea, K. & Wolters, M.K. (2020) What is this URL's destination? Empirical Evaluation of Users' URL Reading" (https://doi.org/10.1145/3313831.3376168). The student will re-implement the study following the precise description from the original authors, run it and then compare the results with the previous iteration.

Title: Password Generator Defaults
Number of students: 2 Bachelor or Master level
Description: Password Managers are useful tools that help the use of complex passwords and avoid the password recycle practice. Moreover, they support users by providing password generator tools, that create random password of specific length. However, the defaults settings might be at odds with the password policies of popular website, e.g., they can contain forbidden characters or be too long/short. Moreover, we need to understand if Password Managers users change the default settings to generate passwords, in how many cases and for what reasons. The students task is therefore two-folds: (1) compare the default settings of several Password Managers to the privacy policies of popular websites; (2) design and implement a survey to collect the behavior of Password Managers users with regard to the password generator tools.

Title: Benutzerstudie zur Auswertung der PassSec+ Browser Extension mittels Eye-Tracking
Number of students: 1/2 Bachelor or Master level
Description: PassSec+ ist eine von SECUSO entwickelte Browser-Erweiterung für Firefox und Google Chrome, die hilft, Passwörter, Zahlungsdaten und andere sensible Daten besser zu schützen, indem es bereits vor der Eingabe dieser Daten prüft, ob eine sichere Dateneingabe gewährleistet ist und im Zweifel ein Dialog anzeigt, welcher den Nutzer bei der Entscheidung unterstützt. In der Nutzerstudie soll untersucht werden, wo der Fokus des Nutzers mit und ohne Benutzung von PassSec+ liegt und dabei die Effektivität zur Prävention vor Phishing untersucht werden. Es wird das Setup sowie der Aufbau der Studie bereits vorgegeben. Ziel ist es, die Nutzerstudie mit Probanden durchzuführen und die Daten entsprechend z.B. mit Heatmaps auszuwerten.

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)** **Practical course (P)**
2512555, WS 22/23, 3 SWS, Language: German/English, Open in study portal **Online**

Content
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WiWi portal: https://portal.wiwi.kit.edu/ys/6273

Important dates:

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Report + code submission : 30.01.2023 23:59 CET
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Presentation day: 01.02.2023

Topics:

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Title: User study on user's knowledge about brainwaves verification
Number of students: 1 Master level
Description: Brainwaves can be used to authenticate users. Hoerver, several questions are left unanswered regarding the users' stance on this: What is the prior knowledge of users about verification and brainwaves? Are they comfortable wearing a device to record their brainwaves? How are they feeling regarding storing their brainwaves samples? Which kind of information can be extracted from the smaples? How secure would such an authentication scheme be? The task of the student is to design, implement an pre-test a user study investigating these questions.

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) .

T 6.12 Course: Advanced Machine Learning [T-WIWI-109921]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr. Abdolreza Nazemi

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540535	Advanced Machine Learning	2 SWS	Lecture	Nazemi
ST 2022	2540536	Exercise Advanced Machine Learning	1 SWS	Practice	Nazemi
Exams					
ST 2022	7900227	Advanced Machine Learning			Geyer-Schulz
ST 2022	7900308	Advanced Machine Learning			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 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.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Advanced Machine Learning

2540535, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
In recent years, the volume, variety, velocity, veracity, and variability of available data have increased due to improvements in computational and storage power. The rise of the Internet has made available large sets of data that allow us to use and merge them for different purposes. Data science helps us to extract knowledge from the continually-increasing large datasets. This course will introduce students to a wide range of machine learning and statistical techniques such as deep learning, LASSO, and support vector machine. You will get familiar with text mining, and the tools you need to analyze the various facets of data sets in practice. Students will learn theory and concepts with real data sets from different disciplines such as marketing, finance, and business.

Tentative Course Outline:

- Introduction
- Statistical Inference
- Shrinkage Methods
- Model Assessment and Selection
- Tree-based Machine Learning Algorithms
- Dimensionality Reduction
- Neural Networks and Deep Learning
- Natural Language Processing with Deep Learning
- Support Vector Machine

Time of attendance

- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m

The student will learn

- A wide range of machine learning algorithms and their weaknesses.
- The fundamental issues and challenges: data, high-dimension, train, model selection, etc.
- How to imply machine learning algorithms for real-world applications.
- The fundamentals of deep learning, main research activities, and on-going research in this field.

Literature

- Alpaydin, E. (2014). Introduction to Machine Learning. Third Edition, MIT Press.
- De Prado, M. L. (2018). Advances in Financial Machine Learning. John Wiley & Sons.
- Goodfellow, I., Bengio, Y., and A. Courville (2017). Deep Learning. MIT Press. (online available)
- Hastie, T., Tibshirani, R., and J. Friedman (2009). Elements of Statistical Learning. Second Edition. Springer. (online available)
- Leskovec, J., Rajaraman, A., Ullman, J. D., (2014). Mining of Massive Datasets. Cambridge University Press. (online available)
- Witten, I. H., Eibe, F., Hall, M. A., Pal, C. J. (2016). Data Mining: Practical Machine Learning Tools and Techniques. Morgan Kaufmann.

T 6.13 Course: Advanced Machine Learning and Data Science [T-WIWI-111305]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105659 - Advanced Machine Learning and Data Science

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each term	2

Events					
ST 2022	2530357	Advanced Machine Learning and Data Science	4 SWS	Practical course	Ulrich
Exams					
ST 2022	7900378	Advanced Machine Learning and Data Science			Ulrich

Competence Certificate
The assessment is carried out in form of a written thesis based on the course "Advanced Machine Learning and Data Science".

Annotation
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning. Please apply via the link: https://portal.wiwi.kit.edu/forms/form/fbv-ulrich-msc-project.

An online meetup will be offered at 14:00 on Tuesday of the first week of summer semester 2022 (i.e., 19.04.2022).

Below you will find excerpts from events related to this course:

V Advanced Machine Learning and Data Science

2530357, SS 2022, 4 SWS, Language: English, Open in study portal

Practical course (P)

Content
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning.

Organizational issues
Location: Räume des Lehrstuhls, Blücherstraße 17, E-008

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

T 6.14 Course: Advanced Management Accounting [T-WIWI-102885]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2579907	Advanced Management Accounting	4 SWS	Lecture / 🗣	Wouters, Dickemann

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

Competence Certificate
The assessment consists of an oral exam (30 min) (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendation
The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Annotation
This course is held in English. Lectures and tutorials are integrated.

The course is compulsory and must be examined.

Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters∂kit.edu).

Below you will find excerpts from events related to this course:

V **Advanced Management Accounting** — **Lecture (V) On-Site**
2579907, WS 22/23, 4 SWS, Language: English, Open in study portal

Content
This course is held in English. Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

Inhalt:

- The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

Learning objectives:

- Students will be able to consider advanced management accounting methods in an interdisciplinary way and to apply these to managerial decision-making problems in operations and innovation.
- They will also be able to identify relevant research results on such methods.

Examination:

- The assessment consists of an oral exam (30 min) taking place in the recess period (according to § 4 (2) No. 2 of the examination regulation).
- The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Required prior Courses:

- The course is compulsory and must be examined.

Recommendations:

- The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Workload:

- The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature is mostly made available via ILIAS.

T 6.15 Course: Advanced Statistics [T-WIWI-103123]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101637 - Analytics and Statistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2550552	Advanced Statistics	2 SWS	Lecture /	Grothe
WT 22/23	2550553	Übung zu Statistik für Fortgeschrittene	2 SWS	Practice /	Grothe
Exams					
ST 2022	7900037	Advanced Statistics			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

Below you will find excerpts from events related to this course:

V Advanced Statistics

2550552, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Skript zur Vorlesung

T 6.16 Course: Advanced Stochastic Optimization [T-WIWI-106548]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

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.

T 6.17 Course: Advanced Topics in Digital Management [T-WIWI-111912]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2573016	Advanced Topics in Digital Management	2 SWS	Colloquium (K / 🗣)	Nieken, Mitarbeiter

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

Competence Certificate
Alternative exam assessment. The following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendation
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas digital HRM, personnel economics, and leadership and those who are interest in an academic career path.

Below you will find excerpts from events related to this course:

V **Advanced Topics in Digital Management** — **Colloquium (KOL) On-Site**
2573016, SS 2022, 2 SWS, Language: English, Open in study portal

Content
The students will discuss and analyze selected research papers in the areas digital HRM, personnel economics, and leadership with a focus on digital management. The students will present research papers and discuss research methods and designs as well as content. They will develop an own research design on a predefined topic.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership with a focus on digital management and AI.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills and discussion skills.
- Practices scientific debating.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of digital HRM and management.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
- Learns how to develop an own research design and idea.

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues
Geb. 05.20, Raum 2A-25, Termine werden bekannt gegeben

T 6.18 Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2022	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture / 🗣	Mitusch, Brumm
ST 2022	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice / 🗣	Pegorari, Corbo
Exams					
ST 2022	00227	Advanced Topics in Economic Theory			Mitusch, Brumm
ST 2022	7900269	Advanced Topics in Economic Theory			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 2022, 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 6.19 Course: Advanced Topics in Human Resource Management [T-WIWI-111913]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2573014	Advanced 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 following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendation
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas HRM, personnel economics, and leadership and those who are interest in an academic career path.

Below you will find excerpts from events related to this course:

V **Advanced Topics in Human Resource Management** — **Colloquium (KOL) On-Site**
2573014, SS 2022, 2 SWS, Language: English, Open in study portal

Content
The students will discuss and analyze selected research papers in the areas HRM, personnel economics, and leadership. The students will present research papers and discuss research methods and designs as well as content. They will develop an own research design on a predefined topic.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills and discussion skills.
- Practices scientific debating.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of HRM.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
- Learns how to develop an own research design and idea.

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues
Geb. 05.20, Raum 2A-25, Termine werden bekannt gegeben

T 6.20 Course: Algorithm Engineering [T-INFO-101332]

Responsible: Prof. Dr. Peter Sanders
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-100795 - Algorithm Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
ST 2022	2400051	Algorithm Engineering	2/1 SWS	Lecture / 🗣	Sanders, Schimek, Laupichler
Exams					
ST 2022	75514	Algorithm Engineering			Sanders

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

T 6.21 Course: Algorithm Engineering Pass [T-INFO-111856]

Responsible: Prof. Dr. Peter Sanders
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-100795 - Algorithm Engineering

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

Exams			
ST 2022	7500339	Algorithm Engineering Pass	Sanders

T 6.22 Course: Algorithmic Graph Theory [T-INFO-103588]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-100762 - Algorithmic Graph Theory

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

Events					
ST 2022	2400028	Algorithmische Graphentheorie	2+1 SWS	Lecture / Practice (/ 🗣	Ueckerdt, Gritzbach, Wolf
Exams					
ST 2022	7500238	Algorithmic Graph Theory			Ueckerdt

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

T 6.23 Course: Algorithmic Methods for Network Analysis [T-INFO-104759]

Responsible: Dr. rer. nat. Torsten Ueckerdt
Prof. Dr. Dorothea Wagner

Organisation: KIT Department of Informatics

Part of: M-INFO-102400 - Algorithmic Methods for Network Analysis

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

T 6.24 Course: Algorithms for Ad-Hoc and Sensor Networks [T-INFO-104388]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-102093 - Algorithms for Ad-Hoc and Sensor Networks

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

T 6.25 Course: Algorithms for Routing [T-INFO-100002]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-100031 - Algorithms for Routing

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	2

Events					
ST 2022	2424638	Algorithmen für Routenplanung (mit Übungen)	3 SWS	Lecture / Practice (/	Zeitz, Sauer, Ueckerdt, Feilhauer
Exams					
ST 2022	7500019	Algorithms for Routing			Ueckerdt

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.26 Course: Algorithms for Visualization of Graphs [T-INFO-104390]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-102094 - Algorithms for Visualization of Graphs

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

Events					
WT 22/23	2424118	Algorithmen zur Visualisierung von Graphen	2+1 SWS	Lecture / Practice (/ 🗣	Wagner, Ueckerdt, Jungeblut
Exams					
ST 2022	7500341	Algorithms for Visualization of Graphs			Ueckerdt

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

T 6.27 Course: Algorithms II [T-INFO-102020]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-101173 - Algorithms II

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24079	Algorithms II	4 SWS	Lecture / 🗣	Sanders, Lehmann, Laupichler
Exams					
ST 2022	7500464	Algorithms II			Sanders

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

T 6.28 Course: Algorithms in Cellular Automata [T-INFO-101334]

Responsible: Thomas Worsch
Organisation: KIT Department of Informatics
Part of: M-INFO-100797 - Algorithms in Cellular Automata

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	24622	Algorithms for Cellular Automata	3 SWS	Lecture /	Worsch, Vollmar
Exams					
ST 2022	75400001	Algorithms in Cellular Automata			Worsch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.29 Course: Analysis of Multivariate Data [T-WIWI-103063]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Exams			
ST 2022	7900344	Analysis of Multivariate Data	Grothe

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.

T 6.30 Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation).

Innovation plan (exposé) (20%), Guided interviews/ quantitative survey (20%), presentation of results (20%), seminar paper (about 5 pages per person) (40%).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
The course will be discontinued in the winter semester 2022/23.

T 6.31 Course: Application Security Lab [T-INFO-106289]

Responsible: Dr. Willi Geiselmann
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-103166 - Application Security Lab

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

Events					
ST 2022	2400114	Application security lab	4 SWS	Practical course / 🗣	Müller-Quade, Mechler, Dörre, Wressnegger, Noppel
WT 22/23	2400114	Application security lab	4 SWS	Practical course	Müller-Quade, Mechler, Dörre, Noppel, Wressnegger
Exams					
ST 2022	7500119	Application Security Lab			Geiselmann, Müller-Quade

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

T 6.32 Course: Applied Differential Geometry [T-INFO-109924]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-102226 - Applied Differential Geometry

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

T 6.33 Course: Applied Differential Geometry - Practical [T-INFO-111000]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-102226 - Applied Differential Geometry

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	2	Grade to a third	Each term	2

Events					
ST 2022	24175	Angewandte Differentialgeometrie mit Übung	2+1 SWS	Lecture / Practice (/	Prautzsch, Xu

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.34 Course: Applied Econometrics [T-WIWI-111388]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2520020	Applied Econometrics	2 SWS	Lecture /	Krüger
WT 22/23	2520021	Tutorial in Applied Econometrics	2 SWS	Practice /	Krüger, Koster

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Applied Econometrics

2520020, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Content:

The course covers two econometric topics: (1) Conditional expectation and regression, and (2) Causal inference. Part (1) reviews foundations like the best linear predictor, least squares estimation, and robust covariance estimation. Part (2) introduces the potential outcomes framework for studying causal, what-if type questions such as `How does an internship affect a person's future wage?'. It then presents research strategies like randomized trials, instrumental variables, and regression discontinuity.

For each part, we discuss econometric methods and theory, empirical examples (including recent research papers), and R implementation.

Learning goal:

Students are able to assess the properties of various econometric estimators and research designs, and to implement econometric estimators using R software.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Independent Study: 105 hours

Literature

Angrist, J.D., and J.-S. Pischke (2009): Mostly Harmless Econometrics. Princeton University Press.

Cattaneo, M.D., N. Idrobo and R. Titiunik (2020): A Practical Introduction to Regression Discontinuity Designs: Foundations. Cambridge University Press.

Hansen, B. (2022): Econometrics. Princeton University Press.

DiTraglia, F.J. (2021): Lecture Notes on Treatment Effects. Course notes, available at https://www.treatment-effects.com/.

T 6.35 Course: Applied material flow simulation [T-MACH-112213]

Responsible: Dr.-Ing. Marion Baumann
Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2117054	Applied material flow simulation	2 SWS	Lecture / 🗣	Baumann

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 according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
None

Recommendation

- Basic statistical knowledge and understanding
- Knowledge of a common programming language (Java, Python, ...)
- Recommended course: T-WIWI-102718 - Discrete Event Simulation in Production and Logistics

Below you will find excerpts from events related to this course:

V Applied material flow simulation

2117054, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning Content:

- Methods of modeling a simulation such as:
  - Discrete-event simulation
  - Agent based simulation
- Design of a simulation model of a material flow system
- Data exchange in simulation models
- Verification and validation of simulation models
- Execution of simulation studies
- Statistical evaluation and parameter study

This is an application-oriented course in which the course contents are applied and deepened using the Anylogic software.

Learning Goals:
Students are able to:

- select the appropriate simulation modeling method depending on a modeling objective and build a suitable simulation model for material flow systems,
- extend a simulation model in a meaningful way with data import and export,
- verify and validate a simulation model,
- conduct a simulation study efficiently and with meaningful results, and
- design and conduct a parameter study and statistically analyze and evaluate the results.

Recommendations:

- Basic statistical skills
- Prior knowledge of a common programming language (Java, Python, ...).
- Recommended course: T-WIWI-102718 - Discrete Event Simulation in Production and Logistics

Workload for 4,5 ECTS (135 h):

- regular attendance: 21 hours
  self-study: 114 hours

Literature
Borshev, A. (2022): The Big Book of Simulation Modeling - Multimethod Modeling with AnyLogic 8, https://www.anylogic.de/resources/books/big-book-of-simulation-modeling/.

Grigoryev, I. (2021): AnyLogic8 in Three Days, 5. Aufl., https://www.anylogic.de/resources/books/free-simulation-book-and-modeling-tutorials/.

Gutenschwager, K. et. al. (2017): Simulation in Produktion und Logistik, Springer Vieweg, Berlin.

VDI (2014): Simulation von Logistik-, Materialfluss- und Produktionssystemen - Grundlagen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

VDI (2016): Simulation von Logistik-, Materialfluss- und Produktionssystemen - Simulation und Optimierung. VDI Richtlinie 3633, Blatt 12, VDI-Verlag, Düsseldorf

T 6.36 Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2595650	Artificial Intelligence in Service Systems	1,5 SWS	Lecture /	Kühl, Vössing
Exams					
ST 2022	7900001_neu	Artificial Intelligence in Service Systems			Satzger
WT 22/23	7900015	Artificial Intelligence in Service Systems			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 min). Successful completion of the exercises is a prerequisite for admission to the written exam.

Prerequisites
None

Annotation
The course will be offered in the form of a flipped classroom concept starting in winter semester 2022/2023. The lecture will be recorded in advance and made available online. During the exercise classes, the contents of the lecture will be discussed and applied as part of programming exercises.

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Service Systems

2595650, WS 22/23, 1,5 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Artificial Intelligence (AI) and the application of machine learning is becoming more and more popular to solve relevant business challenges — both within isolated entities but also within co-creating systems (like value chains). However, it is not only essential to be familiar with precise algorithms but rather a general understanding of the necessary steps with a holistic view—from real-world challenges to the successful deployment of an AI-based solution. As part of this course, we teach the complete lifecycle of an AI project focusing on supervised machine learning challenges. We do so by also introducing the use of Python and the required packages like scikit-learn with exemplary data and use cases. We then take this knowledge to the more complex case of service systems with different entities (e.g., companies) who interact with each other and show possibilities on how to derive holistic insights. Apart from the technical aspects necessary when developing AI within service systems, we also shed light on the collaboration of humans and AI in such systems (e.g., with the support of XAI), topics of ethics and bias in AI, as well as AI's capabilities on being creative.

Students of this course will be able to understand and implement the complete lifecycle of a typical Artificial Intelligence use case with supervised machine learning. Furthermore, they understand the importance and the means of applying AI and Machine Learning within service systems, which allows multiple, independent entities to collaborate and derive insights. Besides technical aspects, they will gain an understanding of the broader challenges and aspects when dealing with AI. Students will be proficient with typical Python code for AI challenges.

Organizational issues
The course will be offered in the form of a flipped classroom concept starting in winter semester 2022/2023. The lecture will be recorded in advance and made available online. During the exercise classes, the contents of the lecture will be discussed and applied as part of programming exercises.

Literature

- Baier, L., Kühl, N., & Satzger, G. (2019). How to cope with change?-preserving validity of predictive services over time. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Cawley, G. C., & Talbot, N. L. (2010). On over-fitting in model selection and subsequent selection bias in performance evaluation. The Journal of Machine Learning Research, 11, 2079-2107.
- Fink, O., Netland, T., & Feuerriegel, S. (2021). Artificial intelligence across company borders. arXiv preprint arXiv:2107.03912.
- Gama, J., Žliobaitė, I., Bifet, A., Pechenizkiy, M., & Bouchachia, A. (2014). A survey on concept drift adaptation. ACM computing surveys (CSUR), 46(4), 1-37.
- Hemmer, P., Schemmer, M., Vössing, M., & Kühl, N. (2021). Human-AI Complementarity in Hybrid Intelligence Systems: A Structured Literature Review. PACIS 2021 Proceedings.
- Hirt, R., & Kühl, N. (2018). Cognition in the Era of Smart Service Systems: Inter-organizational Analytics through Meta and Transfer Learning. In 39th International Conference on Information Systems, ICIS 2018; San Francisco Marriott MarquisSan Francisco; United States; 13 December 2018 through 16 December 2018.
- Kühl, N., Goutier, M., Hirt, R., & Satzger, G. (2019, January). Machine Learning in Artificial Intelligence: Towards a Common Understanding. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Kühl, N., Hirt, R., Baier, L., Schmitz, B., & Satzger, G. (2021). How to Conduct Rigorous Supervised Machine Learning in Information Systems Research: The Supervised Machine Learning Report Card. Communications of the Association for Information Systems, 48(1), 46.
- Maleshkova, M., Kühl, N., & Jussen, P. (Eds.). (2020). Smart Service Management: Design Guidelines and Best Practices. Springer Nature.
- Martin, D., Hirt, R., & Kühl, N. (2019). Service Systems, Smart Service Systems and Cyber-Physical Systems—What's the difference? Towards a Unified Terminology. 14. Internationale Tagung Wirtschaftsinformatik 2019 (WI 2019), Siegen, Germany, February 24-27.
- Mehrabi, N., Morstatter, F., Saxena, N., Lerman, K., & Galstyan, A. (2019). A survey on bias and fairness in machine learning. arXiv preprint arXiv:1908.09635.
- Müller, V. C., & Bostrom, N. (2016). Future progress in artificial intelligence: A survey of expert opinion. In Fundamental issues of artificial intelligence (pp. 555-572). Springer, Cham.
- Pan, S. J., & Yang, Q. (2009). A survey on transfer learning. IEEE Transactions on knowledge and data engineering, 22(10), 1345-1359.
- Schöffer, J., Machowski, Y., & Kühl, N. (2021). A Study on Fairness and Trust Perceptions in Automated Decision Making. In Joint Proceedings of the ACM IUI 2021 Workshops, April 13–17, 2021, College Station, USA.
- Shmueli, G., & Koppius, O. R. (2011). Predictive analytics in information systems research. MIS quarterly, 553-572.
- Zahn, M. V., Feuerriegel, S., & Kühl, N. (2021). The cost of fairness in AI: Evidence from e-commerce. Business & information systems engineering.

T 6.37 Course: Artificial Intelligence in Service Systems - Applications in Computer Vision [T-WIWI-111219]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

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

Events					
ST 2022	2595501	Artificial Intelligence in Service Systems - Applications in Computer Vision	3 SWS	Lecture / 🗣	Satzger, Schmitz
Exams					
ST 2022	7900003_neu	Artificial Intelligence in Service Systems - Applications in Computer Vision			Satzger

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

Competence Certificate
Alternative exam assessment.

Annotation
This course is admission restricted (see http://dsi.iism.kit.edu).

The course replaces "Service Analytics A" as of summer semester 2021.

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Service Systems - Applications in Computer Vision

2595501, SS 2022, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
---We renamed this course from "Service Analytics A" to "Artificial Intelligence in Service Systems - Applications in Computer Vision ---

Learning objectives

This course teaches students how to apply machine learning concepts to develop predictive models that form the basis of many innovative service offerings and business models today. Using a selected use case each term, students learn the foundations of selected algorithms and development frameworks and apply them to build a functioning prototype of an analytics-based service. Students will become proficient in writing code in Python to implement a data science use case over the course period.

Description

Data-driven services have become a key differentiator for many companies. Their development is based on the increasing availability of structured and unstructured data and their analysis through methods from data science and machine learning. Examples comprise highly innovative service offerings based on technologies such as natural language processing, computer vision or reinforcement learning.

Using a selected use case, this lecture will teach students how to develop analytics-based services in an applied setting. We teach the theoretical foundations of selected machine learning algorithms (e.g., convolutional neural networks) and development concepts (e.g., developing modeling, training, inference pipelines) and teach how to apply these concepts to build a functioning prototype of an analytics-based service (e.g., inference running on a device). During the course, students will work in small groups to apply the learned concepts in the programming language Python using packages such as Keras, Tensorflow or Scikit-Learn. For more information on recent projects as part of the course, please visit the website of our lecture: https://www.aiss-cv.com.

Recommendations

The course is aimed at students in the Master's program with basic knowledge in statistics and applied programming in Python. Knowledge from the lecture Artificial Intelligence in Service Systems may be beneficial.

Additional information

The lecture will be held as part of 7 blocks within the summer semester. Due to the practical group sessions in the course, the number of participants is limited. The official application period in the WiWi portal will open mid of February. Please apply here until April, 3rd: http://go.wiwi.kit.edu/aiss_cv. The course will be held mainly online via Zoom. For interim and final presentation, we will meet in person in building 05.20, room 1C-03. Further information on the dates of interim and final presentation will be announced via Ilias and mail.

Literature

- Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. *The elements of statistical learning*. Vol. 1. No. 10. New York: Springer series in statistics, 2001.
- Russell, S., & Norvig, P. (2002). Artificial intelligence: a modern approach.
- Goldstein, E. B. (2009). Sensation and perception. 8th. *Belmont: Wadsworth, Cengage Learning*, *496*(3).
- Gonzalez, Rafael C., Woods, Richard E. (2018). *Digital Image Processing*. 4th Pearson India
- Szeliski, R. (2010). *Computer vision: algorithms and applications*. Springer Science & Business Media.
- Redmon, J., Divvala, S., Girshick, R., & Farhadi, A. (2016). You only look once: Unified, real-time object detection. In *Proceedings of the IEEE conference on computer vision and pattern recognition*(pp. 779-788).
- Sermanet, P., Chintala, S., & LeCun, Y. (2012, November). Convolutional neural networks applied to house numbers digit classification. In *Proceedings of the 21st International Conference on Pattern Recognition (ICPR2012)*(pp. 3288-3291). IEEE.
- Ren, S., He, K., Girshick, R., & Sun, J. (2015). Faster r-cnn: Towards real-time object detection with region proposal networks. In *Advances in neural information processing systems*(pp. 91-99).
- Girshick, R., Donahue, J., Darrell, T., & Malik, J. (2014). Rich feature hierarchies for accurate object detection and semantic segmentation. In *Proceedings of the IEEE conference on computer vision and pattern recognition*(pp. 580-587).
- Krizhevsky, A., Sutskever, I., & Hinton, G. E. (2012). Imagenet classification with deep convolutional neural networks. In *Advances in neural information processing systems*(pp. 1097-1105).

T 6.38 Course: Asset Pricing [T-WIWI-102647]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2530555	Asset Pricing	2 SWS	Lecture / 🗣	Uhrig-Homburg, Thimme
ST 2022	2530556	Übung zu Asset Pricing	1 SWS	Practice / 🗣	Uhrig-Homburg, Böll
Exams					
ST 2022	7900110	Asset Pricing			Uhrig-Homburg, Thimme
WT 22/23	7900056	Asset Pricing			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
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

Below you will find excerpts from events related to this course:

V Asset Pricing

2530555, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Basisliteratur

- Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

Zur Wiederholung/Vertiefung

- Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.
- The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

T 6.39 Course: Auction Theory [T-WIWI-102613]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2520408	Auktionstheorie	2 SWS	Lecture	Ehrhart
WT 22/23	2520409	Übungen zu Auktionstheorie	1 SWS	Practice	Ehrhart
Exams					
ST 2022	7900255	Auction Theory			Ehrhart
WT 22/23	7900160	Auction Theory			Ehrhart

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

Below you will find excerpts from events related to this course:

V Auktionstheorie

2520408, WS 22/23, 2 SWS, Open in study portal **Lecture (V)**

Literature

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

T 6.40 Course: Automated Planning and Scheduling [T-INFO-109085]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-104447 - Automated Planning and Scheduling

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	1

T 6.41 Course: Automated Visual Inspection and Image Processing [T-INFO-101363]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: M-INFO-100826 - Automated Visual Inspection and Image Processing

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	2

Events					
WT 22/23	24169	Automated Visual Inspection and Image Processing	4 SWS	Lecture / 🗣	Beyerer, Zander, Fischer
Exams					
ST 2022	7500003	Automated Visual Inspection and Image Processing			Beyerer
WT 22/23	7500008	Automated Visual Inspection and Image Processing			Beyerer

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

Below you will find excerpts from events related to this course:

V Automated Visual Inspection and Image Processing

24169, WS 22/23, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Topics covered:

- sensors and concepts for image acquisition
- light and colour
- image signals (system theory, Fourier transformation, stochastic processes)
- excursion to wave optics
- pre-processing and image enhancement
- image restoration
- segmentation
- morphological image processing
- texture analysis
- detection
- image pyramids, multi scale analysis and wavelet-transform

Educational objective:

- Students have a sound knowledge regarding the basic concepts and methods of image processing (pre-processing and image enhancement, image restoration, image segmentation, morphological filtering, texture analysis, detection, image pyramids, multi-scale analysis and the wavelet transform)
- Students are in the position to work out and to evaluate solution concepts for problems of automated visual inspection
- Students have a sound knowledge of the different sensors and methods for the acquisition of image data as well as of the relevant optical principles
- Students know different concepts to describe image data and they know the essential system theoretical concepts and interrelations

Organizational issues
Die Erfolgskontrolle wird in der Modulbeschreibung erläutert.

Empfehlungen:

Grundkenntnisse der Optik und der Signalverarbeitung sind hilfreich.

Literature
Weiterführende Literatur

- R. C. Gonzalez und R. E. Woods, Digital Image Processing, Prentice-Hall, Englewood Cliffs, New Jersey, 2002
- B. Jähne, Digitale Bildverarbeitung, Springer, Berlin, 2002

T 6.42 Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

Responsible: Gerd Gutekunst
Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture / 🗣	Wigger, Gutekunst
Exams					
ST 2022	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger
WT 22/23	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 22/23, 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 6.43 Course: Behavioral Lab Exercise [T-WIWI-111806]

Responsible: Prof. Dr. Petra Nieken
Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Events					
ST 2022	2540489	Behavioral Lab Exercise	4.5 SWS	Seminar /	Scheibehenne, Nieken

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment.

Recommendation
This class caters towards Master students who are interested in empirical research and in running lab experiments.

Annotation
The course will be offered for the first time in the winter semester 21/22.

Due to the interactive nature of the class, the number of participants is limited. If you are interested, please contact the teachers directly via email.

Below you will find excerpts from events related to this course:

V Behavioral Lab Exercise

2540489, SS 2022, 4.5 SWS, Language: English, Open in study portal

Seminar (S)
Online

Content
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback enabling them to improve their drafts for future research.

T 6.44 Course: Biologically Inspired Robots [T-INFO-101351]

Responsible: Dr.-Ing. Arne Rönnau
Organisation: KIT Department of Informatics
Part of: M-INFO-100814 - Biologically Inspired Robots

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24619	Biologisch Motivierte Roboter	2 SWS	Lecture /	Rönnau
Exams					
ST 2022	7500237	Biologically Inspired Robot			Rönnau

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.45 Course: Biometric Systems for Person Identification [T-INFO-105948]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-102968 - Biometric Systems for Person Identification

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2403011	Biometric Systems for Person Identification	2 SWS	Lecture / 🗣	Sarfraz
Exams					
ST 2022	7500025	Biometric Systems for Person Identification			Stiefelhagen
WT 22/23	7500043	Biometric Systems for Person Identification			Stiefelhagen

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Biometric Systems for Person Identification

2403011, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Biometrics deals with the science of recognizing and identifying humans based on their biometrics traits, such as finger prints, face, iris, gait etc. With the increasing demands put on security and surveillance e.g. safer access control, border control/passports and identifying criminals /law enforcement, biometrics becomes more and more essential and technologies are being developed to solve many issues in this demanding area of research. In this course, the students will learn the fundamental concepts of underlying biometrics technologies, understanding of various techniques for different topics/technologies used in biometrics.

The topics include
- Introduction: Biometrics acquisitions and image processing, basic introduction to the area of computer vision/machine learning applied to biometrics
- Biometrics system: requirements, enrollment, identification/verification, performance metrics
- Biometrics technologies: Overview of different biometrics technologies
- Finger print recognition: image enhancement, state-of-the art techniques, challenges
- Iris recognition: image acquisitions, feature extraction, state-of-the-art techniques, challenges
- Face recognition: introduction, current methods, applications
- Palm print recognition: current methods
- Gait recognition: emerging methods
- Multi-Biometrics: multiple modes of biometrics, fusion strategies
- Risk analysis: attacks, liveness detection, fraud prevention

T 6.46 Course: Blockchains & Cryptofinance [T-WIWI-108880]

Responsible: Dr. Philipp Schuster
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-101446 - Market Engineering
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate
The examination is offered for the last time in winter semester 20/21 for first-time writers and then again for second attempts. The assessment consists of a written exam (75 min).

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.

Depending on further pandemic developments, the examination will be offered as an open-book examination (alternative exam assessment).

Prerequisites
None

Recommendation
None

Annotation
The lecture is currently not offered.

T 6.47 Course: Bond Markets [T-WIWI-110995]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2530560	Bond Markets	3 SWS	Lecture / Practice (/ 🗣	Uhrig-Homburg, Müller
Exams					
ST 2022	7900280	Bond Markets			Uhrig-Homburg
WT 22/23	7900311	Bond Markets			Uhrig-Homburg

Legend: 💻 Online, 🌍 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (75min.)

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Depending on further pandemic developments, the examination will be offered as an open-book examination (alternative exam assessment).

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V Bond Markets

2530560, WS 22/23, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture "Bond Markets" deals with the national and international bond markets, which are an important source of financing for companies, as well as for the public sector. After an overview of the most important bond markets, different yield definitions are discussed. Based on this, the concept of the yield curve is presented. In addition, the theoretical and empirical relationships between ratings, default probabilities and spreads are analyzed. The focus will then be on questions regarding the valuation, measurement, management and control of credit risks.

The total workload for this course is approximately 135 hours (4.5 credits).

The assessment consists of a written exam (75min.) (according to §4(2), 1 SPO). A bonus can be earned by correctly solving at least 50% of the posed bonus exercices. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Students deepen their knowledge of national and international bond markets. They gain knowledge of the traded instruments and their key figures for describing default risk such as ratings, default probabilities or credit spreads.

Organizational issues
wird als Blockveranstaltung angeboten

Alle Termine in Geb. 09.21 Raum 124 (Blücherstraße).

T 6.48 Course: Bond Markets - Models & Derivatives [T-WIWI-110997]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2530565	Bond Markets - Models & Derivatives	2 SWS	Block / 🗣	Grauer, Uhrig-Homburg
Exams					
WT 22/23	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg

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

Competence Certificate
The assessment of success consists in equal parts of a written thesis and an oral exam including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.

Recommendation
Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V Bond Markets - Models & Derivatives

2530565, WS 22/23, 2 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content

- **Competence Certificate:** The assessment of success consists in equal parts of a written thesis and an oral exam (according to §4(2), 3 SPO) including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** Students deepen their knowledge of national and international bond markets. They are able to apply the knowledge they have gained about traded instruments and common valuation models for pricing derivative financial instruments.
- **Prerequisites:**
- **Content:** The lecture "Bond Markets – Models & Derivatives" deepens the content of the lecture "Bond Markets". The modelling of the dynamics of yield curves and the management of credit risks forms the theoretical foundation for the valuation of interest rate and credit derivatives to be discussed. In this course, students deal intensively with selected topics and acquire the relevant knowledge on their own.
- **Recommendation:** Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.
- **Workload:** The total workload for this course is approximately 90 hours (3.0 credits).

T 6.49 Course: Bond Markets - Tools & Applications [T-WIWI-110996]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

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

Events					
WT 22/23	2530562	Bond Markets - Tools & Applications	1 SWS	Block / 🗣	Uhrig-Homburg, Grauer
Exams					
WT 22/23	7900317	Bond Markets - Tools & Applications			Uhrig-Homburg

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

Competence Certificate
The assessment consists of an empirical case study with written elaboration and presentation. The main examination is offered once a year, re-examinations every semester.

Recommendation
Knowledge of the "Bond Markets" course is very helpful.

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V Bond Markets - Tools & Applications

2530562, WS 22/23, 1 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content

- **Competence Certificate:** The assessment consists of an empirical case study with written elaboration and presentation (according to $4(2), 3 SPO). The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** The students apply various methods in practice within the framework of a project-related case study. They are able to deal with empirical data and analyze them in a targeted manner.
- **Content:** The course "Bond Markets – Tools & Applications" includes a hands-on project in the field of national and international bond markets. Using empirical datasets, the students have to apply practical methods in order to analyze the data in a targeted manner.
- **Recommendation:** Knowledge of the "Bond Markets" course is very helpful.
- **Workload:** The total workload for this course is approximately 45 hours (1.5 credits).

T 6.50 Course: Business Data Analytics: Application and Tools [T-WIWI-109863]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-103118 - Data Science: Data-Driven User Modeling
M-WIWI-104812 - Information Systems: Engineering and Transformation
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2540466	Business Data Analytics: Application and Tools	2 SWS	Lecture	Staudt
ST 2022	2540467	Excercise Business Data Analytics: Application and Tools	1 SWS	Practice / 🗣	Badewitz, Grote, Sterk, Bezzaoui, Nikolajevic
Exams					
ST 2022	7900183	Business Data Analytics: Application and Tools			Weinhardt
ST 2022	7900189	Business Data Analytics: Application and Tools			Weinhardt

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

Competence Certificate
Success is monitored through ongoing elaborations and presentations of tasks and a written exam (60 minutes) at the end of the lecture period. Successful participation in the exercises is a prerequisite for admission to the written examination. The scoring scheme for the overall evaluation will be announced at the beginning of the course.
The number of participants is limited to 50, as this is the only way to ensure conscientious support for the case study. The selection of participants is based on a short letter of motivation (max. 2000 characters including spaces) in the faculty's portal.

Prerequisites
None

Recommendation
Knowledge of (object-oriented) programming and statistics is helpful.

Below you will find excerpts from events related to this course:

V Business Data Analytics: Application and Tools

2540466, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)

T 6.51 Course: Business Data Strategy [T-WIWI-106187]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2540484	Business Data Strategy	2 SWS	Lecture / 🗣	Weinhardt, Dinther, Badewitz
WT 22/23	2540485	Übung zu Business Data Strategy	1 SWS	Practice / 🗣	Weinhardt, Badewitz

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 regulationand an alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. The grade isdetermined by 2/3 through the written exam and by 1/3 through the alternative exam assessment (e.g., presentation).

Prerequisites
None

Recommendation
Students should be familiar with basic concepts of business organisations, information systems, and programming. However, all material will be introduced, so no formal pre-conditions are applied.

Annotation
Limited number of participants.

Below you will find excerpts from events related to this course:

V Business Data Strategy

2540484, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
With new methods for capturing and using different types of data and industry's recognition that society's use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making all add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense–making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications.

Organizational issues
Application/Registration

Attendance will be limited to 20-25 participants. Application/registration is therefore preliminary. After the application deadline has passed, positions will be allocated, based on evaluation of the previous study records. Applications are accepted only through the Wiwi-Portal: https://portal.wiwi.kit.edu/ys/5254

Anmeldung

Die Teilnehmeranzahl ist begrenzt (ca. 20-25 Plätze). Eine Anmeldung erfolgt deshalb zunächst unter Vorbehalt. Nach Ablauf der Anmeldefrist werden die Plätze zur Teilnahme, nach Einsicht der Vorleistungen im Studium vergeben. Die Anmeldung/Bewerbung erfolgt ausschließlich über das Wiwi-Portal: https://portal.wiwi.kit.edu/ys/5254

T 6.52 Course: Business Dynamics [T-WIWI-102762]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Exams			
ST 2022	7900065	Business Dynamics (Nachklausur WS 2021/2022)	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 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.

Prerequisites
None

Recommendation
None

T 6.53 Course: Business Intelligence Systems [T-WIWI-105777]

Responsible: Prof. Dr. Alexander Mädche
Mario Nadj
Dr. Peyman Toreini

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101506 - Service Analytics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2540422	Business Intelligence Systems	3 SWS	Lecture /	Mädche
Exams					
ST 2022	7900149	Business Intelligence Systems			Mädche
WT 22/23	7900224	Business Intelligence Systems			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
Basic knowledge on database systems is helpful.

Below you will find excerpts from events related to this course:

V **Business Intelligence Systems** — **Lecture (V)**
2540422, WS 22/23, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
In most modern enterprises, Business Intelligence & Analytics (BI&A) Systems represent a core enabler of decision-making in that they are supplying up-to-date and accurate information about all relevant aspects of a company's planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance. Modern BI&A systems leverage beyond reporting and dashboards also advanced analytical functions. Thus, today they also play a major role in enabling data-driven products and services. The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of BI&A Systems from a managerial and technical perspective.

The course is complemented with an engineering capstone project, where students work in a team with real-world use cases and data in order to create running Business intelligence & Analytics system prototypes.

Learning objectives

- Understand the theoretical foundations of key Business Intelligence & Analytics concepts supporting decision-making
- Explore key capabilities of state-of-the-art Business Intelligence & Analytics Systems
- Learn how to successfully implement and run Business Intelligence & Analytics Systems from multiple perspectives, e.g. architecture, data management, consumption, analytics
- Get hands-on experience by working with Business Intelligence & Analytics Systems with real-world use cases and data

Prerequisites
This course is limited to a capacity of 50 places. The capacity limitation is due to the attractive format of the accompanying engineering capstone project. Strong analytical abilities and profound skills in SQL as wells as Python and/or R are required. Students have to apply with their CV and transcript of records. All organizational details and the underlying registration process of the lecture and the capstone project will be presented in the first lecture. The teaching language is English.

Literature

- Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. "Decision Support and Business Intelligence Systems".
- Watson, H. J. 2014. "Tutorial: Big Data Analytics: Concepts, Technologies, and Applications," Communications of the Association for Information Systems (34), p. 24.
- Arnott, D., and Pervan, G. 2014. "A critical analysis of decision support systems research revisited: The rise of design science," Journal of Information Technology (29:4), Nature Publishing Group, pp. 269–293 (doi: 10.1057/jit.2014.16) .
- Carlo, V. (2009). "Business intelligence: data mining and optimization for decision making". Editorial John Wiley and Sons, 308-317.
- Chen, H., Chiang, R. H. L, and Storey, V. C. 2012. „Business Intelligence and Analytics: From Big Data to Big Impact," MIS Quarterly (36:4), pp. 1165-1188.
- Davenport, T. 2014. Big Data @ Work, Boston, MA: Harvard Business Review.
- Economist Intelligence Unit. 2015 "Big data evolution: Forging new corporate capabilities for the long term"
- Power, D. J. 2008. "Decision Support Systems: A Historical Overview," Handbook on Decision Support Systems, pp. 121–140 (doi: 10.1007/978-3-540-48713-5_7) .
- Sharma, R., Mithras, S., and Kankanhalli, A. 2014. „Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations," European Journal of Information Systems (23:4), pp. 433-441.
- Silver, M. S. 1991. "Decisional Guidance for Computer-Based Decision Support," MIS Quarterly (15:1), pp. 105-122.

Further literature will be made available in the lecture.

T 6.54 Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2540456	Internet Business Models	2 SWS	Lecture	Peukert
ST 2022	2540457	Übungen zu Geschäftsmodelle im Internet: Planung und Umsetzung	1 SWS	Practice	Peukert
Exams					
ST 2022	7979234	Business Models in the Internet: Planning and Implementation			Weinhardt

Competence Certificate
As of summer semester 2022, the course "Business Models in the Internet: Planning and Implementation" can no longer be taken. The exam will be offered in summer semester 2022 and winter semester 2022/23 for repeaters.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Internet Business Models

2540456, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)

Organizational issues
Im SoSem. 22 wird nur die Prüfung angeboten.

Literature
Wird in der Vorlesung bekannt gegeben.

T 6.55 Course: Business Planning [T-WIWI-102865]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2545109	Business Planning for Founders in the field of IT-Security (KASTEL)	2 SWS	Seminar / 🗣	Terzidis, Martjan
WT 22/23	2545109	Business Planning for Founders	2 SWS	Seminar / 🗣	Martjan, Kühl
Exams					
ST 2022	7900236	Business Planning for Founders in the field of IT-Security			Terzidis
WT 22/23	7900023	Business Planning for Founders			Terzidis

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

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Business Planning for Founders in the field of IT-Security (KASTEL)

2545109, SS 2022, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

The seminar introduces students to basic concepts of business planning based on technological innovations. On the one hand, this involves concepts for the concretization of business ideas (business modeling, market potential assessment, resource planning, etc.) and, on the other hand, the creation of a feasible business plan (with or without VC financing).

Learning Objectives

During the seminar, students are familiarized with methods to develop technological inventions and initial business ideas into a more concrete business plan. After completing this seminar, students will have learned and actually practiced the whole business model development process.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues
Block event in the framework of the KASTEL project.

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

V Business Planning for Founders

2545109, WS 22/23, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Course Content:

In the course Business Planning for Founders, you will be working in interdisciplinary teams on a real-world challenge presented by an industry partner (former partners have been e.g., EnBW and WIBU-Systems). To solve the case, you will learn about human-centered design using design thinking methods. These methods will help you develop your own business idea. Building on your idea, you will deploy a business plan and finally present, as a team, the results on the pitch day in front of the seminar participants and the industry partner.

Information about the seminar:

ONLY ONE of the two options - Business Planning for founders OR Business Planning for founders in the field of IT-Security - can be taken and credited under the in CAS mentioned partial credit, as they cover similar content. Registration must take place in the CAS for the respective examination.

Target group: Master Student

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. The seminars will be held in English.

T 6.56 Course: Business Strategies of Banks [T-WIWI-102626]

Responsible: Prof. Dr. Wolfgang Müller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Exams			
ST 2022	7900079	Business Strategies of Banks	Müller

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 6.57 Course: Case Studies Seminar: Innovation Management [T-WIWI-102852]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2545105	Case studies seminar: Innovation management	2 SWS	Seminar / 🗣	Weissenberger-Eibl
Exams					
WT 22/23	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl

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

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Below you will find excerpts from events related to this course:

V Case studies seminar: Innovation management

2545105, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course. A short introduction to presentation techniques is planned to help students prepare the seminar papers.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 6.58 Course: Challenges in Supply Chain Management [T-WIWI-102872]

Responsible: Esther Mohr
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2550494	Challenges in Supply Chain Management	3 SWS	Lecture /	Mohr
Exams					
ST 2022	00030	Challenges in Supply Chain Management			Nickel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written paper and an oral exam of ca. 30-40 min.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is offered irregularly. 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 Challenges in Supply Chain Management

2550494, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. 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 project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / “Internet of Everything in production”, supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

Organizational issues
Bewerbung bis 31.03.22 über das WiWi-Portal möglich:

http://go.wiwi.kit.edu/ChallengesSCM

Literature
Wird in Abhängigkeit vom Thema in den Projektteams bekanntgegeben.

T 6.59 Course: Cognitive Systems [T-INFO-101356]

Responsible: Prof. Dr. Gerhard Neumann
Prof. Dr. Alexander Waibel

Organisation: KIT Department of Informatics

Part of: M-INFO-100819 - Cognitive Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	24572	Kognitive Systeme	4 SWS	Lecture / Practice (/ 🗣	Waibel, Neumann
WT 22/23	2400158	Introduction to Artificial Intelligence	3 SWS	Lecture / Practice (/ 🗣	Neumann, Friederich, Dahlinger, Shaj Kumar
Exams					
ST 2022	7500157	Cognitive Systems			Waibel, Neumann
WT 22/23	7500158	Cognitive Systems Waibel/Neumann			Waibel, Neumann

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

T 6.60 Course: Competition in Networks [T-WIWI-100005]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 22/23	2561204	Competition in Networks	2 SWS	Lecture /	Mitusch
WT 22/23	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice /	Wisotzky, Mitusch, Corbo
Exams					
ST 2022	7900274	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.

Below you will find excerpts from events related to this course:

V Competition in Networks

2561204, WS 22/23, 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 6.61 Course: Computational Cartography [T-INFO-101291]

Responsible: Dr. Martin Nöllenburg
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-100754 - Computational Cartography

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

T 6.62 Course: Computational Complexity Theory, with a View Towards Cryptography [T-INFO-103014]

Responsible: Prof. Dr. Dennis Hofheinz
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-101575 - Computational Complexity Theory, with a View Towards Cryptography

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Irregular	1

T 6.63 Course: Computational Geometry [T-INFO-104429]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-102110 - Computational Geometry

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Irregular	2

T 6.64 Course: Computer Architecture [T-INFO-101355]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: M-INFO-100818 - Computer Architecture

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	2424570	Computer structures	3 SWS	Lecture / 🗣	Bauer, Karl
Exams					
ST 2022	7500190	Computer Architecture			Karl

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

T 6.65 Course: Computer Contract Law [T-INFO-102036]

Responsible: Michael Menk
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	2411604	Computer Contract Law	2 SWS	Lecture / 🗣	Menk
Exams					
ST 2022	7500066	Computer Contract Law			Dreier, Matz

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Computer Contract Law

2411604, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

Literature

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H.Beck, II. Aufl. 2002
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

Weiterführende Literatur

Ergänzende Literatur wird in den Vorlesungsfolien angegeben.

T 6.66 Course: Computer Graphics [T-INFO-101393]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-100856 - Computer Graphics

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24081	Computergrafik	4 SWS	Lecture / 🗣	Dachsbacher
Exams					
ST 2022	7500257	Computer Graphics			Dachsbacher

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.67 Course: Computer Graphics Pass [T-INFO-104313]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-100856 - Computer Graphics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each winter term	1

Events					
WT 22/23	24083	Übungen zu Computergrafik		Lecture / Practice (	Jung, Dolp

T 6.68 Course: Context Sensitive Systems [T-INFO-107499]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-INFO-100728 - Context Sensitive Systems
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	2400099	Context Sensitive Systems	1 SWS	Practice / 💻	Riedel
ST 2022	24658	Context Sensitive Systems	2 SWS	Lecture / 🗣	Riedel
Exams					
ST 2022	7500208_05.05.22	Context Sensitive Systems			Riedel
ST 2022	7500291_29.07.22	Context Sensitive Systems			Riedel
ST 2022	75002911_30.08.22	Context Sensitive Systems			Riedel
ST 2022	7500293_19.09.22	Context Sensitive Systems			Riedel
WT 22/23	7500293_07.11.22	Context Sensitive Systems			Riedel

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.69 Course: Convex Analysis [T-WIWI-102856]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

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.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 6.70 Course: Copyright [T-INFO-101308]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24121	Copyright	2 SWS	Lecture / 🗣	Dreier
Exams					
ST 2022	7500064	Copyright			Dreier, Matz

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

T 6.71 Course: Corporate Compliance [T-INFO-101288]

Responsible: Andreas Herzig
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2400087	Corporate Compliance	2 SWS	Lecture /	Herzig
Exams					
ST 2022	7500063	Corporate Compliance			Dreier, Matz

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.72 Course: Corporate Financial Policy [T-WIWI-102622]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2530214	Corporate Financial Policy	2 SWS	Lecture / 🗣	Ruckes
ST 2022	2530215	Übungen zu Corporate Financial Policy	1 SWS	Practice / 🗣	Ruckes, Hoang
Exams					
ST 2022	7900073	Corporate Financial Policy			Ruckes
WT 22/23	7900058	Corporate Financial Policy			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

Below you will find excerpts from events related to this course:

V Corporate Financial Policy

2530214, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course develops the foundations for the management and financing of firms in imperfect markets.

The course covers the following topics:

- Measures of good corporate governance
- Corporate finance
- Liquidity management
- Executive compensation and incentives
- Corporate takeovers

Learning outcomes: The students

- are able to explain the importance of information asymmetry for the contract design of firms,
- are capable to evaluate measures for the reduction of information asymmetry,
- are in the position to analyze contracts with regard to their incentive and communication effects.

T 6.73 Course: Corporate Risk Management [T-WIWI-109050]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.
Please note that the exam is only offered in the semester of the lecture as well as in the following semester.

Prerequisites
None

Recommendation
None

Annotation
The course will be held again in the summer term 2023 at the earliest. Please pay attention to the announcements on our website.

T 6.74 Course: Critical Information Infrastructures [T-WIWI-109248]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures
M-WIWI-104812 - Information Systems: Engineering and Transformation

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

Events					
WT 22/23	2511400	Critical Information Infrastructures	2 SWS	Lecture	Sunyaev, Dehling, Bartsch
WT 22/23	2511401	Exercises to Critical Information Infrastructures	1 SWS	Practice	Sunyaev, Dehling, Bartsch

Competence Certificate
The alternative exam assessment consists of

- the preparation of a written elaboration as well as
- an oral examination as part of a presentation of the work.

Details of the grades will be announced at the beginning of the course.

The examination is only offered to first-time students in the winter semester, but can be repeated in the following summer semester.

Prerequisites
None.

Annotation
New lecture from winter semester 2018/2019.

T 6.75 Course: Cryptographic Voting Schemes [T-INFO-101279]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-100742 - Cryptographic Voting Schemes

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Irregular	1

T 6.76 Course: Curves and Surfaces for Geometric Design II [T-INFO-102041]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101231 - Curves and Surfaces for Geometric Design

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

Events					
WT 22/23	2400151	Curves and Surfaces in CAD II	2+1 SWS	Lecture / Practice (	Prautzsch, Hoffmann
Exams					
ST 2022	7500316	Curves and Surfaces for Geometric Design II			Prautzsch

T 6.77 Course: Curves and Surfaces in CAD I [T-INFO-101374]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-100837 - Curves and Surfaces in CAD I

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

Events					
WT 22/23	2400056	Curves and Surfaces in CAD I	2+1 SWS	Lecture / Practice (/	Prautzsch, Hoffmann
Exams					
ST 2022	7500253	Curves and Surfaces in CAD I			Prautzsch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.78 Course: Curves and Surfaces in CAD II [T-INFO-102006]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101213 - Curves and Surfaces in CAD III

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

T 6.79 Course: Data and Storage Management [T-INFO-101276]

Responsible: Prof. Dr. Bernhard Neumair
Organisation: KIT Department of Informatics
Part of: M-INFO-100739 - Data and Storage Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	24074	Data and Storage Management	2 SWS	Lecture / 🗣	Neumair

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.80 Course: Data Privacy: From Anonymization to Access Control [T-INFO-108377]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-104045 - Data Privacy: From Anonymization to Access Control

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Irregular	1

Events					
ST 2022	2400132	Data Privacy: From Anonymization to Access Control	2 SWS	/ 🗣	Buchmann
Exams					
ST 2022	7500209	Data Privacy: From Anonymization to Access Control			Böhm

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

T 6.81 Course: Data Protection Law [T-INFO-111406]

Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	2400238	Bereichsdatenschutz	2 SWS	Lecture / 🗣	Boehm
Exams					
ST 2022	7500168	Data Protection Law			Boehm

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

T 6.82 Course: Data Science I [T-INFO-111622]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Dr.-Ing. Edouard Fouché

Organisation: KIT Department of Informatics

Part of: M-INFO-105799 - Data Science I
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	2

Events					
WT 22/23	24114	Data Science 1	3 SWS	Lecture /	Fouché
Exams					
ST 2022	7500062	Data Science I			Böhm
ST 2022	7500311	Data Science I			Böhm
WT 22/23	7500087	Data Science 1			Böhm

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.83 Course: Data Science II [T-INFO-111626]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Dr.-Ing. Edouard Fouché
Organisation: KIT Department of Informatics
Part of: M-INFO-105801 - Data Science II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Irregular	1

Events					
ST 2022	2400042	Data Science 2	2 SWS	Lecture / 🗣	Fouché
Exams					
ST 2022	7500313	Data Science II			Böhm
WT 22/23	7500190	Data Science 2			Böhm

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

Below you will find excerpts from events related to this course:

V Data Science 2

2400042, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This lecture replaces the lecture "Big Data Analytics 2". Our intention is to devote more attention to the Data Science process and to explicitly address the steps of this process. – Data Science techniques are attracting great interest among users, in particular for analyzing large data sets. The spectrum is broad and includes classic industries such as banks and insurance companies, but also newer players, such as Internet companies, social media, natural sciences and engineering. In all cases, the desire is to extract interesting patterns from very large data sets with as little effort as possible, and to monitor the behavior or systems. This lecture deals with the preparation of data as a prerequisite for a fast and efficient analysis as well as with modern techniques for the analysis itself. The course emphasizes phenomena and techniques that were not considered in the lecture "Data Science 1", such as approaches for dealing with data streams, high-dimensional data sets, data integration, and compression and sampling of large data sets.

At the end of this course, participants should have a good understanding of advanced concepts in the field of Data Science und shoud be able to explain them clearly. They should be able to discuss and compare approaches for the analysis and management of large data sets and data streams in terms of their effectiveness and applicability. Participants should understand which problems are currently open in the field of Data Science and have gained insights into the current state of the art.

Organizational issues
Wichtige Organisatorische Hinweise finden Sie im Ilias Kurs und auf unserer Website!

Die Vorlesung wird hauptsächlich auf Englisch stattfinden. Fragen können selbstverständlich auch auf Deutsch gestellt werden.

T 6.84 Course: Database as a Service [T-INFO-111400]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-105724 - Database as a Service
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

Exams			
ST 2022	7500310	Database as a Service	Böhm
ST 2022	7500326	Database as a Service	Böhm
WT 22/23	7500309	Database as a Service	Böhm

Prerequisites
none

T 6.85 Course: Database Systems and XML [T-WIWI-102661]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-101477 - Development of Business Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2511202	Database Systems and XML	2 SWS	Lecture / 🗣	Oberweis
WT 22/23	2511203	Exercises Database Systems and XML	1 SWS	Practice / 🗣	Oberweis, Fritsch
Exams					
ST 2022	79AIFB_DBX_A3	Database Systems and XML (Registration until 18 July 2022)			Oberweis
WT 22/23	79AIFB_DBX_A4	Database Systems and XML			Oberweis

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 Database Systems and XML

2511202, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

Learning objectives:

Students

- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- M. Klettke, H. Meyer: XML & Datenbanken: Konzepte, Sprachen und Systeme. dpunkt.verlag 2003
- H. Schöning: XML und Datenbanken: Konzepte und Systeme. Carl Hanser Verlag 2003
- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- R. Elmasri, S. B. Navathe: Grundlagen der Datenbanksysteme. 2009
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 6.86 Course: Decentralized Systems: Fundamentals, Modeling, and Applications [T-INFO-110820]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-105334 - Decentralized Systems: Fundamentals, Modeling, and Applications

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each summer term	3

Events					
ST 2022	2400089	Decentralized Systems: Fundamentals, Modeling, and Applications	4 SWS	Lecture / Practice (/ 🗣	Stengele, Hartenstein
Exams					
ST 2022	7500284	Decentralized Systems: Fundamentals, Modeling, and Applications			Hartenstein
ST 2022	7500345	Decentralized Systems: Fundamentals, Modeling, and Applications			Hartenstein

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

Recommendation
Prior knowledge in Foundations of IT-Security and Computer Networks is recommended.

Below you will find excerpts from events related to this course:

V Decentralized Systems: Fundamentals, Modeling, and Applications

2400089, SS 2022, 4 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Decentralized Systems (like blockchain-based systems) represent distributed systems that are controlled by multiple parties who make their own independent decisions. In this course, we cover fundamental theoretical aspects as well as up-to-date decentralized systems and connect theory with current practice. We thereby address fault tolerance, security & trust, as well as performance aspects. Furthermore, we address measurements, modeling and simulation of decentralized systems and applications like Bitcoin and Matrix.

Prior knowledge in Foundations of IT-Security and Computer Networks is recommended.

Learning Objectives

1. Fundamentals & Modeling
    1. The student is able to recognize and distinguish distributed, federated, and decentralized systems.
    2. The student understands consensus, consistency and coordination within the context of networked and decentralized systems.
    3. The student understands the concept of Sybil attacks in relation to distributed and decentralized systems.
    4. The student is familiar with decentralized algorithms for leader election and mutual exclusion for execution contexts with various guarantees.
    5. The student understands the formally proven limits of fault tolerance and their underlying assumptions. This includes an understanding of synchronous and asynchronous network models which underpin the respective proofs. The student also understands several models for fault tolerance, notably silent and noisy crash as well as byzantine fault tolerance within the context of decentralized and distributed systems.
    6. The student knows various models for and levels of consistency. In particular, strictly ordered, causally ordered, partially ordered consistency as well as numerical and temporal relaxations thereof.
2. Applications
    1. The student understands conflict-free replicated data types and their use in decentralized systems like Matrix.
    2. The student has a fundamental understanding of blockchain-based cryptocurrencies (e.g. Bitcoin/Ethereum), Payment Channels, and decentralized communication systems like Matrix.
    3. The student understands trust relations in distributed and decentralized systems.
    4. The student is able to understand how the previously introduced theoretical foundations relate to networked and decentralized systems in practice.

T 6.87 Course: Deep Learning and Neural Networks [T-INFO-109124]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-104460 - Deep Learning and Neural Networks

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	2400024	Deep Learning and Neural Networks	4 SWS	Lecture / 🗣	Waibel
Exams					
ST 2022	7500044	Deep Learning and Neural Networks			Waibel

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

T 6.88 Course: Deep Learning for Computer Vision I: Basics [T-INFO-111491]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-105753 - Deep Learning for Computer Vision I: Basics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2400007	Deep Learning for Computer Vision I: Basics	2 SWS	Lecture / 🗣	Stiefelhagen, Roitberg
Exams					
ST 2022	7500122	Deep Learning for Computer Vision I: Basics			Stiefelhagen
WT 22/23	7500258	Deep Learning for Computer Vision I: Basics			Stiefelhagen

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Recommendation
Basic knowledge of pattern recognition as taught in the module Cognitive Systems, is expected.

Annotation
The course is partially given in German and English.

T 6.89 Course: Deep Learning for Computer Vision II: Advanced Topics [T-INFO-111494]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-105755 - Deep Learning for Computer Vision II: Advanced Topics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	2400258	Deep Learning for Computer Vision II: Advanced Topics	2 SWS	Lecture / 🗣	Stiefelhagen, Roitberg, Sarfraz
Exams					
ST 2022	7500150	Deep Learning for Computer Vision II: Advanced Topics			Stiefelhagen
WT 22/23	7500277	Deep Learning for Computer Vision II: Advanced Topics			Stiefelhagen

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

T 6.90 Course: Demand-Driven Supply Chain Planning [T-WIWI-110971]

Responsible: Josef Packowski
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Competence Certificate
The assessment consists of a written exam.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

T 6.91 Course: Deployment of Database Systems [T-INFO-101317]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-100780 - Deployment of Database Systems
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2400111	Datenbankeinsatz	3 SWS	Lecture / 🗣	Böhm
Exams					
ST 2022	7500090	Deployment of Database Systems			Böhm
WT 22/23	7500007	Deployment of Database Systems			Böhm

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

T 6.92 Course: Derivatives [T-WIWI-102643]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2530550	Derivatives	2 SWS	Lecture / 🗣	Thimme, Uhrig-Homburg
ST 2022	2530551	Übung zu Derivate	1 SWS	Practice / 🗣	Thimme, Eska, Uhrig-Homburg
Exams					
ST 2022	7900111	Derivatives			Uhrig-Homburg
WT 22/23	7900051	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 2022, 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 6.93 Course: Design and Architectures of Embedded Systems (ES2) [T-INFO-101368]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-100831 - Design and Architectures of Embedded Systems (ES2)

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2424106	Design and architectures of embedded systems (ES2)	2 SWS	Lecture	Khdr, Henkel
Exams					
ST 2022	7500037	VL: Design and architectures of embedded systems (ES2)			Henkel

Below you will find excerpts from events related to this course:

V Design and architectures of embedded systems (ES2)

2424106, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
State-of-the-art System-on-Chips (SoCs) integrate more than a billion transistors on a single chip. Embedded devices powered by these SoCs would be increasingly ubiquitous and seamlessly integrated into the environment. Therefore they will no longer be perceived as separate computing devices. Such examples can be found in Wireless Sensor Networks (WSNs), Cyber Physical Systems (CPSs), electronic textiles and many more.

However, new efficient ESL (Embedded System Level) design tools as well as novel hardware-software architectures must be developed in order to enable embedded devices to achieve their true potential. The focus of this lecture is therefore on the high-level design methods and architectures for embedded systems. Since the power consumption of embedded systems is of paramount importance, this lecture emphasizes on hardware-software co-design procedures targeting low power consumption.

Appointments for the oral exam can be requested at exam-ces@ira.uka.de.

The student learns complex hardware-software co-design methods that can be applied to the design of embedded systems. The student assesses and selects specific hardware-software architecture most suitable for an embedded system given its function. Furthermore, the student receives an introduction to the relevant current research topics.

T 6.94 Course: Design Principles for Interactive Real-Time Systems [T-INFO-101290]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: M-INFO-100753 - Design Principles for Interactive Real-Time Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24648	Design Principles for Interactive Real-Time Systems	2 SWS	Lecture / 🗣	Peinsipp-Byma, Sauer
Exams					
ST 2022	7500030	Design Príncipes for Interactive Real-Time Systems			Beyerer, Sauer, Peinsipp-Byma
WT 22/23	7500098	Design Príncipes for Interactive Real-Time Systems			Beyerer, Sauer, Peinsipp-Byma

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

T 6.95 Course: Design Thinking [T-WIWI-102866]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2545008	Design Thinking (Track 1)	2 SWS	Seminar / 🗣	Jochem, Terzidis
WT 22/23	2545008	Design Thinking (Track 1)	2 SWS	Seminar / 💻	Abraham, Csernalabics
Exams					
ST 2022	7900053	Design Thinking (Track 1)			Terzidis
WT 22/23	7900084	Design Thinking (Track 1)			Terzidis

Legend: 💻 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
None

Annotation
The seminar content will be published on the website of the institute.

Below you will find excerpts from events related to this course:

V Design Thinking (Track 1)

2545008, SS 2022, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

Design Thinking is a user-centric innovation management method. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes are created and tested by the user group. The result is a proven and validated product.

Learning Objectives

During the seminar, the students learn basic procedures for achieving user-centric innovations. These are concrete methods that start with the potential user of certain products and services. The method is problem-oriented and emphasizes the specific customer situation. After attending the seminar, the students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues
Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

V

Design Thinking (Track 1)

2545008, WS 22/23, 2 SWS, Language: English, Open in study portal

Seminar (S)
Online

Content
Course Content:

Design Thinking is a user-centric innovation management method. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes are created and tested by the user group. The result is a proven and validated product.

Learning Objectives
During the seminar, the students learn basic procedures for achieving user-centric innovations. These are concrete methods that start with the potential user of certain products and services. The method is problem-oriented and emphasizes the specific customer situation. After attending the seminar, the students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues
Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of 4-5 persons. The groups are formed in the seminar

T 6.96 Course: Designing Interactive Systems [T-WIWI-110851]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Events					
ST 2022	2540558	Designing Interactive Systems	3 SWS	Lecture /	Mädche, Gnewuch
Exams					
ST 2022	00009	Designing Interactive Systems			Mädche
WT 22/23	7900205	Designing Interactive Systems			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Annotation
The course is held in english.

Below you will find excerpts from events related to this course:

V **Designing Interactive Systems** — **Lecture (V)**
2540558, SS 2022, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
Description

Computers have evolved from batch processors towards highly interactive systems. This offers new possibilities but also challenges for the successful design of the interaction between human and computer. Interactive system are socio-technical systems in which users perform tasks by interacting with technology in a specific context in order to achieve specified goals and outcomes.

The aim of this course is to introduce advanced concepts and theories, interaction technologies as well as current practice of contemporary interactive systems.

The course is complemented with a design capstone project, where students in a team select and apply design methods & techniques in order to create an interactive prototype

Learning objectives

- Get an advanced understanding of conceptual foundations of interactive systems from a human and computer perspective
- explore the theoretical grounding of Interactive Systems leveraging theories from reference disciplines such as psychology
- know specific design principles for the design of advanced interactive systems
- get hands-on experience in conceptualizing and designing advanced Interactive Systems to solve a real-world challenge from an industry partner by applying the lecture contents.

Prerequisites

No specific prerequisites are required for the lecture

Literature

Die Vorlesung basiert zu einem großen Teil auf

· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.

Weiterführende Literatur wird in der Vorlesung bereitgestellt.

T 6.97 Course: Development of Sustainable Business Models [T-WIWI-112143]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Exams			
WT 22/23	7900050	Development of Sustainable Business Models	Weissenberger-Eibl

Competence Certificate
Non exam assessment. The final grade is composed 50% of the grade of the written paper (ca. 5 Pages /Person) and 50% of the presentation of the results.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

T 6.98 Course: Digital Accessibility and Assistive Technologies [T-INFO-111830]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-105882 - Digital Accessibility and Assistive Technologies

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2400165	Digital Accessibility and Assistive Technologies		Lecture / 🗣	Stiefelhagen, Schwarz
Exams					
ST 2022	7500163	Digital Accessibility and Assistive Technologies			Stiefelhagen

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

T 6.99 Course: Digital Health [T-WIWI-109246]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures
M-WIWI-104813 - Information Systems: Internet-Based Markets and Services

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	3

Events					
WT 22/23	2511402	Digital Health	2 SWS	Lecture	Sunyaev, Thiebes, Schmidt-Kraepelin

Competence Certificate
Alternative exam assessment (written elaboration, presentation, peer review, oral participation) according to §4(2),3 of the examination regulation. Details of the grading will be announced at the beginning of the course. The examination is only offered to first-time writers in the winter semester, but can be repeated in the following summer semester.

Prerequisites
None.

T 6.100 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsible: Prof. Dr. Martin Klarmann
Anja Konhäuser
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

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

Events					
ST 2022	2571156	Digital Marketing and Sales in B2B	1 SWS	Others (sons / 🗣	Konhäuser
Exams					
ST 2022	7900297	Digital Marketing and Sales in B2B			Klarmann

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

Prerequisites
None.

Annotation
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).Please note that only one of the 1.5-ECTS courses can be attended in this module.

Below you will find excerpts from events related to this course:

V Digital Marketing and Sales in B2B

2571156, SS 2022, 1 SWS, Language: English, Open in study portal

Others (sonst.)
On-Site

Content
Learning Sessions:

The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.
Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g. product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:

After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

- Understand digital marketing and sales approaches for the B2B sector
- Recognise important elements and understand how-to-setup of digital strategies
- Become familiar with the effectiveness and usage of different digital marketing channels
- Understand the effect of digital sales on sales management, customer support and value chain
- Be able to measure and interpret digital KPIs
- Calculate the Return on Investment (RoI) for digital marketing by combining online data with company performance data

time of presentness = 15 hrs.

private study = 30 hrs.

Organizational issues
Blockveranstaltung, Raum 115, Geb. 20.21, Termine werden noch bekannt gegeben

Literature
-

T 6.101 Course: Digital Transformation and Business Models [T-WIWI-108875]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	2545103	Digital Transformation and Business Models	2 SWS	Seminar / 🗣	Koch
Exams					
ST 2022	7900284	Digital Transformation and Business Models			Weissenberger-Eibl

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

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation). The final grade is composed 75% of the grade of the written paper and 25% of the presentation.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Below you will find excerpts from events related to this course:

V Digital Transformation and Business Models

2545103, SS 2022, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar "Digital Transformation and Business Models" aims at the development of thematic aspects of digital transformation with simultaneous application of different business model methodologies. Established companies face the challenge of digital transformation. The digital transformation is particularly relevant for the business models of industrial enterprises. As part of innovation management, the examination of business model changes against the background of digital transformation is one of the main challenges facing the German economy. At the beginning, seminar topics will be assigned. These will be presented and discussed at the end of the seminar. In the first seminar date impulses to business model methodologies and the digital transformation take place, which are to be discussed then, in order to provide an understanding for the topic complex and to ensure the purposeful development of the seminar topics.

T 6.102 Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

Responsible: Dr. Sven Spieckermann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2550488	Ereignisdiskrete Simulation in Produktion und Logistik	3 SWS	Lecture / 🗣	Spieckermann
Exams					
ST 2022	7900271	Discrete-Event Simulation in Production and Logistics			Spieckermann

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

Competence Certificate
The assessment consists of a written paper and an oral exam of about 30-40 min (alternative exam assessment).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is planned to be held every summer term.

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

Below you will find excerpts from events related to this course:

V Ereignisdiskrete Simulation in Produktion und Logistik

2550488, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

Organizational issues
Den Bewerbungszeitraum finden Sie auf der Veranstaltungswebseite im Lehre-Bereich unter dol.ior.kit.edu

Literature

- Gutenschwager K., Rabe M., Spieckermann S. und S. Wenzel (2017): Simulation in Produktion und Logistik, Springer, Berlin.
- Banks J., Carson II J. S., Nelson B. L., Nicol D. M. (2010) Discrete-event system simulation, 5.Aufl., Pearson, Upper Saddle River.
- Eley, M. (2012): Simulation in der Logistik - Einführung in die Erstellung ereignisdiskreter Modelle unter Verwendung des Werkzeuges "Plant Simulation“, Springer, Berlin und Heidelberg
- Kosturiak, J. und M. Gregor (1995): Simulation von Produktionssystemen. Springer, Wien und New York.
- Law, A. M. (2015): Simulation Modeling and Analysis. 5th Edition, McGraw-Hill, New York usw.
- Liebl, F. (1995): Simulation. 2. Auflage, Oldenbourg, München.
- Noche, B. und S. Wenzel (1991): Marktspiegel Simulationstechnik. In: Produktion und Logistik. TÜV Rheinland, Köln.
- Pidd, M. (2004): Computer Simulation in Management Science. 5th Edition, Wiley, Chichester.
- Robinson S (2004) Simulation: the practice of model development and use. John Wiley & Sons, Chichester
- VDI (2014): Simulation von Logistik-, Materialfluß- und Produktionssystemen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

T 6.103 Course: Distributed Computing [T-INFO-101298]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: M-INFO-100761 - Distributed Computing

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 22/23	2400050	Distributed Computing	2 SWS	Lecture / 🗣	Streit, Krauß, Fischer
Exams					
ST 2022	7500282	Distributed Computing			Streit

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

T 6.104 Course: Dynamic Macroeconomics [T-WIWI-109194]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation and Growth
M-WIWI-101496 - Growth and Agglomeration

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 22/23	2560402	Dynamic Macroeconomics	2 SWS	Lecture / 🗣	Brumm
WT 22/23	2560403	Übung zu Dynamic Macroeconomics	1 SWS	Practice / 🗣	Hußmann
Exams					
ST 2022	7900026	Dynamic Macroeconomics			Brumm
WT 22/23	7900261	Dynamic Macroeconomics			Brumm

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

Competence Certificate
The assessment is a written exam (60 min.).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Dynamic Macroeconomics

2560402, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This course addresses macroeconomic questions on an advanced level. The main focus of this course is on dynamic programming and its fundamental role in modern macroeconomics. In the first part of the course, the necessary mathematical tools are introduced as well as basic applications in labor economics, economic growth and business cycle analysis. In the second part of the course, these basic models are expanded to incorporate household heterogeneity in various forms: Models of economic inequality to analyze the distributional impact of tax policies and models of overlapping generations to analyze the impact of social security reforms or changes in government debt. Finally, advanced methods based on sparse grids or neural nets are introduced to solve high-dimensional models. The course pursues a hands-on approach so that students not only gain theoretical insights but also learn numerical tools to solve dynamic economic models using the programming language Python.

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 6.105 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Responsible: PD Dr. Patrick Jochem
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581006	Efficient Energy Systems and Electric Mobility	2 SWS	Lecture / 🗣	Jochem
Exams					
ST 2022	7981006	Efficient Energy Systems and Electric Mobility			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

Recommendation
None

Below you will find excerpts from events related to this course:

V Efficient Energy Systems and Electric Mobility

2581006, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

- Understand the concept of energy efficiency as applied to specific systems
- Obtain an overview of the current trends in energy efficiency
- Be able to determine and evaluate alternative methods of energy efficiency improvement
- Overview of technical and economical stylized facts on electric mobility
- Judging economical, ecological and social impacts through electric mobility

Organizational issues
s. Institutsaushang

Literature
Wird in der Vorlesung bekanntgegeben.

T 6.106 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-101446 - Market Engineering
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture / 🗣	Weinhardt, Notheisen
WT 22/23	2540455	Übungen zu eFinance: Information Systems for Securities Trading	1 SWS	Practice / 🗣	Jaquart

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.

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.

Below you will find excerpts from events related to this course:

V eFinance: Information Systems for Securities Trading

2540454, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature

- Picot, Arnold, Christine Bortenlänger, Heiner Röhrl (1996): "Börsen im Wandel". Knapp, Frankfurt
- Harris, Larry (2003): "Trading and Exchanges - Market Microstructure for Practitioners"". Oxford University Press, New York

Weiterführende Literatur:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

T 6.107 Course: Emerging Trends in Digital Health [T-WIWI-110144]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2513404	Seminar Emerging Trends in Digital Health (Bachelor)	2 SWS	Seminar /	Lins, Sunyaev, Thiebes
ST 2022	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar /	Lins, Sunyaev, Thiebes
Exams					
ST 2022	7900146	Seminar Emerging Trends in Digital Health (Master)			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 6.108 Course: Emerging Trends in Internet Technologies [T-WIWI-110143]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2513402	Seminar Emerging Trends in Internet Technologies (Bachelor)	2 SWS	Seminar /	Sunyaev, Thiebes, Lins
ST 2022	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar /	Lins, Sunyaev, Thiebes
Exams					
ST 2022	7900128	Seminar Emerging Trends in Internet Technologies (Master)			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 6.109 Course: Emissions into the Environment [T-WIWI-102634]

Responsible: Ute Karl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2581962	Emissions into the Environment	2 SWS	Lecture / 🗣	Karl
Exams					
ST 2022	7981962	Emissions into the Environment			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. 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).

Recommendation
None

Below you will find excerpts from events related to this course:

V Emissions into the Environment

2581962, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Emission sources/emission monitoring/emission reduction: The lecture gives an overview of relevant emissions of air pollutants and greenhouse gases, emission monitoring and pollutant abatement options together with relevant legal regulations at national and international level. In addition, the fundamentals of circular economy, waste management and recycling are explained.

Structure:

Air pollution control

- Introduction, terms and definitions
- Sources of air pollutants
- Legal framework of air quality control
- Technical measures to reduce air pollutant emissions

Circular economy, recycling and waste management

- Waste collection and logistics
- Dual systems for packaging waste
- Recycling
- Thermal and biological waste treatment
- Final waste disposal

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.110 Course: Empirical Software Engineering [T-INFO-101335]

Responsible: Dr. Christopher Gerking
Organisation: KIT Department of Informatics
Part of: M-INFO-100798 - Empirical Software Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	24156	Empirical Software Engineering	2 SWS	Lecture / 🗣	Gerking

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.111 Course: Employment Law [T-INFO-111436]

Responsible: Dr. Alexander Hoff
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	24668	Employment Law	2 SWS	Lecture / 🗣	Hoff
Exams					
ST 2022	7500082	Employment Law			Dreier, Matz

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.112 Course: Energy and Environment [T-WIWI-102650]

Responsible: Ute Karl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology
M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581003	Energy and Environment	2 SWS	Lecture / 🗣	Karl
ST 2022	2581004	Übungen zu Energie und Umwelt	1 SWS	Practice / 🗣	Langenmayr, Fichtner, Kraft
Exams					
ST 2022	7981003	Energy and Environment			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 and Environment

2581003, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture focuses on the environmental impacts arising from fossil fuels use and on the methods for the evaluation of such impacts. The first part of the lecture describes the environmental impacts of air pollutants and greenhouse gases as well as technical measures for emission control. The second part covers methods of impact assessment and their use in environmental communication as well as methods for the scientific support of emission control strategies.

The topics include:

- Fundamentals of energy conversion
- Formation of air pollutants during combustion
- Technical measures to control emissions from fossil-fuel combustion processes
- External effects of energy supply (life cycle analyses of selected energy systems)
- Environmental communication on energy services (e.g. electricity labelling, carbon footprint)
- Integrated Assessment Modelling to support the European Clean Air Strategy
- Cost-effectiveness analyses and cost-benefit analyses for emission control strategies
- Monetary valuation of external effects (external costs)

Literature
Die Literaturhinweise sind in den Vorlesungsunterlagen enthalten (vgl. ILIAS)

T 6.113 Course: Energy Informatics 1 [T-INFO-103582]

Responsible: Prof. Dr. Veit Hagenmeyer
Organisation: KIT Department of Informatics
Part of: M-INFO-101885 - Energy Informatics 1

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	2

Events					
WT 22/23	2400058	Energy Informatics 1	4 SWS	Lecture / Practice (	Hagenmeyer, Süß, An
Exams					
ST 2022	7500079	Energy informatics 1			Hagenmeyer

Below you will find excerpts from events related to this course:

V Energy Informatics 1

2400058, WS 22/23, 4 SWS, Language: German/English, Open in study portal

Lecture / Practice (VÜ)

Content
This module provides an overview of the physical and technical principles of different forms of energy, their storage, their transmission and the corresponding energy conversion processes. Furthermore, this module covers the system-technical combination of different local energy systems to form an overall energy system and provides an outlook on typical information technology applications in the energy sector.

In detail, the following topics are discussed with examples:

- Energy forms, systems and storage
- Energy conversion processes in power plants
- Renewable resources
- Energy transmission (electricity/gas/heat networks)
- Electrical networks of the future, load management
- Use of information and communication technology (ICT)
- Energy Economics

Literature
Diese werden in der Vorlesung gegeben.

T 6.114 Course: Energy Informatics 1 - Preliminary Work [T-INFO-110356]

Responsible: Prof. Dr. Veit Hagenmeyer
Organisation: KIT Department of Informatics
Part of: M-INFO-101885 - Energy Informatics 1

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each term	1

Exams			
ST 2022	7500065	Energy Informatics 1 - preliminary work	Hagenmeyer

T 6.115 Course: Energy Informatics 2 [T-INFO-106059]

Responsible: Prof. Dr. Veit Hagenmeyer
Organisation: KIT Department of Informatics
Part of: M-INFO-103044 - Energy Informatics 2

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	2

Events					
ST 2022	2400017	Energy Informatics 2	4 SWS	Lecture / Practice (/ 🗣	Hagenmeyer, Förderer, Stucky, Bao, Elbez, Kühnapfel, Schäfer, Mikut, Cakmak, Heidrich, Zahn, An, Phipps, Meisenbacher
Exams					
ST 2022	7500156	Energy Informatics 2			Hagenmeyer

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

T 6.116 Course: Energy Market Engineering [T-WIWI-107501]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101451 - Energy Economics and Energy Markets
M-WIWI-103720 - eEnergy: Markets, Services and Systems
M-WIWI-104813 - Information Systems: Internet-Based Markets and Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540464	Energy Market Engineering	2 SWS	Lecture / 🗣	Henni, Weinhardt
ST 2022	2540465	Übung zu Energy Market Engineering	1 SWS	Practice	Semmelmann
Exams					
ST 2022	79852	Energy Market Engineering			Weinhardt

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

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".

The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

Below you will find excerpts from events related to this course:

V Energy Market Engineering

2540464, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.
- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

T 6.117 Course: Energy Networks and Regulation [T-WIWI-107503]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2540494	Energy Networks and Regulation	2 SWS	Lecture / 🗣	Rogat
WT 22/23	2540495	Übung zu Energy Networks and Regulation	1 SWS	Practice / 🗣	Rogat

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 exam is offered every semester. Re-examinations are offered on every ordinary examination date.

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

Below you will find excerpts from events related to this course:

V Energy Networks and Regulation

2540494, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning Goals

The student,

- understands the business model of a network operator and knows its central tasks in the energy supply system,
- has a holistic overview of the interrelationships in the network economy,
- understands the regulatory and business interactions,
- is in particular familiar with the current model of incentive regulation with its essential components and understands its implications for the decisions of a network operator
- is able to analyse and assess controversial issues from the perspective of different stakeholders.

Content of teaching

The lecture “Energy Networks and Regulation” provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead (“Energiewende”, redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO
- Objectives of regulation: Fair price calculation and high standard access conditions
- The functioning of incentive regulation
- First major amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily?) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Literature

Averch, H.; Johnson, L.L (1962). Behavior of the firm under regulatory constraint, in: American Economic Review, 52 (5), S. 1052 – 1069.

Bundesnetzagentur (2006): Bericht der Bundesnetzagentur nach § 112a EnWG zur Einführung der Anreizregulierung nach § 21a EnWG, http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/Netzentgelte/Anreizregulierung/BerichtEinfuehrgAnreizregulierung.pdf?__blob=publicationFile&v=3.

Bundesnetzagentur (2015): Evaluierungsbericht nach § 33 Anreizregulierungsverordnung, https://www.bmwi.de/Redaktion/DE/Downloads/A/anreizregulierungsverordnung-evaluierungsbericht.pdf?__blob=publicationFile&v=1.

Filippini, M.; Wild, J.; Luchsinger, C. (2001) : Regulierung der Verteilnetzpreise zu Beginn der Marktöffnung. Erfahrungen in Norwegen und Schweden, Bundesamt für Energie, Bern, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/34/066/34066585.pdf.

Gómez, T. (2013): Monopoly Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 151 – 198, Springer-Verlag, London.

Gómez, T. (2013): Electricity Distribution, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 199 – 250, Springer-Verlag, London.

Pérez-Arriaga, I.J. (2013): Challenges in Power Sector Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 647 – 678, Springer-Verlag, London.

Rivier, M.; Pérez-Arriaga, I.J.; Olmos, L. (2013): Electricity Transmission, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 251 – 340, Springer-Verlag, London.

T 6.118 Course: Energy Systems Analysis [T-WIWI-102830]

Responsible: Dr. Armin Ardone
Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2581002	Energy Systems Analysis	2 SWS	Lecture / 🗣	Fichtner, Ardone, Dengiz, Yilmaz
Exams					
ST 2022	7981002	Energy Systems Analysis			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

Recommendation
None

Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Below you will find excerpts from events related to this course:

V Energy Systems Analysis

2581002, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
1. Overview and classification of energy systems modelling approaches
2. Usage of scenario techniques for energy systems analysis
3. Unit commitment of power plants
4. Interdependencies in energy economics
5. Scenario-based decision making in the energy sector
6. Visualisation and GIS techniques for decision support in the energy sector

Learning goals:

The student

- has the ability to understand and critically reflect the methods of energy system analysis, the possibilities of its application in the energy industry and the limits and weaknesses of this approach
- can use select methods of the energy system analysis by her-/himself

Organizational issues
Blockveranstaltung, Termine s. Institutsaushang

Literature
Weiterführende Literatur:

- Möst, D. und Fichtner, W.: **Einführung zur Energiesystemanalyse**, in: Möst, D., Fichtner, W. und Grunwald, A. (Hrsg.): Energiesystemanalyse, Universitätsverlag Karlsruhe, 2009
- Möst, D.; Fichtner, W.; Grunwald, A. (Hrsg.): **Energiesystemanalyse** - Tagungsband des Workshops "Energiesystemanalyse" vom 27. November 2008 am KIT Zentrum Energie, Karlsruhe, Universitätsverlag Karlsruhe, 2009 [PDF: http://digbib.ubka.uni-karlsruhe.de/volltexte/documents/928852]

T 6.119 Course: Energy Trading and Risk Management [T-WIWI-112151]

Responsible: N.N.
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2581020	Energy Trading and Risk Management	2 SWS	Lecture / 🗣	Fraunholz, Kraft, Fichtner

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

Competence Certificate
The lecture "Energiehandel und Risikomanagement" will be held in English under the title "Energy Trading and Risk Management" from the summer semester 2022. The examination for the English-language lecture will be offered in English from the summer semester 2022.
The assessment consists of a written exam (60 minutes). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Energy Trading and Risk Management

2581020, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction to Markets, Mechanisms and Interaction
2. Electricity Trading (platforms, products, mechanisms)
3. Balancing Energy Markets and Congestion Management
4. Coal Markets (reserves, supply, demand, and transport)
5. Investments and Capacity Markets
6. Oil and Gas Markets (supply, demand, trade, and players)
7. Trading Game
8. Risk Management in Energy Trading

Literature
Weiterführende Literatur:

Burger, M., Graeber, B., Schindlmayr, G. (2007): *Managing energy risk: An integrated view on power and other energy markets*, Wiley&Sons, Chichester, England

EEX (2010): *Einführung in den Börsenhandel an der EEX auf Xetra und Eurex*, www.eex.de

Erdmann, G., Zweifel, P. (2008), Energieökonomik, Theorie und Anwendungen, Springer, ISBN: 978-3-540-71698-3

Hull, J.C. (2006): *Options, Futures and other Derivatives*, 6. Edition, Pearson Prentice Hall, New Jersey, USA

Borchert, J., Schlemm, R., Korth, S. (2006): *Stromhandel: Institutionen, Marktmodelle, Pricing und Risikomanagement (Gebundene Ausgabe)*, Schäffer-Poeschel Verlag

www.riskglossary.com

T 6.120 Course: Engineering Interactive Systems [T-WIWI-110877]

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104080 - Designing Interactive Information Systems
M-WIWI-104812 - Information Systems: Engineering and Transformation
M-WIWI-104813 - Information Systems: Internet-Based Markets and Services

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

Exams			
ST 2022	00006	Engineering Interactive Systems	Mädche
WT 22/23	7900195	Engineering Interactive Systems	Mädche

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The course is held in English.

T 6.121 Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	3

Competence Certificate
Please note: The seminar cannot be offered in the winter semester 2019/2020 due to organizational reasons. Alternative exam assessment.

Prerequisites
None

Recommendation
None

T 6.122 Course: Entrepreneurship [T-WIWI-102864]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
ST 2022	2545001	Entrepreneurship	2 SWS	Lecture /	Terzidis, Kuschel
WT 22/23	2545001	Entrepreneurship	2 SWS	Lecture /	Terzidis
Exams					
ST 2022	7900002	Entrepreneurship			Terzidis
ST 2022	7900192	Entrepreneurship			Terzidis

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).

Students are offered the opportunity to earn a grade bonus through separate assignments. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V **Entrepreneurship** — **Lecture (V)**
2545001, SS 2022, 2 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
The lecture as a compulsory part of the module "Entrepreneurship" introduces the basic concepts of entrepreneurship. Important concepts and empirical facts are introduced, which relate to the conception and implementation of newly founded companies.

The focus here is on introducing methods for generating innovative business ideas, translating patents into business concepts, and general principles of business modeling and business planning. In particular, approaches such as Lean-Startup and Effectuation as well as concepts for financing young companies are covered.

A "KIT Entrepreneurship Talk" is part of each session (from 16.15-17.15), in which experienced founder and entrepreneur personalities report on their experiences in the practice of the establishment of an enterprise. Dates and speakers will be announced on the EnTechnon homepage.

Learning objectives:

The students will be introduced to the topic of entrepreneurship. After successful attendance of the course they should have an overview of the sub-areas of entrepreneurship and be able to understand basic concepts of entrepreneurship and apply key concepts.

Workload:

The total effort with 3 credit points: approx. 90 hours
Presence time: 30 hours
Pre- and postprocessing of the LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Examination:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation)

A grade bonus can be earned by successfully participating in a case study as part of the Entrepreneurship lecture. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to 0.3 or 0.4. The bonus only applies if you have passed the exam with at least a 4.0. More details will be provided in the lecture. Participation in the case study is voluntary.

Examdates: 24.06.2022, 6pm - 7.10pm, 30.46 Chemie, Neuer Hörsaal
24.06.2022, 6pm - 7.10pm, 30.95 Forum auditorium (Audimax)

Literature
Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship

Ries, Eric (2011): The Lean Startup

Osterwalder, Alexander (2010): Business Model Generation

Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

R.C. Dorf, T.H. Byers: Technology Ventures – From Idea to Enterprise., (McGraw Hill 2008)

Hisrich, Robert D.; Ramadani, Veland (2017): Effective entrepreneurial management. Strategy, planning, risk management, and organization. Cham, Switzerland: Springer.

V **Entrepreneurship** — **Lecture (V)**
2545001, WS 22/23, 2 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
The lecture as an obligatory part of the module "Entrepreneurship" introduces the basic concepts of entrepreneurship. Important concepts and empirical facts are presented that relate to the conception and implementation of newly founded companies. The focus here is on the introduction to methods for generating innovative business ideas, for transferring patents into business concepts and general principles of business modelling and business planning. In particular approaches such as Lean Startup and Effectuation as well as concepts for the financing of young enterprises are treated.

A "KIT Entrepreneurship Talk" is part of each session (from 17.00-18.00), in which experienced founder and entrepreneur personalities report on their experiences in practice of the establishment of an enterprise. Dates and speakers will be announced on the EnTechnon homepage.

Learning objectives:

The studentsare introduced to the topic Entrepreneurship. After successful attendance of the meeting they are to have an overview of the subranges of the Entrepreneurships and be able to understand basic concepts of the Entrepreneurships and apply key concepts.

Workload:

Total effort with 3 credit points: approx. 90 hours
Presence time: 30 hours
Pre- and postprocessing of the LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Examination:

The assessment of success takes place in the form of a written examination (60 min.) (according to §4(2), 1 SPO). The grade is the grade of the written exam.A grade bonus can be earned through successful participation in a case study in the Entrepreneurship lecture. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to 0.3 or 0.4.The bonus only applies if you have passed the exam with at least a 4.0. More details will be provided in the lecture. Participation in the case study is voluntary.

Exam date: 12/20/2022

Literature
Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

R.C. Dorf, T.H. Byers: Technology Ventures – From Idea to Enterprise., (McGraw Hill 2008)

Füglistaller, Urs, Müller, Christoph and Volery, Thierry (2008): Entrepreneurship

Hisrich, Robert D.; Ramadani, Veland (2017): Effective entrepreneurial management. Strategy, planning, risk management, and organization. Cham, Switzerland: Springer.

Ries, Eric (2011): The Lean Startup.

Osterwalder, Alexander (2010): Business Model Generation.

T 6.123 Course: Entrepreneurship Research [T-WIWI-102894]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	2545002	Entrepreneurship Research	2 SWS	Seminar / 🗣	Terzidis, Dang, Kuschel
Exams					
ST 2022	7900052	Entrepreneurship Research			Terzidis

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

Competence Certificate
The performance review is done via a so called other methods of performance review (term paper) (alternative exam assessment). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

Prerequisites
None

Recommendation
None

Annotation
The topics will be prepared in groups. The presentation of the results is done during a a block period seminar at the end of the semester. Students have to be present all day long during the seminar.

Below you will find excerpts from events related to this course:

V Entrepreneurship Research

2545002, SS 2022, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

The students independently develop a topic from entrepreneurship research in an international setting as a tandem with a partner. At first, there will be an introduction to the methodologies used such as systematic literature review, design science, qualitative and quantitative data analysis and more. As part of a written elaboration, the seminar topic must be presented scientifically on 15-20 pages. The results of the seminar paper will be presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

As part of the written elaboration, the basics of independent scientific work (literature research, argumentation + discussion, citing literature sources, application of qualitative, quantitative and simulative methods) are trained. The skills acquired in the seminar are used to prepare for a potential master thesis. The course is therefore particularly aimed at students who want to write their thesis at the Chair for Entrepreneurship and Technology Management.

Registration:

Registration is via the Wiwi portal.

Organizational issues
Termine werden noch bekannt gegeben.

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

Literature
Wird im Seminar bekannt gegeben.

T 6.124 Course: Environmental and Resource Policy [T-WIWI-102616]

Responsible: Rainer Walz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2560548	Environmental and Ressource Policy	2 SWS	Lecture / Practice (	Walz
Exams					
ST 2022	7900277	Environmental and Resource Policy			Mitusch

Competence Certificate
See German version

Recommendation
It is recommended to already have knowledge in the area of industrial organization and economic policy. This knowledge may be acquired in the courses*Introduction to Industrial Organization* [2520371] and*Economic Policy*[2560280].

Below you will find excerpts from events related to this course:

V Environmental and Ressource Policy

2560548, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Literature
Weiterführende Literatur:

Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg
OECD: Environmental Performance Review Germany, Paris

T 6.125 Course: Environmental Economics and Sustainability [T-WIWI-102615]

Responsible: Prof. Dr. Rainer Walz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	2521547	Umweltökonomik und Nachhaltigkeit (mit Übung)	2 SWS	Lecture / Practice (	Walz
Exams					
ST 2022	7900273	Environmental Economics and Sustainability			Mitusch

Competence Certificate
See German version

Prerequisites
None

Recommendation
It is recommended to already have knowledge in the area of macro- and microeconomics. This knowledge may be acquired in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014].

T 6.126 Course: Environmental Law [T-BGU-111102]

Responsible: Dr. Urich Smeddinck
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each winter term	1 terms	1

Events					
WT 22/23	6111177	Environmental Law		Lecture / 🗣	Smeddinck
Exams					
WT 22/23	8262111102_1	Environmental Law			Smeddinck
WT 22/23	8262111102_2	Environmental Law			Smeddinck

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam with 120 min

Prerequisites
None

Annotation
None

T 6.127 Course: European and International Law [T-INFO-101312]

Responsible: Ulf Brühann
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24666	Europäisches und Internationales Recht	2 SWS	Lecture / 🗣	Brühann
Exams					
ST 2022	7500084	European and International Law			Dreier

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

T 6.128 Course: European and National Technology Law [T-INFO-109824]

Responsible: Prof. Dr. Thomas Dreier
Dr. Yvonne Matz

Organisation: KIT Department of Informatics

Part of: M-INFO-104810 - European and National Technology Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each term	3

Events					
ST 2022	24632	Telekommunikationsrecht	2 SWS	Lecture / 🗣	Döveling
ST 2022	24666	Europäisches und Internationales Recht	2 SWS	Lecture / 🗣	Brühann
WT 22/23	2400238	Bereichsdatenschutz	2 SWS	Lecture / 🗣	Boehm
Exams					
ST 2022	7500320	European and National Technology Law			Dreier

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

T 6.129 Course: Experimental Economics [T-WIWI-102614]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101505 - Experimental Economics
M-WIWI-103118 - Data Science: Data-Driven User Modeling
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2540489	Experimental Economics	2 SWS	Lecture / 🗣	Knierim, Peukert
WT 22/23	2540493	Übung zu Experimental Economics	1 SWS	Practice / 🗣	Greif-Winzrieth, Knierim, Peukert

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

Competence Certificate
The assessment consists of a written exam (60 min).

By successful completion of 70% of the maximum number of points in the exercise(s) a bonus can be obtained.

If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The exact criteria for the award of 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 Experimental Economics

2540489, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2. Aufl. 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

T 6.130 Course: Extraordinary additional course in the module Cross-Functional Management Accounting [T-WIWI-108651]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate
The assessment depends on which extraordinary course becomes part of the module "Cross-Functional Management Accounting".

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Prerequisites
None

Annotation
The pupose of this placeholder is to make it possible zu include an extraordinary course in the module "Cross-Functional Management Accounting". Proposals for specific courses have to be approved in advance by the module coordinator.

T 6.131 Course: Financial Analysis [T-WIWI-102900]

Responsible: Dr. Torsten Luedecke
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2530205	Financial Analysis	2 SWS	Lecture / 🗣	Luedecke
ST 2022	2530206	Übungen zu Financial Analysis	2 SWS	Practice / 🗣	Luedecke
Exams					
ST 2022	7900075	Financial Analysis			Luedecke
WT 22/23	7900059	Financial Analysis			Ruckes, Luedecke

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

Competence Certificate
See German version.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance, accounting, and valuation is required.

Below you will find excerpts from events related to this course:

V Financial Analysis

2530205, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

T 6.132 Course: Financial Econometrics [T-WIWI-103064]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II
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 22/23	2520022	Financial Econometrics	2 SWS	Lecture /	Schienle
WT 22/23	2520023	Übungen zu Financial Econometrics	2 SWS	Practice /	Schienle, Görgen, Buse
Exams					
WT 22/23	7900123	Financial Econometrics			Schienle
WT 22/23	7900126	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

2520022, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Learning objectives:

The student

- shows a broad knowledge of fincancial econometric estimation and testing techniques
- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

Content:

ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

Requirements:

It is recommended to attend the course *Economics III: Introduction to Econometrics* [2520016] prior to this course.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Literature

Taylor, S. J. (2005): "Asset Price Dynamics, Volatility, and Prediction", Princeton University Press.

Tsay, R. S. (2005): "Analysis of Financial Time Series: Financial Econometrics", Wiley, 2nd edition.

Cochrane, J. H. (2005): "Asset Pricing", revised edition, Princeton University Press.

Campbell, J. Y., A. W. Lo, and A. C. MacKinlay (1997): "The Econometrics of Financial Markets", Princeton University Press.

Hamilton, J. D. (1994): "Time Series Analysis", Princeton University Press.

Additional literature will be discussed in the lecture.

T 6.133 Course: Financial Econometrics II [T-WIWI-110939]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II
M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Competence Certificate
Alternative exam assessment (Takehome Exam). Details will be announced at the beginning of the course.

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.

T 6.134 Course: Financial Intermediation [T-WIWI-102623]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2530232	Financial Intermediation	2 SWS	Lecture /	Ruckes
WT 22/23	2530233	Übung zu Finanzintermediation	1 SWS	Practice /	Ruckes, Benz
Exams					
ST 2022	7900078	Financial Intermediation			Ruckes
WT 22/23	7900063	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 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Literature
Weiterführende Literatur:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

T 6.135 Course: Firm creation in IT security [T-WIWI-110374]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Exams			
ST 2022	7900236	Business Planning for Founders in the field of IT-Security	Terzidis

Competence Certificate
Alternative exam assessment. The grade consists of the presentation and the written elaboration.

Prerequisites
None

T 6.136 Course: Formal Systems [T-INFO-101336]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-100799 - Formal Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24086	Formale Systeme	4 SWS	Lecture / Practice (	Beckert, Ulbrich, Weigl
Exams					
ST 2022	7500009	Formal Systems			Beckert
WT 22/23	7500036	Formal Systems			Beckert

T 6.137 Course: Formal Systems II: Application [T-INFO-101281]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-100744 - Formal Systems II: Application

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

T 6.138 Course: Formal Systems II: Theory [T-INFO-101378]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-100841 - Formal Systems II: Theory

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	24608	Formale Systeme II - Theorie	3 SWS	Lecture / 🗣	Beckert, Ulbrich
Exams					
ST 2022	7500129	Formal Systems II: Theory			Beckert

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

T 6.139 Course: Fundamentals for Financial -Quant and -Machine Learning Research [T-WIWI-111846]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105894 - Foundations for Advanced Financial -Quant and -Machine Learning Research

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	see Annotations	1

Events					
ST 2022	2500375	Fundamentals for Financial -Quant and -Machine Learning Research	4 SWS	Lecture / 🗣	Ulrich
ST 2022	2500377	Übung zu Fundamentals for Financial -Quant and -Machine Learning Research	2 SWS	Practice / 🗣	Ulrich, Seehuber, Zimmer

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

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

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

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

Recommendation

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

Annotation
The course is offered every second year.

T 6.140 Course: Fundamentals of National and International Group Taxation [T-WIWI-111304]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2560133	Fundamentals of National and International Group Taxation	3 SWS	Lecture / 🗣	Wigger, Gutekunst
Exams					
ST 2022	790kobe	Fundamentals of National and International Group Taxation			Wigger
WT 22/23	790kobe	Fundamentals of National and International Group Taxation			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 1.5h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
It is recommended to attend the course “Basics of German Company Tax Law and Tax Planning” beforehand.

T 6.141 Course: Fuzzy Sets [T-INFO-101376]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-INFO-100839 - Fuzzy Sets

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	24611	Fuzzy Sets	3 SWS	Lecture / 🗣	Pfaff
Exams					
ST 2022	7500001	Fuzzy Sets			Pfaff
WT 22/23	7500011	Fuzzy Sets			Pfaff

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Fuzzy Sets

24611, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In this module, the fundamental theory and practical applications of fuzzy sets are communicated. The course copes with fuzzy arithmetics, fuzzy logic, fuzzy relations, and fuzzy deduction. The representation of fuzzy sets and their properties are the theoretical foundation. Based on this theory, arithmetic and logical operations are axiomatically derived and analyzed. Furthermore, it is shown how arbitrary functions and relations are transferred into fuzzy sets. An application of the logic part of the module, fuzzy deduction, shows different approaches to applying rule-based systems on fuzzy sets. The final part of the curse treats the problem of fuzzy control.

Literature
Hilfreiche Quellen werden im Skript und in den Vorlesungsfolien genannt.

T 6.142 Course: Geometric Optimzation [T-INFO-101267]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-100730 - Geometric Optimization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Irregular	1

Exams			
ST 2022	7500230	Geometric Optimzation	Prautzsch

T 6.143 Course: Global Manufacturing [T-WIWI-112103]

Responsible: Dr. Henning Sasse
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2581956	Global Manufacturing	2 SWS	Lecture / 🗣	Sasse

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. 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

Recommendation
None

Annotation
The lecture will be held for the first time in the winter semester 2022/23.

Below you will find excerpts from events related to this course:

V Global Manufacturing

2581956, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

Organizational issues
Blockveranstaltung, siehe Homepage

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.144 Course: Global Optimization I [T-WIWI-102726]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
Exams					
ST 2022	7900270_SS2022_HK	Global Optimization I			Stein
WT 22/23	7900004_WS2223_NK	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** — **Lecture (V) On-Site**
2550134, SS 2022, 2 SWS, Language: German, Open in study portal

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature
O. Stein, 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 6.145 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-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2022	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
ST 2022	2550135	Exercise to Global Optimization I and II	2 SWS	Practice / 🗣	Stein, Beck
ST 2022	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
ST 2022	7900272_SS2022_HK	Global Optimization I and II			Stein
WT 22/23	7900006_WS2223_NK	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 2022, 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

2550136, SS 2022, 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 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 6.146 Course: Global Optimization II [T-WIWI-102727]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
ST 2022	7900271_SS2022_HK	Global Optimization II			Stein
WT 22/23	7900005_WS2223_NK	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** — **Lecture (V) On-Site**
2550136, SS 2022, 2 SWS, Language: German, Open in study portal

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature
O. Stein, 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 6.147 Course: Globalization of Innovation – Innovation for Globalization: Methods and Analyses [T-WIWI-111822]

Responsible: Sophie Schneider
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Exams			
ST 2022	7900018	Globalization of Innovation – Innovation for Globalization: Methods and Analyses	Schneider

Competence Certificate
Alternative exam assessment. The grade consists of a presentation of the results (30%), participation in the discussions (10%) and a seminar paper (60%).

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

T 6.148 Course: Graph Partitioning and Graph Clustering in Theory and Practice [T-INFO-101295]

Responsible: Prof. Dr. Peter Sanders
Dr. rer. nat. Torsten Ueckerdt

Organisation: KIT Department of Informatics

Part of: M-INFO-100758 - Graph Partitioning and Graph Clustering in Theory and Practice

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

T 6.149 Course: Graph Partitioning and Graph Clustering in Theory and Practice - Practical [T-INFO-110999]

Responsible: Prof. Dr. Peter Sanders
Dr. rer. nat. Torsten Ueckerdt
Organisation: KIT Department of Informatics
Part of: M-INFO-100758 - Graph Partitioning and Graph Clustering in Theory and Practice

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

T 6.150 Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Exams			
ST 2022	7900001	Graph Theory and Advanced Location Models	Nickel

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 6.151 Course: Growth and Development [T-WIWI-111318]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation and Growth
M-WIWI-101496 - Growth and Agglomeration

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Exams			
ST 2022	7900105	Growth and Development	Ott
WT 22/23	7900078	Growth and Development	Ott

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as an open-book examination or as a 60-minute written examination.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Annotation
Due to the research semester of Prof. Dr. Ingrid Ott, the course will not be offered in the winter semester 2021/22. The exam will take place. Preparation materials can be found in ILIAS.

T 6.152 Course: Hands-on Bioinformatics Practical [T-INFO-103009]

Responsible: Prof. Dr. Alexandros Stamatakis
Organisation: KIT Department of Informatics
Part of: M-INFO-101573 - Hands-on Bioinformatics Practical

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	3

T 6.153 Course: Heat Economy [T-WIWI-102695]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2581001	Heat Economy	2 SWS	Lecture / 🗣	Fichtner
Exams					
ST 2022	7981001	Heat Economy			Fichtner
WT 22/23	7981001	Heat Economy			Fichtner

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

Competence Certificate
The lecture will be suspended in summer semester 2021.
The assessment consists of a written (60 minutes) or oral exam (30 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. 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.

Recommendation
None

Annotation
See German version.

Below you will find excerpts from events related to this course:

V Heat Economy

2581001, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Block, Seminarraum Standort West - siehe Institutsaushang

T 6.154 Course: Heterogeneous Parallel Computing Systems [T-INFO-101359]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: M-INFO-100822 - Heterogeneous Parallel Computing Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2424117	Heterogene parallele Rechensysteme	2 SWS	Lecture / 🗣	Karl
Exams					
ST 2022	7500216	Heterogeneous Parallel Computing Systems			Karl

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

T 6.155 Course: Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy [T-INFO-101262]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Hon.-Prof. Dr. Uwe Spetzger

Organisation: KIT Department of Informatics

Part of: M-INFO-100725 - Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	2

Events					
ST 2022	24678	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy	2 SWS	Lecture / 🗣	Spetzger
WT 22/23	24139	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy	2 SWS	Lecture / 🗣	Spetzger
Exams					
ST 2022	7500145	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy			Spetzger
WT 22/23	7500118	Human Brain and Central Nervous System: Snatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy			Spetzger

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.156 Course: Human Factors in Security and Privacy [T-WIWI-109270]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104520 - Human Factors in Security and Privacy
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	3

Events					
WT 22/23	2511554	Human Factors in Security and Privacy	2 SWS	Lecture / 🗣	Volkamer
WT 22/23	2511555	Übungen zu Human Factors in Security and Privacy	1 SWS	Practice / 🗣	Volkamer, Berens
Exams					
ST 2022	7900084	Human Factors in Security and Privacy (Registration until 18 July 2022)			Volkamer
WT 22/23	79AIFB_HFSP_B4	Human Factors in Security and Privacy			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. Only those who have successfully participated in the exercises and the lecture will be admitted to the examination.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
Both need to be done:

- Pass Quiz on Paper for Graphical Passwords
- Presentation of Results Exercise 2

+ 9 of the following 11 need to be done:

- Submit ILIAS certificate until Oct 24
- Pass Quiz on InfoSec Lecture
- Active participation exercise 1 Part 1 - Evaluation and analyses methods
- Pass Quiz Paper Discussion 1 - User Behaviour and motivation theories
- Active participation exercise 1 Part 2
- Pass Quiz Paper Discussion 2 - User Behaviour and motivation theories
- Pass Quiz Paper Discussion 3 - Security Awareness
- Active participation exercise 1 Part 3
- Pass Quiz Paper Discussion 4 - Graphical Authentication
- Pass Quiz Paper Discussion 5 - Shoulder Surfing Authentication
- Active participation exercise 2

Recommendation
The prior attendance of the lecture "Information Security" is strongly recommended.

Annotation
The lecture will not be offered in winter semester 2020/21.

Some lectures are in English, some in German.

Below you will find excerpts from events related to this course:

V **Human Factors in Security and Privacy** — Lecture (V), On-Site
2511554, WS 22/23, 2 SWS, Language: German/English, Open in study portal

Content
Please take a look at all the information provided before the first event (e.g. first slides)!

The event will be conducted with 3G. Accordingly, either a one-time proof of vaccination or an official proof of a negative test is required for each event.

Some lectures are in English, some in German.

To participate in the quizzes at the beginning of the event a charged device is needed e.g. laptop or cell phone.

To successfully pass the course, the following requirements must be met:

Both need to be done:

- Reading Paper, Active Participation & Pass Quiz on Paper for Graphical Passwords
- Presentation of Results Exercise 2

+ 9 of the following 11 need to be done:

- Submit ILIAS certificate until Oct 24
- Pass Quiz on InfoSec Lecture
- Active participation exercise 1 – Part 1
- Reading Paper, Active Participation & Pass Quiz “Users are not the enemy”Active participation exercise 1 – Part 2
- Reading Paper, Active Participation & Pass Quiz “Why Johnny can't encrypt”
- Reading Paper, Active Participation & Pass Quiz “Put Your Warning Where Your Link Is: Improving and Evaluating Email Phishing Warnings”
- Active participation exercise 1 – Part 3
- Active participation exercise 1 – Part 4 Results
- Reading Paper, Active Participation & Pass Quiz “User-centered security”Active participation exercise 2 – Part 1

Here is a first preview of the topics planned for the lecture:

1. General Introduction
2. Self-Study: Knowlege of Information Security Lecture
3. Terminology + Basics
4. Evaluation and analyses methods
5. Risk Communication
6. Security Awareness
7. Security Indicators
8. Graphical Authentication
9. Shoulder Surfing Authentication
10. Usable Verifiable Electronic Voting
11. Q&A + Exam preparation

Literature

- Usable Security: History, Themes, and Challenges (Synthesis Lectures on Information Security, Privacy, and Trust): Simson Garfinkel und Heather Richter Lipford. 2014
- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
- Melanie Volkamer, Karen Renaud: Mental Models - General Introduction and Review of Their Application to Human-Centred Security. In Number Theory and Cryptography (2013): 255-280: https://link.springer.com/chapter/10.1007/978-3-642-42001-6_18
- Paul Gerber, Marco Ghiglierie, Birgit Henhapl, Oksana Kulyk, Karola Marky, Peter Mayer, Benjamin Reinheimer, Melanie Volkamer: Human Factors in Security. In: Reuter C. (eds) Sicherheitskritische Mensch-Computer-Interaktion. Springer (2018) https://link.springer.com/chapter/10.1007/978-3-658-19523-6_5
- Bruce Schneier: Psychology of Security (2018): https://www.schneier.com/essays/archives/2008/01/the_psychology_of_se.html
- Ross Anderson: security /usability and psychology. In Security Engineering. http://www.cl.cam.ac.uk/~rja14/Papers/SEv2-c02.pdf
- Andrew Odlyzko: Economics, Psychology and Sociology of Security: http://www.dtc.umn.edu/~odlyzko/doc/econ.psych.security.pdf

T 6.157 Course: Human-Machine-Interaction [T-INFO-101266]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-INFO-100729 - Human Computer Interaction

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	2

Events					
ST 2022	24659	Human-Computer-Interaction	2 SWS	Lecture /	Beigl
Exams					
ST 2022	7500048	Human-Machine-Interaction			Beigl
WT 22/23	7500076	Human-Machine-Interaction			Beigl

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.158 Course: Human-Machine-Interaction in Anthropomatics: Basics [T-INFO-101361]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Dr. Jürgen Geisler
Organisation: KIT Department of Informatics
Part of: M-INFO-100824 - Human-Machine-Interaction in Anthropomatics: Basics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	24100	Human-Machine-Interaction in Anthropomatics: Basics	2 SWS	Lecture /	van de Camp
Exams					
ST 2022	7500005	Human-Machine-Interaction in Anthropomatics: Basics			Beyerer, Geisler
WT 22/23	7500017	Human-Machine-Interaction in Anthropomatics: Basics			Beyerer, van de Camp

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.159 Course: Human-Machine-Interaction Pass [T-INFO-106257]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-INFO-100729 - Human Computer Interaction

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Events					
ST 2022	2400095	Human-Computer-Interaction	1 SWS	Practice / 🖳	Beigl, Pescara
ST 2022	24659	Human-Computer-Interaction	2 SWS	Lecture / 🖳	Beigl
Exams					
ST 2022	7500121	Human-Machine-Interaction			Beigl

Legend: 🖳 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.160 Course: Humanoid Robotics Laboratory [T-INFO-111590]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-INFO-105792 - Humanoid Robotics Laboratory

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	2

Events					
WT 22/23	24890	Humanoid Robotics Laboratory	4 SWS	Practical course / 🗣	Asfour

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

Recommendation

- Very good programming skills in at least one high-level programming language are strongly recommended.
- Attendance of the lectures Robotics 1, Robotics 2, Robotics 3, as well as the robotics practical course are recommended.
- Project-specific recommendations (knowledge of C++, Python, ...) will be announced in the individual project descriptions

Annotation

- Internship dates are always by arrangement with the supervising staff member.
- An extension work of the topic as a master thesis is possible in principle.
- The number of participants in this practical course is generally **limited** and varies with the number of available research projects at the institute.

Below you will find excerpts from events related to this course:

V Humanoid Robotics Laboratory

24890, WS 22/23, 4 SWS, Language: German/English, Open in study portal

Practical course (P)
On-Site

Content
In this practical course, a is worked on alone or in small teams with up to 3 students. Questions of humanoid robotics are dealt with, such as semantic scene interpretation, active perception, planning of grasping and manipulation tasks, action representation with motion primitives, and programming by demonstration.

The project work (alone or in groups) is performed largely independently but supported by scientific staff of the H2T. At the end of the practical course, the work has to be documented and presented in a scientific talk.

Learning Objectives:

- Students will be able to independently understand, structure, analyze, and solve a complex humanoid robotics problem using existing programming skills, alone or in a small team.
- Students can convey complex technical content in a presentation.

Recommendation:

- Very good programming skills in at least one high-level programming language are strongly recommended.
- Attendance of the lectures Robotics 1, Robotics 2, Robotics 3, as well as the robotics practical course are recommended.
- Project-specific recommendations (knowledge of C++, Python, ...) will be announced in the individual project descriptions

Organizational issues
Die Erfolgskontrolle erfolgt in Form einer mündlichen Prüfung nach § 4 Abs. 2 Nr. 2 SPO.

Die Modulnote ist die Note der mündlichen Prüfung.

Zielgruppe: Das Praktikum richtet sich an Studierende der Informatik, Elektrotechnik, Maschinenbau, Mechatronik im Masterstudium sowie alle Interessenten an der Robotik.

Arbeitsaufwand:

6 LP entspricht ca. 180h, davon

1. 10h Präsenzzeit in Praktikumsbesprechungen
2. 10h Vor- und Nachbereitung derselben
3. 150h Selbststudium zur Bearbeitung des Themas

ca. 10h Vorbereitung und Halten eines wissenschaftlichen Vortrags

T 6.161 Course: Incentives in Organizations [T-WIWI-105781]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101505 - Experimental Economics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2573003	Incentives in Organizations	2 SWS	Lecture / 🗣	Nieken
ST 2022	2573004	Übung zu Incentives in Organizations	2 SWS	Practice / 🗣	Nieken, Mitarbeiter
Exams					
ST 2022	7900132	Incentives in Organizations			Nieken

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

Competence Certificate
The assessment of this course is a written examination (60 min). The exam takesplace in every semester. Re-examinations are offered at every ordinaryexamination date. In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendation
Knowledge of microeconomics, game theory, and statistics is assumed.

Below you will find excerpts from events related to this course:

V Incentives in Organizations

2573003, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Aim
The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics.
- understands how econometric methods can be used to analyze performance and compensation data.
- knows incentive schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical data from companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Workload
The total workload for this course is: approximately 135 hours.

Lecture: 32 hours

Preparation of lecture: 52 hours

Exam preparation: 51 hours

Literature
Slides, Additional case studies and research papers will be announced in the lecture.

Literature (complementary):

Managerial Economics and Organizantional Architecture, Brickley / Smith / Zimmerman, McGraw-Hill Education, 2015

Behavioral Game Theory, Camerer, Russel Sage Foundation, 2003

Personnel Economics in Practice, Lazear / Gibbs, Wiley, 2014

Introduction to Econometrics, Wooldridge, Andover, 2014

Econometric Analysis of Cross Section and Panel Data, Wooldridge, MIT Press, 2010

T 6.162 Course: Information Processing in Sensor Networks [T-INFO-101466]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-INFO-100895 - Information Processing in Sensor Networks

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Exams			
ST 2022	7500011	Information Processing in Sensor Networks	Hanebeck, Pfaff
WT 22/23	7500030	Information Processing in Sensor Networks	Pfaff

T 6.163 Course: Information Service Engineering [T-WIWI-106423]

Responsible: Prof. Dr. Harald Sack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101456 - Intelligent Systems and Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2511606	Information Service Engineering	2 SWS	Lecture /	Sack
ST 2022	2511607	Exercises to Information Service Engineering	1 SWS	Practice /	Sack
Exams					
ST 2022	79AIFB_ISE_B3	Information Service Engineering (Registration until 18 July 2022)			Sack
WT 22/23	79AIFB_ISE_B2	Information Service Engineering			Sack

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 (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Below you will find excerpts from events related to this course:

V **Information Service Engineering** — **Lecture (V) Online**
2511606, SS 2022, 2 SWS, Language: English, Open in study portal

Content
- Information, Natural Language and the Web

- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques & Challenges
- Evaluation, Precision and Recall
- Regular Expressions and Automata
- Tokenization
- Language Model and N-Grams
- Part-of-Speech Tagging
- Distributional Semantics & Word Embeddings

- Knowledge Graphs

- Knowledge Representations and Ontologies
- Resource Description Framework (RDF) as simple Data Model
- Creating new Models with RDFS
- Querying RDF(S) with SPARQL
- More Expressivity via Web Ontology Language (OWL)
- From Linked Data to Knowledge Graphs
- Wikipedia, DBpedia, and Wikidata
- Knowledge Graph Programming

- Basic Machine Learning

- Machine Learning Fundamentals
- Evaluation and Generalization Problems
- Linear Regression
- Decision Trees
- Unsupervised Learning
- Neural Networks and Deep Learning

- ISE Applications

- From Data to Knowledge
- Data Mining, Information Visualization and Knowledge Discovery
- Semantic Search
- Exploratory Search
- Semantic Recommender Systems

Learning objectives:

- The students know the fundamentals and measures of information theory and are able to apply those in the context of Information Service Engineering.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students have fundamental skills of information retrieval and are enabled to conduct and to evaluate simple information retrieval tasks.
- The students apply their skills of natural language processing, Linked Data engineering, and Information Retrieval to conduct and evaluate simple knowledge mining tasks.
- The students know the fundamentals of recommender systems as well as of semantic and exploratory search.

Literature

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- A. Hogan, The Web of Data, Springer, 2020.
- G. Rebala, A. Ravi, S. Churiwala, An Introduction to Machine Learning, Springer, 2019.

T 6.164 Course: Innovation & Space [T-WIWI-112157]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

Events					
ST 2022	2500015	Innovation & Space	2 SWS	Seminar	Beyer
Exams					
ST 2022	7900239	Innovation & Space			Weissenberger-Eibl

Competence Certificate
Non exam assessment. The final grade is composed of the grade of the written paper and of the presentation.

Prerequisites
None

T 6.165 Course: Innovation Management: Concepts, Strategies and Methods [T-WIWI-102893]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2545100	Innovation Management: Concepts, Strategies and Methods	2 SWS	Lecture / 🔀	Weissenberger-Eibl
Exams					
ST 2022	7900144	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl
ST 2022	7900145	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl

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 summer semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Innovation Management: Concepts, Strategies and Methods

2545100, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application. The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particularly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addition to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of integrated knowledge.

Aim: Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

Organizational issues
Wichtig! Bitte treten Sie dem **ILIAS-Kurs zur Vorlesung** bei, damit wir Ihnen weitere Informationen mitteilen können.

Literature
Eine ausführliche Literaturliste wird mit den Vorlesungsunterlagen zur Verfügung gestellt.

Eine Einführung bei: Vahs,D./Brem,A. (2013): Innovationsmanagement. Von der Idee zur erfolgreichen Vermarktung, 4. Auflage, Stuttgart 2013.

T 6.166 Course: Innovation Processes Live [T-WIWI-110234]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO). The grade consists of an exposé (15%), a guideline interview or an analysis tool (25%), a group presentation of the results (20%) and a seminar paper (40%).

Prerequisites
None.

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

Annotation
The course will be discontinued in the winter semester 2022/23.

T 6.167 Course: Innovation Theory and Policy [T-WIWI-102840]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation and Growth
M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2560236	Innovationtheory and -policy	2 SWS	Lecture / 🗣	Ott
ST 2022	2560237		1 SWS	Practice / 🗣	Ott, Mirzoyan
Exams					
ST 2022	7900107	Innovationtheory and -Policy			Ott
WT 22/23	7900077	Innovationtheory and -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 [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Below you will find excerpts from events related to this course:

V Innovationtheory and -policy

2560236, SS 2022, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives:

Students shall be given the ability to

- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- understand the relationships between market structure and the development of innovation
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Course content:

The course covers the following topics:

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Exam description:

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Literature
Auszug:

- Aghion, P., Howitt, P. (2009), The Economics of Growth, MIT Press, Cambridge MA.
- de la Fuente, A. (2000), Mathematical Methods and Models for Economists. Cambridge University Press, Cambridge, UK.
- Klodt, H. (1995), Grundlagen der Forschungs- und Technologiepolitik. Vahlen, München.
- Linde, R. (2000), Allokation, Wettbewerb, Verteilung - Theorie, UNIBUCH Verlag, Lüneburg.
- Ruttan, V. W. (2001), Technology, Growth, and Development. Oxford University Press, Oxford.
- Scotchmer, S. (2004), Incentives and Innovation, MIT Press.
- Tirole, Jean (1988), The Theory of Industrial Organization, MIT Press, Cambridge MA.

T 6.168 Course: Innovative Concepts for Programming Industrial Robots [T-INFO-101328]

Responsible: Prof. Dr.-Ing. Björn Hein
Organisation: KIT Department of Informatics
Part of: M-INFO-100791 - Innovative Concepts for Programming Industrial Robots

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

T 6.169 Course: Integrated Network and Systems Management [T-INFO-101284]

Responsible: Prof. Dr. Bernhard Neumair
Organisation: KIT Department of Informatics
Part of: M-INFO-100747 - Integrated Network and Systems Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2400004	Integrated Network and Systems Management	2 SWS	Lecture / 🗣	Neumair
Exams					
ST 2022	7500144	Integrated Network and Systems Management			Neumair

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

T 6.170 Course: Intelligent Agent Architectures [T-WIWI-111267]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104814 - Information Systems: Analytical and Interactive Systems
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Exams			
ST 2022	7900069	Intelligent Agent Architectures (Nachklausur WS 2021/2022)	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 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.

Prerequisites
None

Recommendation
It is recommended to additionally review the Bachelor-level lecture "Customer Relationship Management" from the module "CRM and Servicemanagement".

T 6.171 Course: Intelligent Agents and Decision Theory [T-WIWI-110915]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104814 - Information Systems: Analytical and Interactive Systems
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540537	Intelligent Agents and Decision Theory	2 SWS	Lecture	Geyer-Schulz
ST 2022	2540538	Übung zu Intelligent Agents and Decision Theory	1 SWS	Practice	Schweizer
Exams					
ST 2022	7900306	Intelligent Agents and Decision Theory			Geyer-Schulz

Competence Certificate
Oral (30 minutes) or written examination (60 minutes). The exam is held in each semester and can be repeated at any regular examination date.Details of the grading system and any exam bonus that may be achieved from the practice are announced in the course.

Prerequisites
None

Recommendation
We assume knowledge in statistics, operations research and microeconomics as taught in the Bachelor program (VWL I, Operations Research I + II, Statistics I + II) and a familiarity with preferably the Python programming language.

Annotation
new lecture starting summer semester 2020

Below you will find excerpts from events related to this course:

V Intelligent Agents and Decision Theory

2540537, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The key assumption of this lecture is that the concept of artificial intelligence is inseparably linked to the economic concept of rationality of agents. We consider different classes of decision problems - decisions under certainty, risk and uncertainty - from an economic, managerial and AI-engineering perspective:

From an economic point of view, we analyze how to act rationally in these situations based on classic utility theory. In this regard, the course also introduces the relevant parts of decision theory for dealing with

- multiple conflicting objectives,
- incomplete, risky and uncertain information about the world,
- assessing utility functions, and
- quantifying the value of information ...

From an engineering perspective, we discuss how to develop practical solutions for these decision problems, using appropriate AI components. We introduce

- a general, agent-based design framework for AI systems,

as well as AI methods from the fields of

- search (for decisions under certainty),
- inference (for decions under risk) and
- learning (for decisions under uncertainty).

Where applicable, the course highlights the theoretical ties of these methods with decision theory.

We conclude with a discussion of ethical and philosophical issues concerning the development and use of AI.

Learning objectives

Students are able to design, analyze, implement, and evaluate intelligent agents.

Lecture Outline

1. Introduction: Artificial intelligence and the economic concept of rationality
2. Intelligent Agents: A general, agent-based design framework for AI systems
3. Decision under certainty: Assessing utility functions for decisions with multiple objectives
4. Search: Linear programming for decisions under certainty
5. Decisions under risk: The expected utility principle
6. Information systems: Improving economic decisions under risk
7. Inference: Bayesian networks for decisions under risk
8. Information Learning objectives value: When should an agent gather new information?
9. Decisions under uncertainty: Complete lack of information
10. Learning: Statistical learning of bayesian networks
11. Learning: Supervised learning with neural networks
12. Learning: Reinforcement learning
13. Learning: Preference-based reinforcement learning
14. Discussion: Ethical and philosophical issues

Note: This rough outline may be subject to change.

Literature
Basic literature (by lecture):

1. Russell & Norvig (2016, chapter 1), Bamberg et al. (2019, chapters 1 & 2)
2. Russell & Norvig (2016, chapter 2)
3. Keeney & Raiffa (1993, chapter 3)
4. Nickel et al. (2014, chapter 1) [German], Russell & Norvig (2016, chapter 3)
5. Bamberg et al. (2019, chapter 4), Fishburn (1988)
6. Bamberg et al. (2019, chapter 6)
7. Russell & Norvig (2016, chapters 13, 14, 16)
8. Russell & Norvig (2016, chapter 16), Bamberg et al. (2019, chapter 6)
9. Bamberg et al. (2019, chapter 5)
10. Russell & Norvig (2016, chapter 20)
11. Goodfellow et al. (2016, chapter 6)
12. Sutton & Barto (2018, chapter 3)
13. Wirth et al. (2017)
14. Russell & Norvig (2016, chapter 26)

Detailed references:

Bamberg, Coenenberg & Krapp (2019). Betriebswirtschaftliche Entscheidungslehre (16th ed.). Verlag Franz Vahlen GmbH.

Fishburn (1988). Nonlinear preference and utility theory. Baltimore: Johns Hopkins University Press.

Goodfellow, Bengio & Courville (2016). Deep learning. Cambridge: MIT press.

Keeney & Raiffa (1993). Decisions with multiple objectives: preferences and value trade-offs. Cambridge University Press.

Nickel, S., Stein, O., & Waldmann, K.-H. (2014). Operations Research (2nd ed.). Springer Berlin Heidelberg.

Russell & Norvig (2016). Artificial Intelligence: A Modern Approach (3rd Global Edition). Pearson.

Sutton & Barto (2018). Reinforcement learning: An introduction. Cambridge: MIT press.

Wirth, Akrour, Neumann & Fürnkranz (2017). A Survey of Preference-Based Reinforcement Learning Methods. Journal of Machine Learning Research, 18(1), 1–46.

T 6.172 Course: Interactive Computer Graphics [T-INFO-101269]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-100732 - Interactive Computer Graphics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	24679	Interaktive Computergrafik	2 SWS	Lecture / 🗣	Dachsbacher, Schudeiske
Exams					
ST 2022	7500123	Interactive Computer Graphics			Dachsbacher

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

T 6.173 Course: International Business Development and Sales [T-WIWI-110985]

Responsible: Erice Casenave
Prof. Dr. Martin Klarmann
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	see Annotations	1

Events					
WT 22/23	2572189	International Business Development and Sales	4 SWS	Block / 🗣	Klarmann, Terzidis, Schmitt

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

Competence Certificate
Non exam assessment. The grade is based on the presentation, the subsequent discussion and the written elaboration.

Annotation
Please note that currently it cannot be guaranteed that the course will take place in the winter term 22/23 . Please contact the Marketing and Sales Research Group for further information.

Below you will find excerpts from events related to this course:

V International Business Development and Sales

2572189, WS 22/23, 4 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content
This course is offered as part of the EUCOR programme in cooperation with EM Strasbourg. Max. 10 students of KIT and max. 10 students of EM Strasbourg will develop a sales presentation in tandems (teams of 2). This is based on the value proposition of a business model.

- An application is required to participate in this event. The application phase usually takes place at the beginning of the lecture period. Further information on the application process can be found on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the start of the lecture period.

Total workload for 6 ECTS: about 180 hours.

T 6.174 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Events					
ST 2022	2530570	International Finance	2 SWS	Lecture / 🗣	Walter, Uhrig-Homburg
Exams					
ST 2022	7900097	International Finance			Uhrig-Homburg
WT 22/23	7900052	International Finance			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 (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
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 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Die Veranstaltung wird als Blockveranstaltung angeboten, nach dem Kickoff am 27.04. 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 6.175 Course: Internet Law [T-INFO-101307]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	24354	Internet Law	2 SWS	Lecture /	Dreier
Exams					
ST 2022	7500057	Internet Law			Dreier, Matz

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.176 Course: Internet of Everything [T-INFO-101337]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-100800 - Internet of Everything
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	24104	Internet of Everything	2 SWS	Lecture / 🗣	Zitterbart, Mahrt, Neumeister
Exams					
ST 2022	7500071	Internet of Everything			Zitterbart
WT 22/23	7500009	Internet of Everything			Zitterbart

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

T 6.177 Course: Introduction to Bayesian Statistics for Analyzing Data [T-WIWI-110918]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Competence Certificate
Grades will be based on active participation (50%) and homework assignments (50%).

Prerequisites
Participants should already have a basic knowledge of R and standard frequentist statistical tests. Please bring your own Laptop with you as we will be using R for several hands-on examples and exercises during the class. We will mainly work with the book “Statistical Rethinking. A Bayesian Course with Examples in R and Stan” by Richard McElrath. Students are advised to obtain the book before the class starts.

Annotation
Due to its interactive nature, the number of participants will be limited.

T 6.178 Course: Introduction to Bioinformatics for Computer Scientists [T-INFO-101286]

Responsible: Prof. Dr. Alexandros Stamatakis
Organisation: KIT Department of Informatics
Part of: M-INFO-100749 - Introduction to Bioinformatics for Computer Scientists

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2400055	Introduction to Bioinformatics for Computer Scientists	2 SWS	Lecture / 🗣	Stamatakis
Exams					
WT 22/23	7500057	Introduction to Bioinformatics for Computer Scientists			Stamatakis

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

Recommendation
Grundlegende Kenntnisse in den Bereichen der theoretischen Informatik (Algorithmen, Datenstrukturen) und der technischen Informatik (sequentielle Optimierung in C oder C++, Rechnerarchitekturen, parallele Programmierung, Vektorprozessoren) werden vorausgesetzt.

T 6.179 Course: Introduction to Hybrid Quantum Machine Learning Algorithms [T-INFO-112571]

Responsible: Dr. Max Fischer
Dr. Eileen Kühn
Organisation: KIT Department of Informatics
Part of: M-INFO-106189 - Introduction to Hybrid Quantum Machine Learning Algorithms

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2400171	Introduction to hybrid Quantum Machine Learning algorithms	2 SWS	Lecture / 🗣	Kühn, Fischer

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

T 6.180 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2550470	Introduction to Stochastic Optimization	2 SWS	Lecture /	Rebennack
ST 2022	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice /	Rebennack, Sinske
ST 2022	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	2 SWS	Others (sons	Rebennack, Sinske
Exams					
ST 2022	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.

T 6.181 Course: Introduction to Video Analysis [T-INFO-101273]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: M-INFO-100736 - Introduction to Video Analysis

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24684	Introduction to Video Analysis	2 SWS	Lecture / 🗣	Arens
Exams					
ST 2022	7500031	Introduction to Video Analysis			Beyerer, Arens
WT 22/23	7500099	Introduction to Video Analysis			Beyerer, Arens

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.182 Course: IT-Security Management for Networked Systems [T-INFO-101323]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-100786 - IT-Security Management for Networked Systems
M-WIWI-101458 - Ubiquitous Computing
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	24149	IT-Security Management for Networked Systems	3 SWS	Lecture / Practice (/ 🗣	Hartenstein, Grundmann, Westermeyer
Exams					
ST 2022	7500337	IT-Security Management for Networked Systems			Hartenstein
ST 2022	7500599	IT-Security Management for Networked Systems			Hartenstein
WT 22/23	7500599	IT-Security Management for Networked Systems			Hartenstein

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.183 Course: Joint Entrepreneurship Summer School [T-WIWI-109064]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Irregular	1

Events					
ST 2022	2545021	Joint Entrepreneurship School	4 SWS	Seminar /	Kleinn, Terzidis
Exams					
ST 2022	7900346	Joint Entrepreneurship Summer School			Terzidis

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The learning control of the program (Summer School) consists of two parts:
A) **Investor Pitch**:
Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.

B) **Written elaboration:**
The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyzes and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.

The grade consists of 50% presentation performance and 50% written preparation.

Prerequisites
The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

Recommendation
We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

Annotation
The working language during the Summer School is English. A one-week stay in China is part of the Summer School.

Below you will find excerpts from events related to this course:

V Joint Entrepreneurship School

2545021, SS 2022, 4 SWS, Language: English, Open in study portal

Seminar (S)
Online

Content
During the Summer School in Shanghai and Karlsruhe, students develop a business model of technologies and patents developed at KIT in workshops in German-Chinese tandems over the period of two weeks.

https://etm.entechnon.kit.edu/english/1095.php

Organizational issues
Vorbereitungstermine: tba

JES: 11.07-15.07.2022

T 6.184 Course: Judgement and Decision Making [T-WIWI-111099]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each winter term	1 terms	1

Events					
WT 22/23	2540440	Judgment and Decision Making	3 SWS	Lecture /	Scheibehenne, Seidler
Exams					
ST 2022	7900044	Judgement and Decision Making			Scheibehenne

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam (90min) at the end of the Semester

Annotation
The judgments and decisions that we make can have long ranging and important consequences for our (financial) well-being and individual health. Hence, the goal of this lecture is to gain a better understanding of how people make judgments and decisions and the factors that influences their behavior. We will look into simple heuristics and mental shortcuts that decision makers use to navigate their environment, in particular so in an economic context. Following this the lecture will provide an overview into social and emotional influences on decision making. In the second half of the semester we will look into some more specific topics including self-control, nudging, and food choice. The last part of the lecture will focus on risk communication and risk perception. We will address these questions from an interdisciplinary perspective at the intersection of Psychology, Behavioral Economics, Marketing, Cognitive Science, and Biology. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates.

The workload of the class is 4.5 ECTS. This consists of 3 ETCS for the lecture and 1.5 ETCS for the Übung. Details about the Übung will be communicated at the first day of the class.

Below you will find excerpts from events related to this course:

V Judgment and Decision Making

2540440, WS 22/23, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this lecture, students will be introduced to fundamental theories and key insights on human judgment and decision making. Topics include decision making under uncertainty, choice biases, simple heuristics, risk perception and -communication, as well as social and emotional influences on decision making, to name but a few. In the Wintersemester 20/21 this class will be held online. The lecture videos will be available for download and there will be regular online meetings to discuss the topics. The lecture will be held in English.

T 6.185 Course: KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics [T-WIWI-111109]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103118 - Data Science: Data-Driven User Modeling
M-WIWI-104080 - Designing Interactive Information Systems
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Exams			
ST 2022	7900368	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	Weinhardt

Competence Certificate
Non exam assessment. Grading will be based on a continuous basis throughout the semester. The assessment consists of:

- A written paper, and
- a group presentation with subsequent discussion and question and answer session of 30 minutes.

For particularly active and constructive participation in the discussions of other papers during the final presentation, a bonus of one grade level (0.3 or 0.4) can be achieved on the passed exam. Details on the grading will be announced at the beginning of the event.

Annotation
Due to the laboratory capacity and in order to ensure an optimal supervision of the project groups, the number of participants is limited. Places are allocated according to preferences and suitability for the topics. In particular, previous knowledge in the field of experimental economics plays a role.
The course will be offered starting in the summer semester 2021.

T 6.186 Course: Knowledge Discovery [T-WIWI-102666]

Responsible: Dr.-Ing. Michael Färber
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-105366 - Artificial Intelligence
M-WIWI-105368 - Web and Data Science

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2511302	Knowledge Discovery	2 SWS	Lecture / 🗣	Färber
WT 22/23	2511303	Exercises to Knowledge Discovery	1 SWS	Practice / 🗣	Färber, Saier, Shao, Popovic
Exams					
ST 2022	79AIFB_KD_C3	Knowledge Discovery (Registration until 18 July 2022)			Färber
WT 22/23	79AIFB_KD_B3	Knowledge Discovery			Färber

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

Competence Certificate
The assessment is a written exam (60 minutes).

1. Successful participation in the exercises can earn a grade bonus in two ways:
   By handing in the answers to an exercise sheet and reaching or exceeding 80% correct answers.
2. By handing in the results of an implementation task related to machine learning, which reaches or exceeds a given evaluation value.

If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Knowledge Discovery

2511302, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture gives an overview of approaches of machine learning and data mining for knowledge acquisition from large data sets. These are examined especially with respect to algorithms, applicability to different data representations and the use in real application scenarios.
Knowledge Discovery is an established research area with a large community that investigates methods for discovering patterns and regularities in large amounts of data, including unstructured text. A variety of methods exist to extract patterns and provide previously unknown insights. This information can be predictive or descriptive.
The lecture gives an overview of Knowledge Discovery. Specific techniques and methods, challenges and current and future research topics in this research area will be taught.
Contents of the lecture cover the entire machine learning and data mining process with topics on supervised and unsupervised learning and empirical evaluation. Covered learning methods range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

Learning obectives:

Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

V Exercises to Knowledge Discovery

Practice (Ü)
On-Site

2511303, WS 22/23, 1 SWS, Language: English, Open in study portal

Content
The exercises are based on the lecture Knowledge Discovery. Several exercises are covered, which take up and discuss in detail the topics covered in the lecture Knowledge Discovery. Practical examples are demonstrated to the students to enable a knowledge transfer of the theoretical aspects learned into practical application.
Contents of the lecture cover the entire machine learning and data mining process with topics on monitored and unsupervised learning processes and empirical evaluation. The learning methods covered range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

Learning objectives:

Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

T 6.187 Course: Lab Course Heterogeneous Computing [T-INFO-108447]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: M-INFO-104072 - Lab Course Heterogeneous Computing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each summer term	1

T 6.188 Course: Lab Project: Speech Translation [T-INFO-112175]

Responsible: Prof. Dr. Jan Niehues
Organisation: KIT Department of Informatics
Part of: M-INFO-105997 - Lab Project: Speech Translation

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	1

Events					
WT 22/23	2400150	Praktikum Speech Translation	4 SWS	Practical course / 🗣	Niehues

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

T 6.189 Course: Lab: Efficient Parallel C++ [T-INFO-106992]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-103506 - Lab: Efficient Parallel C++

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Irregular	1

Events					
WT 22/23	2400121	Efficient parallel C++	4 SWS	Practical course /	Sanders, Witt, Schimek, Williams

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.190 Course: Lab: Graph Visualization in Practice [T-INFO-106580]

Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-103302 - Lab: Graph Visualization in Practice

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Irregular	1

T 6.191 Course: Lab: Internet of Things (IoT) [T-INFO-107493]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-103706 - Lab: Internet of Things (IoT)

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

Events					
ST 2022	2424304	Internet of Things (IoT) Lab	4 SWS	Practical course / 🗣	Alan, Henkel, Balaskas, Siddhu
WT 22/23	2424304	Internet of Things (IoT) Lab	4 SWS	Practical course	Henkel, Siddhu, Balaskas
Exams					
ST 2022	7500187	Lab: Internet of Things (IoT)			Henkel

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

Below you will find excerpts from events related to this course:

V Internet of Things (IoT) Lab

2424304, SS 2022, 4 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
Welcome to the Internet of Things (IoT) world, where millions of connected devices are now involved almost in our everyday life, including our homes, offices, transportation, and our healthcare, from home appliances, vehicles, smartphones to wearable devices like smartwatches. IoT is growing very fast and spreads very quickly.

Overview: This lab aims at providing the student with the practical concept of IoT systems design.

- It provides an overview of the IoT systems' aspects including embedded intelligence, connectivity, interaction with the physical world, etc.
- It covers the main design and implementation issues for IoT devices and their applications. These issues challenge the students to tailor smart techniques to optimize the embedded software on IoT devices to meet the constrained resources.
- The students gain in-depth practical experiences in embedded system design with a focus on IoT applications as well as communication in connected devices.

Lab's Goals:

- The students will understand the main concept of IoT systems including the design objectives, application domains, and their requirements, design challenges, etc.
- The students will gain the ability to develop software programs for the IoT embedded devices, implement the code on the hardware, conduct the tests, find the bugs and errors, and debug the software code on the hardware.
- The students shall be able to implement and apply the concepts that are critical in the IoT domain, e.g. low power design, security, etc.
- The students will be able to develop, integrate and evaluate a small IoT system with its main components: sensors to get data from the physical world, the embedded processor for control the device and process the data, wireless radio to transmit the data from the device to the Internet, storage (on the Internet or on a Smart Phone) to keep the data for further analysis.

Target Audience:

- This lab is also suitable for electrical engineering students and those who have an interest in embedded systems design.

Prerequisites:

- The ability to develop software programs in C or C++ is recommended.
- Basic knowledge about other programming languages can be helpful (e.g., Java or Python)

Details:

- The lab manuals and exercises are available in English.
- The lab is split into weekly sessions throughout the semester. Each session is approximate ~4hours per week. At the end of the semester, there would be a final project.
- The state-of-the-art low-power IoT boards and the corresponding development software, are used in the lab. Currently, Texas Instrument (TI) CC1350 microcontroller, and the latest version of Code Composer Studio is the base platform.
- The exercises in the lab are based on the TI repository. But for the final projects, the students have the flexibility to design their desired systems.

V **Internet of Things (IoT) Lab** **Practical course (P)**
2424304, WS 22/23, 4 SWS, Language: English, Open in study portal

Content
Welcome to the Internet of Things (IoT) world, where millions of connected devices are now involved almost in our everyday life, including our homes, offices, transportation, and our healthcare, from home appliances, vehicles, smartphones to wearable devices like smartwatches. IoT is growing very fast and spreads very quickly.

Overview: This lab aims at providing the student with the practical concept of IoT systems design.

- It provides an overview of the IoT systems' aspects including embedded intelligence, connectivity, interaction with the physical world, etc.
- It covers the main design and implementation issues for IoT devices and their applications. These issues challenge the students to tailor smart techniques to optimize the embedded software on IoT devices to meet the constrained resources.
- The students gain in-depth practical experiences in embedded system design with a focus on IoT applications as well as communication in connected devices.

Lab's Goals:

- The students will understand the main concept of IoT systems including the design objectives, application domains, and their requirements, design challenges, etc.
- The students will gain the ability to develop software programs for the IoT embedded devices, implement the code on the hardware, conduct the tests, find the bugs and errors, and debug the software code on the hardware.
- The students shall be able to implement and apply the concepts that are critical in the IoT domain, e.g. low power design, security, etc.
- The students will be able to develop, integrate and evaluate a small IoT system with its main components: sensors to get data from the physical world, the embedded processor for control the device and process the data, wireless radio to transmit the data from the device to the Internet, storage (on the Internet or on a Smart Phone) to keep the data for further analysis.

Target Audience:

- This lab is also suitable for electrical engineering students and those who have an interest in embedded systems design.

Prerequisites:

- The ability to develop software programs in C or C++ is recommended.
- Basic knowledge about other programming languages can be helpful (e.g., Java or Python)

Details:

- The lab manuals and exercises are available in English.
- The lab is split into weekly sessions throughout the semester. Each session is approximately 3-4 hours per week. At the end of the semester, there would be a final project.
- The state-of-the-art low-power IoT boards and the corresponding development software, are used in the lab. Currently, Texas Instrument (TI) CC1350 microcontroller, and the latest version of Code Composer Studio is the base platform.
- The exercises in the lab are based on the TI repository. But for the final projects, the students have the flexibility to design their desired systems.

T 6.192 Course: Lab: Low Power Design and Embedded Systems [T-INFO-108323]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-104031 - Lab: Low Power Design and Embedded Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
ST 2022	2424811	Low Power Design and Embedded Systems	3 SWS	Practical course /	Gonzalez, Khdr, Henkel
WT 22/23	2424120	Low Power Design and Embedded Systems	3 SWS	Practical course	Gonzalez, Khdr, Henkel
Exams					
ST 2022	7500158	Lab: Low Power Design and Embedded Systems			Henkel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V Low Power Design and Embedded Systems

2424811, SS 2022, 3 SWS, Language: English, Open in study portal

Practical course (P)
Online

Content
Lab Description

Nowadays, power and energy consumption are two of the most important criteria in the design of on-chip applications. Other design constraints, such as performance, were dominant in the past, but now it is imperative to optimize for low power, since on-chip temperature and battery life are limiting design factors on modern multi / many core systems.
This lab explores different software and hardware approaches for power and energy reduction on modern embedded systems, considering other relevant metrics and constraints (eg, temperature, performance, chip area).

First part: software effects on power and performance

The first part of the lab consists of an exploration and analysis of the effect of different resource management techniques on a many-core platform, to optimize for a specific metric (e.g. energy, power, temperature) under predefined application constraints (e.g. performance).

Second part: hardware / software co-design

The second part of the lab consists of a Hardware / Software Co-design exploration using the High-Level Synthesis (HLS) technique. This technique takes a C code implementation and produces three types of system implementation: a complete hardware (RTL) implementation, a pure software implementation to be executed in a MIPS soft-processor, and a hybrid implementation where one or more functions of a program are compiled to hardware accelerators with the remaining program segments running in software in a MIPS soft processor.

Third Part: Demo in Thermal Lab

As part of the course, there will be access to the CES thermal lab, in which an experiment will be carried out to analyze the effect of power and temperature on a real board setup, using a thermal camera.

Preliminary discussion appointment: it will be announced via email to all registrants.
Note: The lab is given as a full week block.

V Low Power Design and Embedded Systems

2424120, WS 22/23, 3 SWS, Language: English, Open in study portal

Practical course (P)

Content
Nowadays, power and energy consumption are two of the most important criterions in the design of on-chip applications. Other design constraints, such as performance, were dominant in the past, but now it is imperative to optimize for low power, since on-chip temperature and battery life are limiting design factors on modern multi/many core systems.
This lab explores different software and hardware approaches for power and energy reduction on modern embedded systems, considering other relevant metrics and constraints (e.g., temperature, performance, chip area).

The first part of the lab consists of an exploration and analysis of the effect of different resource management techniques on a many-core platform, to optimize for a specific metric (e.g. energy, power, temperature) under predefined application constraints (e.g. performance).

The second part of the lab consists of a Hardware/Software Co-design exploration using the High-Level Synthesis (HLS) technique. This technique takes a C code implementation and produces three types of system implementation: a complete hardware (RTL) implementation, a pure software implementation to be executed in a MIPS soft-processor, and a hybrid implementation where one or more functions of a program are compiled to hardware accelerators with the remaining program segments running in software in a MIPS soft-processor.

As part of the course, there will be access to the CES thermal lab, in which an experiment will be carried out to analyse the effect of power and temperature on a real board setup, using a thermal camera.

T 6.193 Course: Laboratory Course Algorithm Engineering [T-INFO-104374]

Responsible: Prof. Dr. Peter Sanders
Dr. rer. nat. Torsten Ueckerdt
Prof. Dr. Dorothea Wagner

Organisation: KIT Department of Informatics

Part of: M-INFO-102072 - Laboratory Course Algorithm Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Irregular	1

Events					
WT 22/23	2424305	Practical Course in Algorithm Design	4 SWS	Practical course / 🗣	Wagner, Zeitz, Sauer, Ueckerdt, Feilhauer

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

Below you will find excerpts from events related to this course:

V Practical Course in Algorithm Design

2424305, WS 22/23, 4 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
In the practical course *Algorithm Engineering* the students are given miscallaneous questions from algorithmics, which they have to implement independently in small working groups. The main focus lies on object oriented programming with Java or C++. Linear programming may also occur.

Prerequisites: Knowledge of the lecture Algorithms II is recommended.

Learning Goals:
The purpose of the practical course in algorithm design is to make learned knowledge work. The students are given varying topics from algorithmics, which they have to implement in small working groups. Possible Topics are, for exmaple, algorithms for flow problems, shortest path problems, or clustering techniques. In this way students learn to write efficient code.

Workload: Praktikum mit 4SWS, 6 LP
6 LP entspricht ca. 180 Arbeitsstunden

T 6.194 Course: Laboratory in Cryptoanalysis [T-INFO-102990]

Responsible: Prof. Dr. Dennis Hofheinz
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-101559 - Laboratory in Cryptoanalysis

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	24881	Laboratory: Cryptanalysis	4 SWS	Practical course / 🗣	Müller-Quade, Geiselmann
Exams					
ST 2022	7500111	Laboratory in Cryptanalysis			Geiselmann, Müller-Quade

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

T 6.195 Course: Laboratory in Cryptography [T-INFO-102989]

Responsible: Prof. Dr. Dennis Hofheinz
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-101558 - Laboratory in Cryptography

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24301	Laboratory Cryptography and Security	4 SWS	Practical course /	Müller-Quade, Geiselmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V Laboratory Cryptography and Security

24301, WS 22/23, 4 SWS, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab covers different areas of computer security and cryptography. The topics are presented theoretically and are implemented afterwards. Covered topics are:

- Historical encryption
- EC-card PINs
- Block ciphers
- Efficient long number arithmetic
- ElGamal encryption / signature

T 6.196 Course: Laboratory in Security [T-INFO-102991]

Responsible: Prof. Dr. Dennis Hofheinz
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-101560 - Laboratory in Security

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

Events					
WT 22/23	2512557	Practical Course Security (Master)	4 SWS	Practical course /	Baumgart, Volkamer, Mayer, Wressnegger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V Practical Course Security (Master)

2512557, WS 22/23, 4 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content

The lab deals with the IT security of everyday utensils. Implemented security mechanisms are first theoretically investigated and put to the test with practical attacks. Finally, countermeasures and suggestions for improvement are worked out. The lab is offered within the competence center for applied security technologies (KASTEL) and is supervised by several institutes.

The success control takes the form of a final presentation, a thesis and the handing over of the developed code.

More information on ILIAS.

T 6.197 Course: Large-scale Optimization [T-WIWI-106549]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2550475	Large-Scale Optimization	2 SWS	Lecture /	Rebennack
ST 2022	2550476	Übung zu Large-Scale Optimization	1 SWS	Practice /	Rebennack, Sinske
ST 2022	2550477	Rechnerübung zu Large-scale Optimization	2 SWS	Others (sons	Rebennack, Sinske
Exams					
ST 2022	7900310	Large-scale 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.

T 6.198 Course: Liberalised Power Markets [T-WIWI-107043]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2581998	Liberalised Power Markets	2 SWS	Lecture / 🗣	Fichtner, Kraft
Exams					
ST 2022	7900253	Liberalised Power Markets			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

Recommendation
None

Below you will find excerpts from events related to this course:

V **Liberalised Power Markets** — **Lecture (V) On-Site**
2581998, WS 22/23, 2 SWS, Language: English, Open in study portal

Content

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.1. Unbundling Dimensions of liberalised power markets
2.2. Central dispatch versus markets without central dispatch
2.3. The short-term market model
2.4. The long-term market model
2.5. Market flaws and market failure
2.6. Regulation in liberalised markets

3. The power (sub)markets

3.1 Day-ahead market
3.2 Intraday market
3.3 (Long-term) Forwards and futures markets
3.4 Emission rights market
3.5 Market for ancillary services
3.6 The “market” for renewable energies
3.7 Future market segments

4. Grid operation and congestion management

4.1. Grid operation
4.2. Congestion management

5. Market power

5.1. Defining market power
5.2. Indicators of market power
5.3. Reducing market power

6. Future market structures in the electricity value chain

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.2. Unbundling Dimensions of liberalised power markets
2.3. Central dispatch versus markets without central dispatch
2.4. The short-term market model
2.5. The long-term market model
2.6. Market flaws and market failure
2.7. Regulation in liberalised markets

3. The power (sub)markets

3.1 Day-ahead market
3.2 Intraday market
3.3 (Long-term) Forwards and futures markets
3.4 Emission rights market
3.5 Market for ancillary services
3.6 The “market” for renewable energies
3.7 Future market segments

4. Grid operation and congestion management

4.1. Grid operation
4.2. Congestion management

5. Market power

5.1. Defining market power
5.2. Indicators of market power
5.3. Reducing market power

6. Future market structures in the electricity value chain

Literature
Weiterführende Literatur:

Power System Economics; Steven Stoft, IEEE Press/Wiley-Interscience Press, 0-471-15040-1

T 6.199 Course: Life Cycle Assessment and Global Forecasts [T-WIWI-112155]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2581995	Life Cycle Assessment and Global Forecasts	2 SWS	Lecture / 🗣	Stengel

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. 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.

Recommendation
None

Below you will find excerpts from events related to this course:

V Life Cycle Assessment and Global Forecasts

2581995, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture will focus on the analysis of environmental impacts of products using life cycle assessment (short: LCA). Structure and individual steps of life cycle assessment will be taught in detail and further developments will be pointed out. Forecasts of global developments using means of integrated assessment modelling and system dynamics will be addressed to put potential environmental impacts into global perspective.

Topics:

- Attributional LCA
- Life cycle sustainability assessment, social LCA and life cycle costing
- Consequential LCA
- Dynamic LCA
- System dynamics
- Integrated assessment modelling in the context of climate change

Literature
werden in der Veranstaltung bekannt gegeben

T 6.200 Course: Localization of Mobile Agents [T-INFO-101377]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-INFO-100840 - Localization of Mobile Agents

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	24613	Localization of Mobile Agents	3 SWS	Lecture / 🗣	Zea Cobo, Li
Exams					
ST 2022	7500004	Localization of Mobile Agents			Zea Cobo, Noack
WT 22/23	7500020	Localization of Mobile Agents			Zea Cobo

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

Below you will find excerpts from events related to this course:

V Localization of Mobile Agents

24613, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This module provides a systematic introduction into the topic of localization methods. In order to facilitate understanding, the module is divided into four main topics. Dead reckoning treats the instantaneous determination of a vehicle's position based on dynamic parameters like velocity or steering angle. Localization with the help of measurements of known landmarks is part of static localization. In addition to the closed-form solutions for particular measurements (distances and angles), the least squares method for fusion arbitrary measurements is also introduced. Dynamic localization treats the combination of dead reckoning and static localization. The central part of the lecture is the derivation of the Kalman filter, which has been successfully applied in several practical applications. Finally, simultaneous localization and mapping (SLAM) is introduced, which allows localization in case of (partly) unknown landmark positions.

Organizational issues
Prüfungsterminvorschläge und das Verfahren dazu sind auf der Webseite der Vorlesung zu finden.

Literature
Grundlegende Kenntnisse der linearen Algebra und Stochastik sind hilfreich.

T 6.201 Course: Low Power Design [T-INFO-101344]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-100807 - Low Power Design

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2424672	Low Power Design	2 SWS	Lecture / 🗣	Henkel, Rapp
Exams					
ST 2022	7500200	VL: Low Power Design			Henkel

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Low Power Design

2424672, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

Smart embedded devices driven by advances in fields as diverse as automotive smart home, to high-tech like lithography or battery technology for IoT devices are now omnipresent in our lives. Today's consumers have very high expectations from the embedded devices they own. Many emerging technologies such as virtual reality, robotics and artificial intelligence are limited in scope only by the performance of the underlying embedded devices. Unfortunately, performance of embedded devices is inherently constrained both by their limited cost, size as well as heat dissipating capacity and their limited on-board battery. The fact that all contemporary smartphones have multi-core chips running at low frequencies instead of single-core chips running at high frequencies can be attributed directly to the power consumption constraints imposed on them.

The constraints mandate highly optimized hardware-software co-design techniques for embedded devices that allows extraction of maximum performance with minimal power consumption. A good low power design requires all three building blocks of an embedded device – hardware, software and operating system – to work together synergistically. The lectures cover all the three aspects alongside their interactions from a low power design perspective in depth.

The lecture provides an overview of design methods, synthesis tools, estimation models, software techniques, operating system strategies, scheduling algorithms, etc., with the aim of minimizing the power consumption of embedded devices without compromising their performance. Both the research-relevant and industry-prevalent topics at different level of abstractions (from circuit to system) are discussed in this lecture.

Recommendations: Module "Entwurf und Architekturen für eingebettete Systeme". Basic knowledge from the module "Optimierung und Synthese Eingebetteter Systeme" is helpful but not essential for understanding of this lecture. The lecture is equally suitable for students from both computer science as well as electrical engineering department.

Students are made aware of various low power design optimizations employed in state-of-the-art embedded devices. At the end of the lecture, the students will be able to recognize the challenges involved in crafting efficient low power designs and how to tackle them.

T 6.202 Course: Machine Learning - Foundations and Algorithms [T-INFO-111558]

Responsible: Prof. Dr. Gerhard Neumann
Organisation: KIT Department of Informatics
Part of: M-INFO-105778 - Machine Learning - Foundations and Algorithms

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Exams			
ST 2022	7500215	Machine Learning - Foundations and Algorithms	Neumann
WT 22/23	7500292	Machine Learning - Foundations and Algorithms	Neumann

T 6.203 Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103356 - Machine Learning

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 22/23	2511500	Machine Learning 1 - Fundamental Methods	2 SWS	Lecture / 🗣	Zöllner
WT 22/23	2511501	Exercises to Machine Learning 1 - Fundamental Methods	1 SWS	Practice / 🗣	Zöllner, Polley, Fechner, Daaboul
Exams					
ST 2022	79AIFB_ML1_C4	Machine Learning 1 - Basic Methods (Registration until 18 July 2022)			Zöllner
WT 22/23	79AIFB_ML1_C6	Machine Learning 1 - Basic Methods			Zöllner

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 every semester and can be repeated at every regular examination date.

A grade bonus can be earned by successfully completing practice exercises. If the grade of the written exam 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.

Below you will find excerpts from events related to this course:

V Machine Learning 1 - Fundamental Methods

2511500, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

Learning obectives:

- Students acquire knowledge of the fundamental methods in the field of machine learning.
- Students can classify, formally describe and evaluate methods of machine learning.
- Students can use their knowledge to select suitable models and methods for selected problems in the field of of machine learning.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 6.204 Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101637 - Analytics and Statistics
M-WIWI-103356 - Machine Learning

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2511502	Machine Learning 2 - Advanced methods	2 SWS	Lecture / 🗣	Zöllner
ST 2022	2511503	Exercises for Machine Learning 2 - Advanced Methods	1 SWS	Practice / 🗣	Zöllner
Exams					
ST 2022	79AIFB_ML2_B1	Machine Learning 2 – Advanced Methods (Registration until 18 July 2022)			Zöllner
WT 22/23	79AIFB_ML2_B8	Machine Learning 2 – Advanced Methods			Zöllner

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 every semester and can be repeated at every regular examination date.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Machine Learning 2 - Advanced methods

2511502, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

Learning objectives:

- Students understand extended concepts of machine learning and their possible applications.
- Students can classify, formally describe and evaluate methods of machine learning.
- In detail, methods of machine learning can be embedded and applied in complex decision and inference systems.
- Students can use their knowledge to select suitable models and methods of machine learning for existing problems in the field of machine intelligence.

Recommendations:

Attending the lecture ***Machine Learning 1*** or a comparable lecture is very helpful in understanding this lecture.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 6.205 Course: Machine Translation [T-INFO-101385]

Responsible: Prof. Dr. Jan Niehues
Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-100848 - Machine Translation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	24639	Maschinelle Übersetzung	4 SWS	Lecture / 🗣	Niehues
Exams					
ST 2022	7500043	Machine Translation			Waibel, Niehues

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

Below you will find excerpts from events related to this course:

V Maschinelle Übersetzung

24639, SS 2022, 4 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
Inhalt:

Wie kann ich verstehen, was meine internationalen Freunde auf ihren Social Media Kanälen in fremden sprachen posten? Für Probleme wie diese kann die Maschinelle Übersetzung einen Menschheitstraum erfüllen: Die Kommunikation über Sprachgrenzen. In dieser Vorlesung werden Sie die Grundlagen und Fähigkeiten erlernen, um Maschinelle Übersetzungssysteme auf dem aktuellen Stand der Technik zu entwickeln. Die Vorlesung wird zunächst eine kurze Einführung in die Maschinelle Übersetzung geben und traditionelle Ansätze der Maschinellen Übersetzung vorstellen. Danach werden wir den aktuellen Ansatz der Maschinellen Übersetzung, Neuronale Maschinelle Übersetzung, der dieses Problem mittels Neuronaler Netze adressiert, im Detail behandeln. Dazu werden sowohl die Grundlagen, wie auch diverse Herausforderungen, besprochen: die Evaluation von Maschineller Übersetzung, die Integration von weiteren Wissensquellen, die Modellierung von komplexer Morphologie, Multilingualität und Sprachübersetzung. Darüberhinaus wird das erworbene Wissen in mehreren praktischen Einheiten angewandt.

Lernziele:

Der Studierende soll in die Grundbegriffe verschiedener Ansätze zur Maschinellen Übersetzung eingeführt werden.

Der Studierende soll grundlegende Konzepte und Algorithmen der Neuronalen Maschinellen Übersetzung verstehen und anwenden lernen.

Der Studierende soll die grundlegenden Methoden zur Evaluation von Maschinellen Übersetzungssystemen lernen.

Der Studierende soll einen Einblick in die aktuelle Forschung im Bereich der Maschinellen Übersetzung erhalten und kann mit dem erworbenen Wissen an aktuellen Forschungsthemen arbeiten.

Der Studierende soll das erworbene Wissen praktisch anwenden und mit Hilfe der bestehenden Tools einen eigenen Übersetzer bauen und evaluieren.

Nach Vollendung der Vorlesung werden die Studierenden in der Lage sein, verschiedene Ansätze der Maschinellen Übersetzung zu vergleichen sowie Übersetzer für verschiedene Anwendungen zu entwickeln.

Literature
Weiterführende Literatur

Philipp Koehn: Neural Machine Translation

T 6.206 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 2022	2579900	Management Accounting 1	2 SWS	Lecture / 🗣	Wouters
ST 2022	2579901	Tutorial Management Accounting 1 (Bachelor)	2 SWS	Practice / 🗣	Dickemann
ST 2022	2579902	Tutorial Management Accounting 1 (Master)	2 SWS	Practice / 🗣	Dickemann
Exams					
ST 2022	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
ST 2022	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters

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

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

Annotation
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V Management Accounting 1

2579900, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

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)** **Practice (Ü) On-Site**
2579901, SS 2022, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

V **Tutorial Management Accounting 1 (Master)** **Practice (Ü) On-Site**
2579902, SS 2022, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

T 6.207 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 22/23	2579903	Management Accounting 2	2 SWS	Lecture / 🖥	Wouters, Dickemann
WT 22/23	2579904	Tutorial Management Accounting 2 (Bachelor)	2 SWS	Practice / 🗣	Wouters
WT 22/23	2579905	Tutorial Management Accounting 2 (Master)	2 SWS	Practice / 🗣	Wouters
Exams					
ST 2022	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
ST 2022	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters

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

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

Recommendation
It is recommended to take part in the course "Management Accounting 1" before this course.

Annotation
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V **Management Accounting 2** — **Lecture (V) Online**
2579903, WS 22/23, 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 22/23, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

V **Tutorial Management Accounting 2 (Master)** — **Practice (Ü) On-Site**
2579905, WS 22/23, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

T 6.208 Course: Management of IT-Projects [T-WIWI-102667]

Responsible: Dr. Roland Schätzle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101477 - Development of Business Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	4

Events					
ST 2022	2511214	Management of IT-Projects	2 SWS	Lecture / 🗣	Schätzle
ST 2022	2511215	Übungen zu Management von Informatik-Projekten	1 SWS	Practice / 🗣	Schätzle
Exams					
ST 2022	79AIFB_MvIP_A1	Management of IT-Projects (Registration until 18 July 2022)			Oberweis
WT 22/23	79AIFB_MvIP_C3	Management of IT-Projects			Oberweis

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

Competence Certificate
The assessment takes place in the form of a written examination (exam) in the amount of 60 minutes. The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
Prerequisite for the participation in the examination is the successful participation in the exercise, which takes place in the summer semester, starting from summer semester 2020. The number of participants in the exercise is limited.

Below you will find excerpts from events related to this course:

V Management of IT-Projects

2511214, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Learning objectives:

Students

- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropiate to current project phases and project contexts,
- consider organisational and social impact factors.

Recommendations:

Knowledge from the lecture Software Engineering is helpful.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004
- Project Management Institute Standards Committee. A Guide to the Project Management Body of Knowledge (PMBoK guide). Project Management Institute. Four Campus Boulevard. Newton Square. PA 190733299. U.S.A.

V

Übungen zu Management von Informatik-Projekten

2511215, SS 2022, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Content
The general conditions, influencing factors and methods in the planning, execution and control of IT projects are dealt with. In particular, the following topics will be dealt with: Project environment, project organization, project structure plan, effort estimation, project infrastructure, project control, decision-making processes, negotiation, time management. The lecture is accompanied by exercises in the form of tutorials. The date of the exercise will be announced later.

T 6.209 Course: Managing New Technologies [T-WIWI-102612]

Responsible: Dr. Thomas Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	2545003	Managing New Technologies	2 SWS	Lecture / 🗣	Reiß
Exams					
ST 2022	7900169	Managing New Technologies			Reiß

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

Competence Certificate
Written exam 100% following §4, Abs. 2.

Prerequisites
None

Recommendation
None

Annotation
The credit points for T-WIWI-102612 "Management of New Technologies" were reduced to 3 credit points in the 2019 summer semester.

Below you will find excerpts from events related to this course:

V Managing New Technologies

2545003, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

T 6.210 Course: Market Engineering: Information in Institutions [T-WIWI-102640]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-102754 - Service Economics and Management
M-WIWI-104813 - Information Systems: Internet-Based Markets and Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540460	Market Engineering: Information in Institutions	2 SWS	Lecture /	Fegert, Weinhardt
ST 2022	2540461	Übungen zu Market Engineering: Information in Institutions	1 SWS	Practice /	Jachimowicz, Stein, Bezzaoui, Fegert
Exams					
ST 2022	7979235	Market Engineering: Information in Institutions			Weinhardt

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by max. one grade level (0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Market Engineering: Information in Institutions

2540460, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Literature

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.
- Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
- Smith, V. "Theory, Experiments and Economics", The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

T 6.211 Course: Market Research [T-WIWI-107720]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101647 - Data Science: Evidence-based Marketing
M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2571150	Market Research	2 SWS	Lecture / 🗣	Klarmann
ST 2022	2571151	Market Research Tutorial	1 SWS	Practice / 🗣	Pade
Exams					
ST 2022	7900015	Market Research			Klarmann
ST 2022	7900203	Market Research			Klarmann

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

Competence Certificate
The assessment of success takes place through a written exam with additional aids in the sense of an open book exam. The written exam will either take place in the lecture hall or online, depending on further pandemic developments. Further details will be announced during the lecture.

Prerequisites
None

Recommendation
None

Annotation
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

Below you will find excerpts from events related to this course:

V **Market Research** — **Lecture (V) On-Site**
2571150, SS 2022, 2 SWS, Language: English, Open in study portal

Content
Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

The aim of this lecture is to give an overview of essential statistical methods. In the lecture students learn the practical use as well as the correct handling of different statistical survey methods and analysis procedures. In addition, emphasis is put on the interpretation of the results after the application of an empirical survey. The derivation of strategic options is an important competence that is required in many companies in order to react optimally to customer needs.

The assessment is carried out (according to §4(2), 3 SPO) in the form of a written open book exam.

The total workload for this course is approximately 135.0 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45.0 hours

Exam and exam preparation: 60.0 hours

Please note that this course has to be completed successfully by students interested in master thesis positions at the chair of marketing.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 6.212 Course: Marketing Analytics [T-WIWI-103139]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101647 - Data Science: Evidence-based Marketing

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

Events					
WT 22/23	2572170	Marketing Analytics	2 SWS	Lecture / 🗣	Klarmann
WT 22/23	2572171		1 SWS	Practice / 🗣	Pade

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

Competence Certificate
Alternative (according to §4(2), 3 of the examination regulation) exam assessment (working on tasks in groups during the lecture).

Prerequisites
The prerequisite for taking the course is the successful completion of the course "Market Research".

Recommendation
It is strongly recommended to complete the course "Market Research" prior to taking the "Marketing Analytics" course.

Annotation
"Marketing Analytics" is offered as a block course with an alternative exam assessment.
Starting in the winter semester 22/23, the course will be scheduled to be completed after two thirds of the semester. For further information, please contact the Marketing and Sales Research Group (marketing.iism.kit.edu). Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing and Sales Research Group.

Below you will find excerpts from events related to this course:

V Marketing Analytics

2572170, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling, structural equation modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

Students

- receive based on the course market research an overview of advanced empirical methods
- learn in the course of the lecture to handle advanced data collection and data analysis methods
- are based on the acquired knowledge able to interpret results and derive strategic implications

Total workload for 4.5 ECTS: ca. 135 hours.

In order to attend Marketing Analytics, students are required to have passed the course Market Research.

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu).

Literature

- Hanssens, Dominique M., Parsons, Leonard J., Schultz, Randall L. (2003), Market response models: Econometric and time series analysis, 2nd ed, Boston.
- Gelman, Andrew, Hill, Jennifer (2006), Data analysis using regression and multilevel/hierarchical models, New York.
- Cameron, A. Colin, Trivedi, Pravin K. (2005), Microeconometrics: methods and applications, New York.
- Chapman, Christopher, Feit, Elea M. (2015), R for Marketing Research and Analytics, Cham.
- Ledolter, Johannes (2013), Data mining and business analytics with R, New York.

V 2572171, WS 22/23, 1 SWS, Language: English, Open in study portal **Practice (Ü) On-Site**

Content
Tasks parallel to the lecture to work on in a group of students.

Organizational issues
Blockveranstaltung: genaue Uhrzeiten und Raum werden noch bekannt gegeben

T 6.213 Course: Marketing Strategy Business Game [T-WIWI-102835]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105312 - Marketing and Sales Management

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

Competence Certificate
The assessment (alternative exam assessment) consists of a group presentation and a subsequent round of questions totalling 20 minutes.

Prerequisites
None

Recommendation
None

Annotation
Please note that only one of the courses from the election block can be chosen in the module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS points in the respective module to all students. Participation in a specific course cannot be guaranteed.
In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

T 6.214 Course: Master's Thesis [T-WIWI-103142]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104833 - Module Master's Thesis

Type	Credits	Grading scale	Version
Final Thesis	30	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	3 months
Correction period	8 weeks

T 6.215 Course: Mathematics for High Dimensional Statistics [T-WIWI-111247]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Irregular	1

Competence Certificate
The assessment consists of an oral exam (30 min.) taking place in the recess period.

Prerequisites
None

Recommendation
Basic knowledge of mathematics and statistics is assumed.
Knowledge in multivariate statistics is an advantage, but not necessary for the course.

T 6.216 Course: Medical Robotics [T-INFO-101357]

Responsible: Prof. Dr.-Ing. Torsten Kröger
Jun.-Prof. Dr. Franziska Mathis-Ullrich

Organisation: KIT Department of Informatics

Part of: M-INFO-100820 - Medical Robotics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24681	Medical Robotics	2 SWS	Lecture / 🗣	Mathis-Ullrich
Exams					
ST 2022	7500244	Medical Robotics			Mathis-Ullrich
ST 2022	7500331	Medical Robotics			Mathis-Ullrich

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.217 Course: Meshes and Point Clouds [T-INFO-101349]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-100812 - Meshes and Point Clouds

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Events					
ST 2022	2400029	Netze und Punktwolken	2 SWS	Lecture /	Prautzsch
Exams					
ST 2022	7500317	Meshes and Point Clouds			Prautzsch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.218 Course: Methods in Economic Dynamics [T-WIWI-102906]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each summer term	2

Events					
ST 2022	2560240	Methods in Economic Dynamics	1 SWS	Lecture / 🗣	Ott
Exams					
ST 2022	7900108	Methods in Economic Dynamics			Ott

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

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012] and Economics II [2600014]. Further, it is assumed that students have interest in using quantiative-mathematical methods.

Below you will find excerpts from events related to this course:

V Methods in Economic Dynamics

2560240, SS 2022, 1 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
The economic exploitation of inventions is an important part of innovation economics. Intellectual property rights such as patents or trademarks play a central role. Within this workshop, the recording, processing and analysis of such intellectual property rights will be deepened, e.g. considering specific technologies. Students will learn how to work with relational databases, the econometric evaluation of recorded data, and methods for visualising them.

Learning objectives:

The student

- learns to query data sources.
- is able to analyse data with statistical methods.
- visualises and interprets data evaluations (e.g. using dashboards or methods of network analysis).

Recommendations:

An interest in working with data, basic knowledge on databases as well as basic knowledge in economics and statistics are advantageous.

Workload:

The total workload for this course is approximately 45 hours.

- Classes: ca. 5 h
- Self-study: ca. 40 h

Assessment:

Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

Organizational issues
The course is structured along two assignments, the first of which is an individual assignment, whereas the second assignment is a group project. Assignment 1 will be completed within one month's time, whereas assignment 2 will take place on the 23. May 2022.

Literature
Relevante Literatur wird in der Vorlesung bekanntgegeben.
(Relevant literature will be announced in the lecture.)

T 6.219 Course: Methods in Innovation Management [T-WIWI-110263]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar / 🗣	Koch
Exams					
WT 22/23	7900359	Methods in Innovation Management			Weissenberger-Eibl

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

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO). The final grade is composed 75% of the grade of the written paper and 25% of the grade of the presentation.

Prerequisites
None.

Recommendation
Prior attendance of the course “Innovation Management: Concepts, Strategies and Methods” is recommended.

Below you will find excerpts from events related to this course:

V Methoden im Innovationsmanagement

2545107, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 6.220 Course: Microeconometrics [T-WIWI-112153]

Responsible: TT-Prof. Dr. Fabian Krüger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
WT 22/23	2500032	Microeconometrics	2 SWS	Lecture /	Krüger
WT 22/23	2500033	Tutorial in Microeconometrics	2 SWS	Practice /	Krüger, Pavlova

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 min).

Prerequisites
None

Recommendation
Course participants are expected to know econometrics at the level of `Volkswirtschaftslehre III: Einführung in die Ökonometrie'

Below you will find excerpts from events related to this course:

V Microeconometrics

2500032, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Microeconometrics is concerned with modeling data from an individual (`micro') unit like a person, household or firm. The response variables of interest are often discrete. For example, a person's type of employment may be coded as a binary variable (e.g. working in IT sector versus not working in IT sector), and a person's choice of transportation mode can be cast as a multinomial variable (e.g. bike, train, car, or other). These examples differ from the basic econometric setting of a continuous response variable, and require nonlinear regression modeling.

The course first introduces maximum likelihood estimation which is particularly useful in microeconometrics. We then discuss econometric models for various types of response variables (binary, ordered, multinomial, censored), as well as methods for estimation and model evaluation. Throughout the course, implementation via R software plays an important role.

Prerequisites: Course participants are expected to know econometrics at the level of `Volkswirtschaftslehre III: Einführung in die Ökonometrie'.

Literature
Winkelmann, R., Boes, S. (2006): Analysis of Microdata. Springer.

T 6.221 Course: Mixed Integer Programming I [T-WIWI-102719]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2022	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🗣	Stein
Exams					
ST 2022	7900014_SS2022_NK	Mixed Integer Programming I			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 *Mixed Integer Programming II* [25140]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from events related to this course:

V **Mixed-integer Programming II** — **Lecture (V) On-Site**
2550140, SS 2022, 2 SWS, Language: German, Open in study portal

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 6.222 Course: Mixed Integer Programming II [T-WIWI-102720]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2022	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🗣	Stein
ST 2022	2550141	Exercise to Mixed-integer Programming II	1 SWS	Practice / 🗣	Stein, Schwarze
Exams					
ST 2022	7900009_SS2022_HK	Mixed Integer Programming II			Stein
WT 22/23	7900007_WS2223_NK	Mixed Integer Programming 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 *Mixed Integer Programming I* [2550138]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from events related to this course:

V Mixed-integer Programming II

2550140, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 6.223 Course: Mobile Communication [T-INFO-101322]

Responsible: Prof. Dr. Oliver Waldhorst
Prof. Dr. Martina Zitterbart

Organisation: KIT Department of Informatics

Part of: M-INFO-100785 - Mobile Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	24643	Mobile Communications	2 SWS	Lecture	Waldhorst, Jung
Exams					
ST 2022	7500073	Mobile Communication			Waldhorst, Zitterbart
WT 22/23	7500015	Mobile Communication			Waldhorst, Zitterbart

T 6.224 Course: Model Driven Software Development [T-INFO-101278]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: M-INFO-100741 - Model-Driven Software Development

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24657	Model-Driven Software Engineering	2 SWS	Lecture / 🗣	Burger
Exams					
ST 2022	7500016	Model Driven Software Development			Burger, Reussner
WT 22/23	7500086	Model Driven Software Development			Reussner

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

T 6.225 Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

Responsible: Dr. Verena Dorner
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103118 - Data Science: Data-Driven User Modeling

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540470	Modeling and Analyzing Consumer Behavior with R	2 SWS	Lecture	Knierim
ST 2022	2540471	Übung zu Modeling and Analyzing Consumer Behaviour with R	1 SWS	Practice / 🔁	Knierim, Bartholomeyczik
Exams					
ST 2022	79791391	Modeling and Analyzing Consumer Behavior with R			Weinhardt

Legend: 📱 Online, 🔁 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations).
As of the summer semester 2022, a bonus for the examination can no longer be achieved. For students who have achieved the bonus in the summer semester 2021, it will be taken into account for the main exam in the summer semester 2022 and the post-exam in the winter semester 2022/23.

Prerequisites
None

Recommendation
None

Annotation
Number of participants limited.

Below you will find excerpts from events related to this course:

V Modeling and Analyzing Consumer Behavior with R

2540470, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Field, A., Miles, J., Field, Z., Discovering Statistics Using R, SAGE 2014

Jones, O., Maillardet, R., Robinson, A., Scientific Programming and Simulation Using R, Chapmann & Hall / CRC Press 2009

Venables, W.N., Smith, D.M. and the R Core Team, "An Introduction to R", 2012 (Version 2.15.2), http://cran.r-project.org/doc/manuals/R-intro.pdf

Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)

T 6.226 Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102808 - Digital Service Systems in Industry
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 22/23	2550490	Modellieren und OR-Software: Fortgeschrittene Themen	3 SWS	Practical course /	Pomes, Linner, Nickel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment is a written examination. The examination is held in every semester. The prerequisite can only be obtained in semesters in which the course exercises are offered.

Prerequisites
Prerequisite for admission to the exam is the successful participation in the exercises. This includes the processing and presentation of exercises.

Recommendation
Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

Successful completion of the course *Modeling and OR-Software: Introduction*.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is held 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: Fortgeschrittene Themen

2550490, WS 22/23, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The advanced course is designated for Master students that already attended the introductory course or gained equivalent experience elsewhere, e.g. during a seminar or bachelor thesis. We will work on advanced topics and methods in OR, among others cutting planes, column generation and constraint programming. The Software used for the exercises is IBM ILOG CPLEX Optimization Studio. The associated modelling progamming languages are OPL and ILOG Script.

Organizational issues
Link zur Bewerbung:

http://go.wiwi.kit.edu/OR_Bewerbung

Bewerberzeitraum:

01.09.2022 00:00 - 09.10.2022 23:55

T 6.227 Course: Models of Parallel Processing [T-INFO-101365]

Responsible: Thomas Worsch
Organisation: KIT Department of Informatics
Part of: M-INFO-100828 - Models of Parallel Processing

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	24606	Modelle der Parallelverarbeitung	3 SWS	Lecture /	Worsch, Vollmar
Exams					
ST 2022	75400003	Models of Parallel Processing			Worsch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.228 Course: Multicore Programming in Practice: Tools, Models, Languages [T-INFO-101565]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-100985 - Multicore Programming in Practice: Tools, Models, Languages

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	1

T 6.229 Course: Multicriteria Optimization [T-WIWI-111587]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Exams			
WT 22/23	7900009_WS2223_HK	Multicriteria Optimization	Stein

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.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The course is offered every second winter semester (starting WiSe 22/23). The curriculum of the next three years is available online (www.ior.kit.edu).

Contents:

Multicriteria optimization deals with optimization problems with multiple objective functions. In practice, the minimization or maximization of several objectives often conflict with each other, such as weight and stability of mechanical components, return and risk of stock portfolios, or cost and duration of transports. Various scalarization approaches allow one to formulate single-objective problems that can be solved using nonlinear or global optimization techniques, and whose optimal points have a reasonable interpretation for the underlying multicriteria problem.

However, some seemingly obvious scalarization approaches suffer from various drawbacks, so that regardless of scalarization approaches, it is necessary to clarify what is meant by the solution of a multicriteria optimization problem in the first place. For such Pareto-optimal points, optimality conditions and solution procedures based on them can be formulated. From the usually non-unique Pareto set, decision makers finally choose an alternative based on their subjective preferences.

The lecture gives a mathematically sound introduction to multicriteria optimization and is structured as follows:

- Introductory examples and terminology
- Solution concepts
- Methods for the determination of the Pareto set
- Selection of Pareto-optimal points under subjective preferences

T 6.230 Course: Multivariate Statistical Methods [T-WIWI-103124]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-101639 - Econometrics and Statistics II
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2550554	Multivariate Verfahren	2 SWS	Lecture / 🗣	Grothe
ST 2022	2550555	Übung zu Multivariate Verfahren	2 SWS	Practice / 🗣	Kächele
Exams					
ST 2022	7900351	Multivariate Statistical Methods			Grothe

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).

The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Recommendation
The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course ''Advanced Statistics''. Without this, participation in the course is not advised.

Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

Below you will find excerpts from events related to this course:

V Multivariate Verfahren

2550554, SS 2022, 2 SWS, Open in study portal

Lecture (V)
On-Site

Literature
Skript zur Vorlesung

T 6.231 Course: Natural Language Processing [T-INFO-112177]

Responsible: Prof. Dr. Jan Niehues
Organisation: KIT Department of Informatics
Part of: M-INFO-105999 - Natural Language Processing

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	2400147	Natural Language Processing	4 SWS	Lecture / 🗣	Niehues

Legend: 📱 Online, ⛒ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.232 Course: Natural Language Processing and Software Engineering [T-INFO-101272]

Responsible: Prof. Dr.-Ing. Anne Koziolek
Organisation: KIT Department of Informatics
Part of: M-INFO-100735 - Natural Language Processing and Software Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24187	Sprachverarbeitung in der Softwaretechnik	2 SWS	Lecture / 🗣	Koziolek
Exams					
ST 2022	7500185	Natural Language Processing and Software Engineering			Koziolek

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

T 6.233 Course: Network Security: Architectures and Protocols [T-INFO-101319]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-100782 - Network Security: Architectures and Protocols
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	24601	Netzsicherheit: Architekturen und Protokolle	2 SWS	Lecture / 🗣	Baumgart, Bless, Heseding, Zitterbart
Exams					
ST 2022	7500072	Network Security: Architectures and Protocols			Zitterbart

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

T 6.234 Course: Next Generation Internet [T-INFO-101321]

Responsible: Dr.-Ing. Roland Bless
Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-100784 - Next Generation Internet

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	24674	Next Generation Internet	2 SWS	Lecture / 🗣	Bless
Exams					
ST 2022	7500074	Next Generation Internet			Bless, Zitterbart
WT 22/23	7500016	Next Generation Internet			Bless, Zitterbart

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Next Generation Internet

24674, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture focuses on current developments in Internet-based network technologies. First, architectural principles of today's Internet are presented and discussed, subsequently nowadays and future challenges are motivated. Methods for quality-of-service support and transport of multi-media stream as well as newer transport protocols and group communication support are presented. Deployment of the presented technologies in IP-based networks are discussed. The lecture presents advanced approaches such as programmable networks and network virtualization as well as newer approaches and protocols for routing, satellite networking, and peer-to-peer networks.

Literature
James F. Kurose, and Keith W. Ross *Computer Networking* 6th edition, Addison-Wesley/Pearson, 2013, ISBN 978-0-273-76896-8, Chapters 1, 2.6 (P2P), 4 (Network Layer), 7.5 (Scheduling, IntServ, DiffServ, RSVP)

Weiterführende Literatur

wird in der Vorlesung bekanntgegeben.

T 6.235 Course: Non- and Semiparametrics [T-WIWI-103126]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
WT 22/23	2521300	Non- and Semiparametrics	2 SWS	Lecture	Schienle
WT 22/23	2521301		2 SWS	Practice	Schienle, Görgen
Exams					
WT 22/23	7900223	Non- and Semiparametrics			Schienle

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 *"Applied Econometrics"* [2520020]

Annotation
The course takes place every second winter semester: 2018/19 then 2020/21

Below you will find excerpts from events related to this course:

V Non- and Semiparametrics

2521300, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Learning objectives:

The student

- has profound knowledge of non- and semiparametric estimation methods
- is capable of implementing these methods using statistical software and using them to assess empirical problems

Content:

Kernel density estimation, local constant and local linear regression, bandwidth choice, series and sieve estimators, additive models, semiparametric models

Requirements:

It is recommended to attend the course *Applied Econometrics* prior to this course.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Literature
Li, Racine: Nonparametric Econometrics: Theory and Practice. Princeton University Press, 2007.

T 6.236 Course: Nonlinear Optimization I [T-WIWI-102724]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 22/23	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 22/23	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Schwarze
Exams					
ST 2022	7900252_SS2022_NK	Nonlinear Optimization I			Stein
WT 22/23	7900001_WS2223_HK	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 22/23, 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 6.237 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-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	6

Events					
WT 22/23	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 22/23	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Schwarze
WT 22/23	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
ST 2022	7900266_SS2022_NK	Nonlinear Optimization I and II			Stein
WT 22/23	7900003_WS2223_HK	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 22/23, 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 22/23, 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 6.238 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 22/23	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Schwarze
WT 22/23	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
ST 2022	7900258_SS2022_NK	Nonlinear Optimization II			Stein
WT 22/23	7900002_WS2223_HK	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 22/23, 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 6.239 Course: Online Concepts for Karlsruhe City Retailers [T-WIWI-111848]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105312 - Marketing and Sales Management

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

Events					
ST 2022	2571184	Online concepts for Karlsruhe city retailers	1 SWS	Others (sons / 🗣	Klarmann, Weber, Pade
Exams					
ST 2022	7900221	Online Concepts for Karlsruhe City Retailers			Klarmann

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

Competence Certificate
Alternative exam assessment according (interim presentation and final presentation in teams).

Annotation
Please note that only one of the 1.5 ECTS courses can be counted within the module. This course has a restriction on attendance. The Marketing and Sales Research Group typically allows all students to attend a 1.5 credit course in the corresponding module. Under no circumstances can a guarantee be made that a particular course will be attended. An application is required to attend this course. The application phase usually takes place at the beginning of the lecture period in the summer semester. More information on the application process is usually available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the lecture period in the summer semester.

Below you will find excerpts from events related to this course:

V Online concepts for Karlsruhe city retailers

2571184, SS 2022, 1 SWS, Language: German, Open in study portal

Others (sonst.)
On-Site

Content
Content
As part of a practical project in cooperation with the city marketing department of KME Karlsruhe Marketing und Event GmbH, students will have the opportunity to directly interact with retailers in Karlsruhe. Challenges of the digitalization of brick-and-mortar retailing will be analyzed and solutions will be developed and implemented.

In a theoretical part at the beginning of the event, students will gain an insight into the theoretical foundations of specific online marketing instruments. In cooperation with Karlsruhe City Marketing, students are taught application-oriented skills in online marketing tools, such as content management systems, social media platforms, search engine optimization or Google Ads campaigns.

In the practical part of the course, student teams cooperate with a real retailer in Karlsruhe's city center and learn how to analyze and optimize online presences and digital solutions based on key performance indicators. Possible use cases range from social media communication and website optimization to the introduction of innovative pricing and payment methods. In this way, students are given the tools for developing, maintaining and optimizing individual websites and digital solutions in stationary retailing.

Learning objectives result accordingly as follows:
- Learning of theoretical basics of central, application-oriented tools of online marketing
- Application and practical deep-dive of the acquired knowledge in a real case
- Concise and structured presentation of results

Total time required for 1.5 credit points: approx. 45.0 hours

Attendance time: 8 hours

Preparation and wrap-up of the course: 29.5 hours

Exam and exam preparation: 7.5 hours

T 6.240 Course: Operations Research in Health Care Management [T-WIWI-102884]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Events					
WT 22/23	2550495	Operations Research in Health Care Management	2 SWS	Lecture / 🗣	Nickel
WT 22/23	2550496	Übungen zu OR im Health Care Management	1 SWS	Practice	Bakker

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

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

Below you will find excerpts from events related to this course:

V Operations Research in Health Care Management

2550495, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Elective literature:

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
- Hall: Patient flow: reducing delay in healthcare delivery, Springer, 2006

T 6.241 Course: Operations Research in Supply Chain Management [T-WIWI-102715]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module Introduction to Operations Research and in the lectures Facility Location and Strategic SCM,Tactical and operational SCMis assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 6.242 Course: Optimization and Synthesis of Embedded Systems (ES1) [T-INFO-101367]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-100830 - Optimization and Synthesis of Embedded Systems (ES1)

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2424143	Optimisation and synthesis of embedded systems (ES1)	2 SWS	Lecture / 🗣	Bauer, Henkel
Exams					
ST 2022	7500038	VL: Optimization and synthesis of embedded systems (ES1)			Henkel
WT 22/23	7500085	VL: Optimization and synthesis of embedded systems (ES1)			Henkel

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

T 6.243 Course: Optimization Models and Applications [T-WIWI-110162]

Responsible: Dr. Nathan Sudermann-Merx
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate
The examination will take place for the last time in the winter semester 2020/2021.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

The prerequisite for participation in the exam is the achievement of a minimum number of points in delivery sheets. Details will be announced at the beginning of the course.

Prerequisites
None.

Annotation
The course will take place for the last time in the winter semester 20/21.

T 6.244 Course: Optimization under Uncertainty [T-WIWI-106545]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 22/23	2550464	Optimization Under Uncertainty	2 SWS	Lecture / 💻	Rebennack
WT 22/23	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	1 SWS	Practice / 🗣	Rebennack, Füllner
WT 22/23	2550466		2 SWS	Others (sons	Rebennack, Füllner

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.

T 6.245 Course: Panel Data [T-WIWI-103127]

Responsible: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2520320	Panel Data	2 SWS	Lecture	Heller
ST 2022	2520321	Übungen zu Paneldaten	2 SWS	Practice	Heller
Exams					
ST 2022	7900115	Panel Data			Heller

Prerequisites
None

Below you will find excerpts from events related to this course:

V Panel Data

2520320, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Content:
Fixed-Effects-Models, Random-Effects-Models, Time-Demeaning

Workload:
Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours
Exam preparation: 40 hours
Exam preparation: 40 hours

Literature
Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. Cambridge and London: MIT Press.
Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach* (5th ed.). Mason, Ohio: South-Western Cengage Learning.

T 6.246 Course: Parallel Algorithms [T-INFO-101333]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-100796 - Parallel Algorithms

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	2

Events					
WT 22/23	2400053	Parallel Algorithms	2/1 SWS	Lecture / 🗣	Sanders, Hübner, Uhl

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

T 6.247 Course: Parallel Algorithms Pass [T-INFO-111857]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-100796 - Parallel Algorithms

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

T 6.248 Course: Parallel Computer Systems and Parallel Programming [T-INFO-101345]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: M-INFO-100808 - Parallel Computer Systems and Parallel Programming

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	24617	Parallel computer systems and parallel programming	2 SWS	Lecture	Streit, Häfner
Exams					
ST 2022	7500141	Parallel computer systems and parallel programming			Streit

T 6.249 Course: Parametric Optimization [T-WIWI-102855]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

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.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 6.250 Course: Pattern Recognition [T-INFO-101362]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Tim Zander
Organisation: KIT Department of Informatics
Part of: M-INFO-100825 - Pattern Recognition

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	2

Events					
ST 2022	24675	Pattern Recognition	4 SWS	Lecture / Practice (/	Beyerer
Exams					
ST 2022	7500032	Pattern Recognition			Beyerer
WT 22/23	7500111	Pattern Recognition			Beyerer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V Pattern Recognition

24675, SS 2022, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Organizational issues
Vorlesung: montags 15:45 bis 16:30 Uhr und mittwochs 14:00 bis 15:30 Uhr

Übung: montags 16:30 bis 17:15 Uhr

Literature
Weiterführende Literatur

- Richard O. Duda, Peter E. Hart, Stork G. David. Pattern Classification. Wiley-Interscience, second edition, 2001
- K. Fukunaga. Introduction to Statistical Pattern Recognition. Academic Press, second edition, 1997
- R. Hoffman. Signalanalyse und -erkennung. Springer, 1998
- H. Niemann. Pattern analysis and understanding. Springer, second edition, 1990
- J. Schürmann. Pattern classification. Wiley & Sons, 1996
- S. Theodoridis, K. Koutroumbas. Pattern recognition. London: Academic, 2003
- V. N. Vapnik. The nature of statistical learning theory. Springer, second edition, 2000

T 6.251 Course: Penetration Testing Lab [T-INFO-109929]

Responsible: Dr.-Ing. Ingmar Baumgart
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-104895 - Penetration Testing Lab

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

Events					
ST 2022	2400058	Penetration Testing Lab	4 SWS	Practical course /	Baumgart, Herr, Goerke
WT 22/23	2400115	Penetration Testing Lab	4 SWS	Practical course /	Baumgart, Goerke
Exams					
ST 2022	7500275	Penetration Testing Lab			Baumgart

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.252 Course: Personalization and Services [T-WIWI-102848]

Responsible: Andreas Sonnenbichler
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate
The exam is currently not offered.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The course is currently not offered.

T 6.253 Course: Photorealistic Rendering [T-INFO-101268]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-100731 - Photorealistic Rendering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	24682	Fotorealistische Bildsynthese	2 SWS	Lecture / 🗣	Schudeiske
Exams					
ST 2022	7500124	Photorealistic Rendering			Dachsbacher

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

T 6.254 Course: Planning and Management of Industrial Plants [T-WIWI-102631]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2581952	Planning and Management of Industrial Plants	2 SWS	Lecture / 🗣	Schultmann
WT 22/23	2581953	Übungen Anlagenwirtschaft	2 SWS	Practice / 🗣	Heck, Heinzmann
Exams					
ST 2022	7981952	Planning and Management of Industrial Plants			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. 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

Recommendation
None

Below you will find excerpts from events related to this course:

V Planning and Management of Industrial Plants

2581952, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.

During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.255 Course: Portfolio and Asset Liability Management [T-WIWI-103128]

Responsible: Dr. Mher Safarian
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2520357	Portfolio and Asset Liability Management	2 SWS	Lecture	Safarian
ST 2022	2520358	Übungen zu Portfolio and Asset Liability Management	2 SWS	Practice	Safarian
Exams					
ST 2022	7900116	Portfolio and Asset Liability Management			Safarian

Competence Certificate
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Portfolio and Asset Liability Management

2520357, SS 2022, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
Learning objectives:

Knowledge of various portfolio management techniques in the financial industry.

Content:

Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Exam preparation: 40 hours

Organizational issues
Blockveranstaltung, Termine werden über Ilias bekanntgegeben

Literature
To be announced in the lecture

T 6.256 Course: Practical Course Applied Telematics [T-INFO-103585]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-101889 - Practical Course Applied Telematics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	3

Events					
WT 22/23	24316	Telematic Labs	1 SWS	Practical course	König, Mahrt, Zitterbart

T 6.257 Course: Practical Course Automatic Speech Recognition [T-INFO-104775]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-102411 - Practical Course Automatic Speech Recognition

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24298	Praktikum Automatische Spracherkennung	2 SWS	Practical course	Waibel

Below you will find excerpts from events related to this course:

V Praktikum Automatische Spracherkennung

24298, WS 22/23, 2 SWS, Language: German, Open in study portal

Practical course (P)

Content

- In a number of experiments different systems for automatic speech recognition will be built step-by-step
- The use of different tools and techniques from the area will be practiced

Literature
Weiterführende Literatur

- A. Waibel, K.F. Lee: Readings in Speech Recognition
- F. Jelinek: Statistical Methods of Speech Recognition
- Schukat-Talamazzini: Automatische Spracherkennung

T 6.258 Course: Practical Course Circuit Design with Intel Galileo [T-INFO-105580]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: M-INFO-102353 - Practical Course Circuit Design with Intel Galileo

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2400092	Circuit Design with Intel Galileo	4 SWS	Practical course / 🗣	Tahoori
WT 22/23	2400116	Circuit Design with Intel Galileo	4 SWS	Practical course / 🗣	Tahoori
Exams					
ST 2022	7500103	Practical Course Circuit Design with Intel Galileo			Tahoori
WT 22/23	7500148	Practical Course Circuit Design with Intel Galileo			Tahoori

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Circuit Design with Intel Galileo

2400092, SS 2022, 4 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
This lab emphasizes on the design process for digital computing systems. In the beginning, an introduction in the digital design flow and testing of digital circuits is given. Afterwards, the students will learn to design and test their own digital circuits.

Therefore, the students will use Intel's Galileo, an Arduino-certified development board available for everybody based on the well-known Intel x86 architecture. At the end, the student will be able to build circuits as complex as full-adders, connect them to Intel Galileo and test them using standard Linux commands.

Students will learn to design and test their own digital circuits.

Organizational issues
As a full week block from 5th Sept 2022 - 9th Sept 2022

Since the number of seats is limited, a registration for this laboratory in the campussystem is necessary.

V Circuit Design with Intel Galileo

2400116, WS 22/23, 4 SWS, Language: German/English, Open in study portal

Practical course (P)
On-Site

Content
This lab emphasizes on the design process for digital computing systems. In the beginning, an introduction in the digital design flow and testing of digital circuits is given.

Afterwards, the students will learn to design and test their own digital circuits. Therefore, the students will use Intel's Galileo, an Arduino-certified development board available for everybody based on the well-known Intel x86 architecture. At the end, the student will be able to build circuits as complex as full-adders, connect them to Intel Galileo and test them using standard Linux commands.

Organizational issues
ab 15.11.2022, alle 2 Wochen dienstags 14:00-17:15, Geb. 07.21, Raum B.312.4

There are limited slots and the registration is handled in a first-come, first-served manner. So make sure you sign-up as early as possible. We can only consider registrations with the correct documents or from the online system (https://campus.studium.kit.edu/exams/index.php)

T 6.259 Course: Practical Course Computer Vision for Human-Computer Interaction [T-INFO-105943]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-102966 - Practical Course Computer Vision for Human-Computer Interaction

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each summer term	3

Events					
ST 2022	2400123	Practical Course Computer Vision for Human-Computer Interaction	2 SWS	Practical course / 🖳	Stiefelhagen, Seibold
Exams					
ST 2022	7500279	Practical Course Computer Vision for Human-Computer Interaction			Stiefelhagen

Legend: 🖳 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.260 Course: Practical Course Decentralized Systems and Network Services [T-INFO-106063]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-103047 - Practical Course Decentralized Systems and Network Services

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Irregular	1

T 6.261 Course: Practical Course Digital Design & Test Automation Flow [T-INFO-105565]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: M-INFO-102570 - Practical Course: Digital Design & Test Automation Flow

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 22/23	24318	Digital Design & Test Automation Flow	4 SWS	Practical course / 🗣	Tahoori
Exams					
ST 2022	7500089	Practical Course Digital Design & Test Automation Flow			Tahoori
WT 22/23	7500084	Practical Course Digital Design & Test Automation Flow			Tahoori

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

Below you will find excerpts from events related to this course:

V Digital Design & Test Automation Flow

24318, WS 22/23, 4 SWS, Language: German/English, Open in study portal

Practical course (P)
On-Site

Content
Electronic Design Automation (EDA) is used to develop nearly all novel electronic systems that we use in our daily lives, such as smartphones or laptops. In order to manage the high complexity of these systems, all steps in the design and verification phases are done automatically with the help of EDA tools.

The objective of this lab is to have a hands-on practice on major steps in digital design and test automation flow, from system-level specification to physical design and verification, using industrial EDA toolsets which are predominantly used in the industry and academia. The students will work on some sample designs and go through all major design and test steps, one by one, in different sessions of the lab. So, by the end of this lab, they become familiar with the steps and tool chain in the digital design and test automation flow. The topics include system-level specification and simulation; high-level synthesis; logic-level synthesis and simulation; design for testability; test pattern generation and fault simulation; physical design and verification; timing analysis and closure; area, delay, and power estimation and analysis.

Organizational issues
ab 25.10.2022, alle 2 Wochen dienstags 14:00-17:15, Geb. 07.21, Raum B.312.4

There are limited slots and the registration is handled in a first-come, first-served manner. So make sure you sign-up as early as possible. We can only consider registrations with the correct documents or from the online system (https://campus.studium.kit.edu/exams/index.php)

T 6.262 Course: Practical Course Engineering Approaches to Software Development [T-INFO-108791]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: M-INFO-104254 - Practical: Course Engineering Approaches to Software Development

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
WT 22/23	2400093	Practical Course Engineering Approaches to Software Development	4 SWS	Practical course	Reussner
Exams					
ST 2022	7500184	Practical Course Engineering Approaches to Software Development			Burger, Reussner
WT 22/23	7500234	Practical Course Engineering Approaches to Software Development			Reussner

T 6.263 Course: Practical Course FPGA Programming [T-INFO-105576]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: M-INFO-102661 - Practical Course FPGA Programming

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2400106	FPGA Programming	4 SWS	Practical course / 🗣	Tahoori
WT 22/23	2400106	FPGA Programming	4 SWS	Practical course / 🗣	Tahoori
Exams					
ST 2022	7500087	Practical Course FPGA Programming			Tahoori
WT 22/23	7500083	Practical Course FPGA Programming			Tahoori

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

Below you will find excerpts from events related to this course:

V FPGA Programming

2400106, SS 2022, 4 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
This lab emphasizes on the practical aspects of Field Programmable Gate Arrays (FPGAs). In the beginning, a short background discussion of FPGAs is given, followed by a tutorial on the workflow of configuring and programming an FPGA. This lab includes FPGA design using schematic layouts as well as several example of VHDL/Verilog programming to implement some sample digital circuits. Students will be exposed to the processes used to design and simulate FPGAs as well as compile their design and see it run on an actual FPGA. The lab is designed around the DE2-115 prototyping board, which provides a programmer, program memory, and array of switches, buttons, LEDs, an LCD, and several I/O ports.

Organizational issues
As a full week block from 29th Aug - 2nd Sept 2022

Since the number of seats is limited, a registration for this laboratory in the campussystem is necessary.

V FPGA Programming

2400106, WS 22/23, 4 SWS, Language: German/English, Open in study portal

Practical course (P)
On-Site

Content
This lab emphasizes on the practical aspects of Field Programmable Gate Arrays (FPGAs). In the beginning, a short background discussion of FPGAs is given, followed by a tutorial on the workflow of configuring and programming an FPGA. This lab includes FPGA design using schematic layouts as well as several example of VHDL/Verilog programming to implement some sample digital circuits. Students will be exposed to the processes used to design and simulate FPGAs as well as compile their design and see it run on an actual FPGA. The lab is designed around the DE2-115 prototyping board, which provides a programmer, program memory, and array of switches, buttons, LEDs, an LCD, and several I/O ports.

Organizational issues
ab 26.10.2022, alle 2 Wochen mittwochs 14:00-17:15, Geb. 07.21, Raum B.312.4

Since the number of seats is limited, a registration for this laboratory in the campussystem is necessary.

T 6.264 Course: Practical Course Model-Driven Software Development [T-INFO-103029]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: M-INFO-101579 - Practical Course Model-Driven Software Development

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	1

Events					
ST 2022	2400091	Practical Course Model-Driven Software Development	4 SWS	Practical course / 🗣	Burger
Exams					
ST 2022	7500017	Practical Course Model-Driven Software Development			Reussner

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.265 Course: Practical Course Natural Language Dialog Systems [T-INFO-104780]

Responsible: Prof. Dr. Jan Niehues
Prof. Dr. Alexander Waibel

Organisation: KIT Department of Informatics

Part of: M-INFO-102414 - Natural Language Dialog Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Irregular	2

T 6.266 Course: Practical Course on Network Security Research [T-INFO-110938]

Responsible: Mario Hock
Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-105413 - Practical Course on Network Security Research

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

T 6.267 Course: Practical Course Protocol Engineering [T-INFO-104386]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-102092 - Practical Course Protocol Engineering

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

Events					
WT 22/23	2400086	Protocol Engineering	4 SWS	Practical course	König, Mahrt, Zitterbart

T 6.268 Course: Practical Course Software Defined Networking [T-INFO-103587]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-101891 - Practical Course Software Defined Networking

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each summer term	1

Events					
ST 2022	2424899	Projektpraktikum: Software Defined Networking	4 SWS	Practical course / 🧩	König, Zitterbart, Seehofer
Exams					
ST 2022	7500167	Practical Course: Software Defined Networking			Zitterbart

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Projektpraktikum: Software Defined Networking

2424899, SS 2022, 4 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
Software-defined networking (SDN) is an emerging approach for controlling and managing network infrastructures. All control functionality (such as routing) is implemented in software and executed with the help of a centralized controller. As part of this practical course, we now want to find out how such SDN applications can be developed

T 6.269 Course: Practical Course: Advanced Topics in High Performance Computing, Data Management and Analytics [T-INFO-111803]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: M-INFO-105870 - Practical Course: Advanced Topics in High Performance Computing, Data Management and Analytics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
ST 2022	2400068	Advanced Topics in High Performance Computing, Data Management and Analytics	3 SWS	Practical course	Streit, Schlitter
WT 22/23	2400043	Advanced Topics in High Performance Computing, Data Management and Analytics	3 SWS	Practical course	Streit, Schlitter
Exams					
ST 2022	7500269	Practical Course: Advanced Topics in High Performance Computing, Data Management and Analytics			Streit

T 6.270 Course: Practical Course: Analysis of Complex Data Sets [T-INFO-105796]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-102807 - Practical Course: Analysis of Complex Data Sets

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Irregular	1

T 6.271 Course: Practical Course: Biologically Inspired Robots [T-INFO-111039]

Responsible: Dr.-Ing. Arne Rönnau
Organisation: KIT Department of Informatics
Part of: M-INFO-105495 - Practical Course: Biologically Inspired Robots

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	1

Events					
WT 22/23	2400079	Practical Course: Biologically Inspired Robots	4 SWS	Practical course / 🧩	Rönnau

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.272 Course: Practical Course: Customized Embedded Processor Design [T-INFO-111457]

Organisation: KIT Department of Informatics
Part of: M-INFO-105740 - Practical Course: Customized Embedded Processor Design

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each winter term	2

Exams			
ST 2022	7500203	Lab: Customized Embedded Processor Design	Henkel

T 6.273 Course: Practical Course: Data Science [T-INFO-111262]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-105632 - Practical Course: Data Science

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	6	pass/fail	Each summer term	1

Exams			
ST 2022	7500091	Data Science - Laboratory Course	Böhm

T 6.274 Course: Practical Course: Database Systems [T-INFO-103201]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-101662 - Practical Course: Database Systems

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each winter term	2

Events					
WT 22/23	24286	Datenbankpraktikum	2 SWS	Practical course / 🗣	Böhm, Richter
Exams					
WT 22/23	7500130	Practical Course Database Systems			Böhm

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

T 6.275 Course: Practical Course: Discrete Freeform Surfaces [T-INFO-103208]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101667 - Practical Course: Discrete Freeform Surfaces

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	1

Events					
ST 2022	24876	Praktikum Diskrete Freiformflächen	4 SWS	Practical course / 🧩	Prautzsch, Xu
WT 22/23	2400059	Discrete freeform surfaces		Practical course / 🧩	Prautzsch, Xu
Exams					
ST 2022	7500191	Practical Course Discrete Freeform Surfaces			Prautzsch

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.276 Course: Practical Course: General-Purpose Computation on Graphics Processing Units [T-INFO-109914]

Organisation: KIT Department of Informatics
Part of: M-INFO-100724 - Practical Course: General-Purpose Computation on Graphics Processing Units

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	24911	Praktikum General-Purpose Computation on Graphics Processing Units	2 SWS	Practical course / 🗣	Herveau, Dolp
WT 22/23	24297	Praktikum General-Purpose Computation on Graphics Processing Units	2 SWS	Practical course / 🏵	Herveau, Dittebrandt
Exams					
ST 2022	7500134	Practical Course: General-Purpose Computation on Graphics Processing Units			Dachsbacher

Legend: 💻 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Praktikum General-Purpose Computation on Graphics Processing Units

Practical course (P)
On-Site

24911, SS 2022, 2 SWS, Language: English, Open in study portal

Content
The kickoff meeting will be held on 20.04.2022 at 15:45 in 50.34 room 131.
The meeting will be streamed over Zoom. (Link on ILIAS)

T 6.277 Course: Practical Course: Geometric Modeling [T-INFO-103207]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101666 - Practical Course: Geometric Modeling

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
ST 2022	2400107	Praktikum Geometrisches Modellieren	2 SWS	Practical course / 🧩	Xu, Prautzsch
WT 22/23	2400024	Geometric Modelling		Practical course / 🧩	Prautzsch, Xu
Exams					
ST 2022	7500212	Practical course: Geometric Modeling			Prautzsch

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

T 6.278 Course: Practical Course: Hot Research Topics in Computer Graphics [T-INFO-109577]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-104699 - Practical Course: Hot Research Topics in Computer Graphics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Irregular	1

T 6.279 Course: Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data [T-INFO-106219]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-103128 - Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Irregular	1

T 6.280 Course: Practical Course: Machine Learning and Intelligent Systems [T-INFO-112104]

Responsible: Michael Fennel
Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-INFO-105958 - Practical Course: Machine Learning and Intelligent Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	8	Grade to a third	Each term	1

Events					
ST 2022	24871	Practical Course Machine Learning and Intelligent Systems	4 SWS	Practical course / 🗣	Hanebeck, Fennel
Exams					
ST 2022	7500050	Practical Course Machine Learning and Intelligent Systems			Hanebeck
WT 22/23	7500103	Practical Course Machine Learning and Intelligent Systems			Hanebeck

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

T 6.281 Course: Practical Course: Neural Network Exercises [T-INFO-106259]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-103143 - Practical Course: Neural Network Exercises

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

T 6.282 Course: Practical Course: Programme Verification [T-INFO-102953]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-101537 - Practical Course: Programme Verification

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Exams			
ST 2022	7500281	Practical Course: Programme Verification	Beckert
WT 22/23	7500260	Practical Course: Programme Verification	Beckert

T 6.283 Course: Practical Course: Smart Data Analytics [T-INFO-106426]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-INFO-103235 - Practical Course: Smart Data Analytics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each summer term	1

Events					
ST 2022	24895	Practical Course: Smart Data Analytics	4 SWS	Practical course /	Beigl, Riedel, Zhou, Bulut, Huang
Exams					
ST 2022	7500088	Practical Course: Smart Data Analytics			Beigl, Riedel

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.284 Course: Practical Course: Visual Computing 2 [T-INFO-103000]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-101567 - Practical Course: Visual Computing 2

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	4

Events					
ST 2022	24909	Praktikum GPU-Computing	4 SWS	Practical course /	Herveau, Dolp
WT 22/23	24283	Praktikum GPU-Computing	4 SWS	Practical course /	Herveau, Dittebrandt
Exams					
ST 2022	7500125	Practical Course GPU-Computing			Dachsbacher

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Below you will find excerpts from events related to this course:

V Praktikum GPU-Computing

24909, SS 2022, 4 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
The kickoff meeting will be held on 20.04.2022 at 15:45 in 50.34 room 131.
The meeting will be streamed over Zoom. (Link on ILIAS)

T 6.285 Course: Practical Course: Web Applications and Service-Oriented Architectures (II) [T-INFO-103121]

Responsible: Prof. Dr. Sebastian Abeck
Organisation: KIT Department of Informatics
Part of: M-INFO-101635 - Practical Course: Web Applications and Service-Oriented Architectures (II)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each summer term	3

Events					
ST 2022	24873	Practical Course: Web Applications and Service-Oriented Architectures (II)	2 SWS	Practical course / 🗣	Abeck, Schneider, Sänger, Throner
Exams					
ST 2022	7500139	Practical Course: Web Applications and Service-Oriented Architectures (II)			Abeck

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

T 6.286 Course: Practical Introduction to Hardware Security [T-INFO-108920]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: M-INFO-104357 - Practical Introduction to Hardware Security

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
ST 2022	2400009	Practical Introduction in Hardware Security	4 SWS	Lecture / Practice (/ 🗣	Tahoori
WT 22/23	2400033	Practical Introduction in Hardware Security	4 SWS	Lecture / Practice (/ 🗣	Tahoori
Exams					
ST 2022	7500224	Practical Introduction to Hardware Security			Tahoori
WT 22/23	7500226	Practical Introduction to Hardware Security			Tahoori

Legend: 📱 Online, ⛐ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Practical Introduction in Hardware Security

2400009, SS 2022, 4 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
4 SWS / 6 ECTS = 180h

1. Hardware security primitives (PUF, TRNG)
2. Hardware Implementation of encryption modules (AES)
3. Passive Attack with side channel (on AES)
4. Active fault attack (on simple circuits, if feasible also on AES)

Security is a major concern for a variety of domains like embedded and cyber-physical systems in which threats in hardware and software components may pose catastrophic consequences. Software security has been studied extensively, since the majority of security attacks were typically at the software level. However, currently hardware becomes the Achilles heel for on-chip system security as recent events show. There is evidence of hardware security breaches and hence, there is a growing emphasize in hardware security from academic, industry, and government sectors. In this regard, physical attacks, side-channel analysis and fault-injection attacks for security-enabled application domains is becoming a real-world challenge.

Organizational issues
ab 20.04.2022 1x wöchentlich Mittwoch: Vorlesung von 14:00-15:30, im Anschluß Übung von 15:30-17:00

V Practical Introduction in Hardware Security

2400033, WS 22/23, 4 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
4 SWS / 6 ECTS = 180h

Organizational issues
Ab 27.10.2022 - 1x wöchentlich donnerstags: Vorlesung von 14:00-15:30, im Anschluß Übung von 15:30-17:00, Geb. 07.21, Raum A.3.15

There are limited slots and the registration is handled in a first-come, first-served manner. So make sure you sign-up as early as possible. We can only consider registrations with the correct documents or from the online system (https://campus.studium.kit.edu/exams/index.php)

T 6.287 Course: Practical Project Robotics and Automation I (Software) [T-INFO-104545]

Responsible: Prof. Dr.-Ing. Björn Hein
Prof. Dr.-Ing. Thomas Längle
Organisation: KIT Department of Informatics
Part of: M-INFO-102224 - Practical Project Robotics and Automation I (Software)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
WT 22/23	24282	Project practical Robotics and Automation I (Software)	4 SWS	Practical course	Hein, Längle
Exams					
ST 2022	750003	Project practical Robotics and Automation I (Software)			Hein, Längle

T 6.288 Course: Practical Project Robotics and Automation II (Hardware) [T-INFO-104552]

Responsible: Prof. Dr.-Ing. Björn Hein
Prof. Dr.-Ing. Thomas Längle
Organisation: KIT Department of Informatics
Part of: M-INFO-102230 - Practical Project Robotics and Automation II (Hardware)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
WT 22/23	24290	Robotics and Automation II (Hardware)	4 SWS	Practical course	Hein, Längle
Exams					
ST 2022	750004	Project practical Robotics and Automation II (Hardware)			Hein, Längle

T 6.289 Course: Practical SAT Solving (extended) [T-INFO-111254]

Responsible: Dr. Markus Iser
Prof. Dr. Carsten Sinz
Organisation: KIT Department of Informatics
Part of: M-INFO-105622 - Practical SAT Solving (extended)

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Irregular	1

Exams			
ST 2022	7500194	Practical SAT Solving (extended)	Sinz

T 6.290 Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-102808 - Digital Service Systems in Industry

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

Events					
ST 2022	2540554	Practical Seminar: Information Systems & Service Design (Master)	3 SWS	Lecture /	Mädche
WT 22/23	2540554	Practical Seminar: Information Systems & Service Design	3 SWS	Lecture /	Mädche
Exams					
ST 2022	7900258	Practical Seminar Service Innovation			Satzger
ST 2022	7900262	Practical Seminar: Information Systems and Service Design / Seminarpraktikum: Information Systems und Service Design			Mädche
ST 2022	7900314	Service Design Thinking			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendation
None

Annotation
New course title starting summer term 2017: "Practical Seminar Digital Service Systems".

The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

Below you will find excerpts from events related to this course:

V Practical Seminar: Information Systems & Service Design (Master)

2540554, SS 2022, 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.

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

V Practical Seminar: Information Systems & Service Design

2540554, WS 22/23, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

T 6.291 Course: Practical Seminar: Advanced Analytics [T-WIWI-108765]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103118 - Data Science: Data-Driven User Modeling

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

Competence Certificate
The assessment consists of practical work in the field of advanced analytics, a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendation
At least one module offered by the institute should have been chosen before attending this seminar.

Annotation
The course is held in English. The course is not offered regularly.

T 6.292 Course: Practical Seminar: Artificial Intelligence in Service Systems [T-WIWI-112152]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101506 - Service Analytics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	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 (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Prerequisites
None.

Recommendation
Knowledge in the field of Artificial Intelligence in Service Systems is assumed. Therefore, it is recommended to attend the course Artificial Intelligence in Service Systems [2595650] beforehand.

T 6.293 Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

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

Competence Certificate
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendation
At least one module offered by the institute should have been chosen before attending this seminar.

Annotation
The course is held in english. The course is not offered regularly.

T 6.294 Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
ST 2022	2550498	Practical seminar: Health Care Management	3 SWS	Practical course / 🏘	Nickel, Mitarbeiter
WT 22/23	2500008	Practical seminar: Health Care Management	3 SWS	Practical course / 🗣	Nickel, Mitarbeiter
Exams					
ST 2022	7900185	Practical Seminar: Health Care Management (with Case Studies)			Nickel
WT 22/23	7900105	Practical Seminar: Health Care Management (with Case Studies)			Nickel

Legend: 💻 Online, 🏘 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Due to a research semester of Professor Nickel in WS 19/20, the courses *Location Planning and Strategic SCM* and *Practice Seminar: Health Care Management* do NOT take place in WS 19/20. Please also refer to the information at https://dol.ior.kit.edu/Lehrveranstaltungen.php for further details.

The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

Prerequisites
None.

Recommendation
Basic knowledge as conveyed in the module *Introduction toOperations Research* is assumed.

Annotation
The credits have been reduced to 4,5 starting summer term 2016.

The lecture is offered every term.

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

T 6.295 Course: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
ST 2022	2540554	Practical Seminar: Information Systems & Service Design (Master)	3 SWS	Lecture /	Mädche
Exams					
ST 2022	7900262	Practical Seminar: Information Systems and Service Design / Seminarpraktikum: Information Systems und Service Design			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment of this course is according to §4(2), 3 SPO 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). In the winter terms, the course is only offered as a seminar.

Prerequisites
None.

Recommendation
Attending the course „Digital Service Design“ is recommended, but not mandatory.

Annotation
The course is held in English.

Below you will find excerpts from events related to this course:

V Practical Seminar: Information Systems & Service Design (Master)

2540554, SS 2022, 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.

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

T 6.296 Course: Practical Seminar: Service Innovation [T-WIWI-110887]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-102806 - Service Innovation, Design & Engineering

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

Exams			
ST 2022	7900258	Practical Seminar Service Innovation	Satzger
ST 2022	7900314	Service Design Thinking	Satzger

Competence Certificate
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical components and an active participation in class.

Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Prerequisites
None

Recommendation
Knowledge of Service Innovation Methods is assumed. Therefore it is recommended to attend the course Service Innovation [2540468] beforehand.

Annotation
Due to the project work, the number of participants is limited and participation requires knowledge about models, concepts and approaches that are taught in the Service Innovation lecture. Having taken the Service Innovation lecture or demonstrating equivalent knowledge is a prerequisite for participating in this Practical Seminar. Details for registration will be announced on the web pages for this course.

The seminar is not offered regularly.

T 6.297 Course: Praktikum: Graphics and Game Development [T-INFO-110872]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-105384 - Praktikum: Graphics and Game Development

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Irregular	1

Events					
ST 2022	24912	Praktikum Graphics and Game Development	4 SWS	Practical course / 🗣	Herveau, Dolp
WT 22/23	24287	Praktikum Graphics and Game Development	4 SWS	Practical course / 🧩	Herveau, Dittebrandt
Exams					
ST 2022	7500135	Practical Course: Graphics and Game Development			Dachsbacher

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Recommendation
Knowledge of basics or algorithms of computer graphics are recommended.

Below you will find excerpts from events related to this course:

V Praktikum Graphics and Game Development

24912, SS 2022, 4 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
The kickoff meeting will be held on 25.04.2022 at 15:45 in 50.34 room 148.
The meeting will be streamed over Zoom. (Link on ILIAS)

T 6.298 Course: Predictive Mechanism and Market Design [T-WIWI-102862]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101505 - Experimental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2022	2500014	Predictive Mechanism and Market Design	2 SWS	Lecture /	Reiß
ST 2022	2520403		1 SWS	Practice /	Reiß
Exams					
ST 2022	7990001	Predictive Mechanism and Market Design			Reiß

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).

Prerequisites
None

Annotation
The course is given every second fall term, e.g., WS2017/18, WS2019/20, ...

The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.

T 6.299 Course: Predictive Modeling [T-WIWI-110868]

Responsible: TT-Prof. Dr. Fabian Krüger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

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

Events					
ST 2022	2521311	Predictive Modeling	2 SWS	Lecture /	Krüger
ST 2022	2521312	Predictive Modeling (Tutorial)	2 SWS	Practice /	Krüger, Koster
Exams					
ST 2022	7900298	Predictive Modeling			Krüger
ST 2022	7900299	Predictive Modeling			Krüger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Examination of another type (open book exam, online).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Predictive Modeling

2521311, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Contents

This course presents methods for making and evaluating statistical predictions based on data. We consider various types of predictions (mean, probability, quantile, and full distribution), all of which are practically relevant. In each case, we discuss selected modeling approaches and their implementation using R software. We consider various economic case studies. Furthermore, we present methods for absolute evaluation (assessing whether a given model is compatible with the data) and relative evaluation (comparing the predictive performance of alternative models).

Learning objectives
Students have a good conceptual understanding of statistical prediction methods. They are able to implement these methods using statistical software, and can assess which method is suitable in a given situation.

Prerequisites

Students should know econometrics on the level of the course `Applied Econometrics' [2520020]

Literature

- Elliott, G., und A. Timmermann (Hrsg.): "Handbook of Economic Forecasting", vol. 2A und 2B, 2013.
- Gneiting, T., und M. Katzfuss: "Probabilistic Forecasting", Annual Review of Statistics and Its Application 1, 125-151, 2014.
- Hastie, T., Tibshirani, R., and J. Friedman: "The Elements of Statistical Learning", 2. Ausgabe, Springer, 2009.
- Weitere Literatur wird in der Vorlesung bekanntgegeben.

V Predictive Modeling (Tutorial)

2521312, SS 2022, 2 SWS, Language: English, Open in study portal

Practice (Ü)
Blended (On-Site/Online)

T 6.300 Course: Price Management [T-WIWI-105946]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540529	Price Management	2 SWS	Lecture / 🗣	Glenn
ST 2022	2540530	Exercise Price Management	1 SWS	Practice / 🗣	Glenn
Exams					
ST 2022	7900139	Price Management			Geyer-Schulz

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

Competence Certificate
Lecture and exam will not be offered in summer semester 2019. The next examination is in the summer semester 2020.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The lecture is offered for the first time in summer term 2016.

Below you will find excerpts from events related to this course:

V Price Management

2540529, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- H. Simon and M. Fassnacht, *Preismanagement*, vol. 4. Wiesbaden: Springer Gabler, 2016.
- T. T. Nagle, J. E. Hogan, und J. Zalee, *The Strategy and Tactics of Pricing: A guide to growing more profitably*. New Jersey: Prentice Hall, 2010.

T 6.301 Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

Responsible: Prof. Dr. Martin Klarmann
Mark Schröder
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each winter term	3

Events					
WT 22/23	2572198	Price Negotiation and Sales Presentations	1 SWS	Block / 🗣	Klarmann, Schröder

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

Competence Certificate
This alternative exam assessment consists of a presentation with a subsequent discussion totalling 25 minutes. Moreover learning contents are checked by realistic 30-minute price negotiations.

Prerequisites
None

Recommendation
None

Annotation
The course is scheduled to be completed after the first half of the semester.
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically, all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless, participation for a specific course can not be guaranteed. For further information, please contact the Marketing and Sales Research Group (marketing.iism.kit.edu). Please note that only one of the courses from the election block can be attended in the module.

Below you will find excerpts from events related to this course:

V Price Negotiation and Sales Presentations

2572198, WS 22/23, 1 SWS, Language: German, Open in study portal

Block (B)
On-Site

Content
At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

Students

- gain a clear impression of the theoretical knowledge about price negotiations and sales presentations
- improve their own negotiation abilities

Non exam assessment (following §4(2), 3 of the examination regulation).

The total workload for this course is approximately 45.0 hours. For further information see German version.

- In order to participate in this course, you need to apply. Applications usually start with the lecture period in the winter term. Detailed information on the application process is provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the 1.5 ECTS courses can be chosen in the module.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

Organizational issues
Blockseminar: genaue Uhrzeiten und Raum werden noch bekannt gegeben

T 6.302 Course: Pricing Excellence [T-WIWI-111246]

Responsible: Dr. Fabian Bill
Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

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

Events					
ST 2022	2571175	Pricing Excellence	1 SWS	Others (sons / 🗣	Bill
Exams					
ST 2022	7900300	Pricing Excellence			Klarmann

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

Competence Certificate
Alternative exam assessment (team presentation of a case study with a duration of about 25 minutes and a subsequent discussion).

Prerequisites
None.

Annotation
Please note that only one of the courses in the module´s supplementary offering can be counted. This event has a restriction on participation. The Marketing and Sales Research Group typically allows all students to attend a 1.5 credit course in the corresponding module. A guarantee for the attendance of a certain event cannot be given. An application is required for participation in this event. The application phase usually takes place at the beginning of the lecture period in the summer semester. More information on the application process is usually available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the lecture period in the summer semester.

Below you will find excerpts from events related to this course:

V Pricing Excellence

2571175, SS 2022, 1 SWS, Language: English, Open in study portal

Others (sonst.)
On-Site

Content
In a theoretical part at the beginning of the course, students are taught the theoretical foundations of pricing. This includes an introduction to (1) price setting of product prices as well as (2) price setting of customer net prices (development of discount systems). Furthermore, theoretical foundations of price implementation and price monitoring are discussed.

Theoretical contents are applied and presented by teams within a case study format.

The learning objectives are as follows:
- Getting to know the theoretical foundations of price setting
- Getting to know the theoretical foundations of price execution and price monitoring
- Application of the acquired knowledge in a case study format
- Concise and structured presentation of the results

Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation (presentation of a case study with subsequent discussion).

Total time required for 1.5 credit points: approx. 45.0 hours

Attendance time: 15 hours

Preparation and wrap-up of the course: 22.5 hours

Exam and exam preparation: 7.5 hours

Organizational issues
Blockveranstaltung, Raum 115, Geb. 20.21, Termine werden noch bekannt gegeben

T 6.303 Course: Principles of Automatic Speech Recognition [T-INFO-101384]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-100847 - Principles of Automatic Speech Recognition

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24145	Grundlagen der Automatischen Spracherkennung	4 SWS	Lecture	Waibel, Niehues
Exams					
ST 2022	7500042	Principles of Automatic Speech Recognition			Waibel

Below you will find excerpts from events related to this course:

V Grundlagen der Automatischen Spracherkennung

Lecture (V)

24145, WS 22/23, 4 SWS, Language: German, Open in study portal

Content

This class explains the layout of state-of-the-art speech recognition systems. The layout will be motivated based on the human speech production process und its properties. The class treats all processing steps of automatic speech recognition systems in detail: signal pre-processing, training of suitable, statistical models, and the actual recognition process. The focus will be on statistical methods, as they are being used in current speech recognition systems. In this way the state-of-the-art of the area of automatic speech recognition will be communicated. Further the class will introduce alternative Methods, which were the foundation of the current methods and which are still being used in special circumstances. Using sample applications und examples from current research projects, the current state-of-the-art and the performance of current systems will be illustrated.

Literature

- Xuedong Huang, Alex Acero, Hsiao-wuen Hon, Spoken Language Processing, Prentice Hall, NJ, USA, 2001
- Fredrick Jelinek (editor), Statistical Methods for Speech Recognition, The MIT Press,1997, Cambridge, Massachusetts, London, England

Weiterführende Literatur

- Lawrence Rabiner and Ronald W. Schafer, Digital Processing of Speech Signals, Prentice Hall, 1978
- Schukat-Talamazzini, Automatische Spracherkennung

T 6.304 Course: Probabilistic Time Series Forecasting Challenge [T-WIWI-111387]

Responsible: TT-Prof. Dr. Fabian Krüger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	2

Events					
WT 22/23	2500080	Probabilistic Time Series Forecasting Challenge	2 SWS	Practice /	Krüger, Bracher, Koster, Lerch
WT 22/23	2500081	Probabilistic Time Series Forecasting Challenge		Project (P /	Krüger, Bracher, Koster, Lerch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. Necessary conditions to pass the course:

1. Weekly submission of statistical forecasts during the semester (excluding the Christmas break),
2. Submission of a final report (10-15 pages) at the end of the semester, describing the forecasting methods and their statistical evaluation.

Grading is based on the final report.

Prerequisites
Good methodological knowledge in statistics and data science.
Good knowledge in applied data analysis, incl. programming skills in R, Python or similar.
Knowledge of time series analysis is helpful, but not required.

Annotation
The course is limited in participation. Participants will be selected via the WIWI portal.

Below you will find excerpts from events related to this course:

V Probabilistic Time Series Forecasting Challenge

2500081, WS 22/23, SWS, Language: English, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
Statistical forecasts are relevant across all fields of society. In this data science project, students make, evaluate and communicate their own statistical forecasts in a real-time setting. We consider probabilistic forecasts that involve a measure of uncertainty in addition to a point forecast. Students are asked to make forecasts of several real-world time series (including weather variables and the DAX stock market index). Historical data on all series are available from public sources that are updated as time proceeds. While the time series differ from each other in important ways, statistical methods can meaningfully be used for prediction in all cases. We focus on quantile forecasts which are useful to measure forecast uncertainty in a relatively simple way.

Organizational issues
Short description

In this data science project, students make and evaluate statistical forecasts in a realistic setup (involving real-time predictions and real-world time series data). A kick-off meeting will take place in mid October. During the semester, there will be a weekly meeting in which students and instructors discuss the current state of the forecasting challenge.

Prerequisites

Students should have a good working knowledge of statistics and data science, including proficiency in a programming language like R, Python, or Matlab. Knowledge of time series analysis is helpful but not strictly required. Motivation and curiosity are particularly important in this course format that requires regular, active participation over the whole semester.

Please note that the number of participants is limited due to the interactive course format. Application takes place via the Wiwi portal, where further information is available.

Examination rules

The project seminar counts for 4.5 credit points (Leistungspunkte). Examination is via an alternative exam assessment (§4(2), 3 SPO). Necessary conditions to pass the course: 1) Weekly submission of statistical forecasts during the semester (excluding the Christmas break), 2) Submission of a final report (10-15 pages) at the end of the semester, describing the forecasting methods and their statistical evaluation. Grading is based on the final report.

T 6.305 Course: Product and Innovation Management [T-WIWI-109864]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101514 - Innovation Economics
M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Events					
ST 2022	2571154	Product and Innovation Management	2 SWS	Lecture / 🗣	Klarmann
Exams					
ST 2022	7900024	Product and Innovation Management			Klarmann
ST 2022	7900204	Product and Innovation Management			Klarmann

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

Competence Certificate
The assessment of success takes place through a written exam with additional aids in the sense of an open book exam. The written exam will either take place in the lecture hall or online, depending on further pandemic developments. Further details will be announced during the lecture.

Prerequisites
None

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Below you will find excerpts from events related to this course:

V Product and Innovation Management

2571154, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

Students

- know the most important terms of the product and innovation concept

- understand the models of product choice behavior (e.g., the Markov model, the Luce model)

- are familiar with the basics of network theory (e.g. the Triadic Closure concept)

- know the central strategic concepts of innovation management (especially the market driving approach, pioneer and successor, Miles/Snow typology, blockbuster strategy)

- master the most important methods and sources of idea generation (e.g. open innovation, lead user method, crowdsourcing, creativity techniques, voice of the customer, innovation games, conjoint analysis, quality function deployment, online toolkits)

- are capable of defining and evaluating new product concepts and know the associated instruments like focus groups, product testing, speculative sales, test market simulation Assessor, electronic micro test market

- have advanced knowledge about market introduction (e.g. adoption and diffusion models Bass, Fourt/Woodlock, Mansfield)

- understand important connections of the innovation process (cluster formation, innovation culture, teams, stage-gate process)

The assessment is carried out (according to §4(2), 3 SPO) in the form of a written open book exam.

Total effort for 3 credit points: approx. 90 hours

Presence time: 30 hours

Preparation and wrap-up of LV: 45.0 hours

Exam and exam preparation: 15.0 hours

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Organizational issues
Die Veranstaltung findet in Geb. 20.21, Raum 217 statt. Während anstehender Bauarbeiten wird die Veransaltung in Geb. 10.11, Raum 223 verlegt. Dies wird kurzfristig bekanntgegeben.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 6.306 Course: Production and Logistics Management [T-WIWI-102632]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581954	Production and Logistics Management	2 SWS	Lecture / 🗣	Schultmann, Glöser-Chahoud
ST 2022	2581955	Production and Logistics Managment	2 SWS	Practice / 🗣	Huster, Treml
Exams					
ST 2022	7981954	Production and Logistics 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. 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

Recommendation
None

Below you will find excerpts from events related to this course:

V Production and Logistics Management

2581954, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This course covers central tasks and challenges of operative production and logistics management. Students get to know the set-up and mode of planning systems such as production planning and control systems, enterprise resource planning systems and advanced planning systems to cope with the accompanying planning tasks in supply chain management. Methods to solve these tasks from the field of operational research will be explored with respect to manufacturing program planning, material requirement planning, lot size problems and scheduling. Alongside to MRP II (Manufacturing Resources Planning), students will be introduced to integrated supply chain management approaches. Finally, commercially available planning systems will be presented and discussed.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.307 Course: Project Lab Cognitive Automobiles and Robots [T-WIWI-109985]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103356 - Machine Learning

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	2

Events					
ST 2022	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar /	Zöllner
WT 22/23	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course /	Zöllner, Daaboul
Exams					
WT 22/23	7900107	Advanced Lab Cognitive Automobile and Robots (Master)			Zöllner

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

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Cognitive Automobiles and Robots

2513500, SS 2022, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
Online

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V

Practical Course Cognitive automobiles and robots (Master)

2512501, WS 22/23, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

T 6.308 Course: Project Lab Machine Learning [T-WIWI-109983]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103356 - Machine Learning

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2512500	Project Lab Machine Learning	3 SWS	Practical course /	Zöllner
Exams					
ST 2022	7900086	Project Lab Machine Learning			Zöllner

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

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Project Lab Machine Learning

2512500, SS 2022, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

T 6.309 Course: Project Lab: Image Analysis and Fusion [T-INFO-104746]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: M-INFO-102383 - Project Lab: Image Analysis and Fusion

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24299	Project Lab: Image Analysis and Fusion	4 SWS	Practical course	Beyerer
Exams					
WT 22/23	7500101	Project Lab: Image Analysis and Fusion			Beyerer

Below you will find excerpts from events related to this course:

V Project Lab: Image Analysis and Fusion

24299, WS 22/23, 4 SWS, Open in study portal

Practical course (P)

Organizational issues
Die Erfolgskontrolle erfolgt durch Bewertung der Projektdokumentation sowie der Präsentation der Projektergebnisse als Erfolgskontrolle anderer Art nach § 4 Abs. 2 Nr. 3 der SPO.

Die Note setzt sich zusammen aus der Note der schriftlichen Ausarbeitung und den Präsentationen.

Literature
Empfehlungen:

Hilfreich sind:

- Kenntnisse der Grundlagen der Stochastik und Signal- und Bildverarbeitung
- Kenntnisse der Vorlesungen Einführung in die Informationsfusion [IN4INEIF], Automatische Sichtprüfung und Bildverarbeitung [IN4INASB], Mustererkennung [IN4INME], Probabilistische Planung.

T 6.310 Course: Project Management [T-WIWI-103134]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2581963	Project Management	2 SWS	Lecture / 🗣	Schultmann, Volk, Rosenberg, Gehring, Wehrle
WT 22/23	2581964	Übung zu Project Management	1 SWS	Practice / 🗣	Volk, Rosenberg, Wehrle, Gehring
Exams					
ST 2022	7981963	Project Management			Schultmann

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 (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Project Management

2581963, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management
8. Stakeholder
9. Communication, Negotiation and Leadership
10. Project Controlling
11. Agile Project Management

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.311 Course: Public Management [T-WIWI-102740]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101504 - Collective Decision Making
M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2561127	Public Management	3 SWS	Lecture / Practice (/	Wigger
Exams					
ST 2022	790puma	Public Management			Wigger
WT 22/23	790puma	Public Management			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 1.5h 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 Management** — **Lecture / Practice (VÜ) Online**
2561127, WS 22/23, 3 SWS, Language: German, Open in study portal

Literature
Weiterführende Literatur:

- Damkowski, W. und C. Precht (1995): Public Management; Kohlhammer
- Richter, R. und E.G. Furubotn (2003): Neue Institutionenökonomik; 3. Auflage, Mohr
- Schedler, K. und I. Proeller (2003): New Public Management; 2. Auflage; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2. Auflage; Springer

T 6.312 Course: Public Revenues [T-WIWI-102739]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2560120	Public Revenues	2 SWS	Lecture / 🗣	Wigger
ST 2022	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice / 🗣	Wigger
Exams					
ST 2022	790oeff	Public Revenues			Wigger
WT 22/23	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 2022, 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 6.313 Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

Responsible: Dr. Patrick Plötz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	2581007	Quantitative Methods in Energy Economics	2 SWS	Lecture / 🗣	Plötz, Dengiz, Yilmaz
WT 22/23	2581008	Übung zu Quantitative Methods in Energy Economics	1 SWS	Practice / 🗣	Plötz, Dengiz, Yilmaz
Exams					
ST 2022	7981007	Quantitative Methods in Energy Economics			Fichtner

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) exam (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. 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

Recommendation
None

Below you will find excerpts from events related to this course:

V Quantitative Methods in Energy Economics

2581007, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

Learning Goals:

The student

- knows and understands selected quantitative methods of energy economics
- is able to use selected quantitative methods of energy economics
- understands they range of usage, limits and is autonomously able to adress new problems by them.

Literature
Wird in der Vorlesung bekannt gegeben.

T 6.314 Course: Randomized Algorithms [T-INFO-101331]

Responsible: Thomas Worsch
Organisation: KIT Department of Informatics
Part of: M-INFO-100794 - Randomized Algorithms

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	24171	Randomized Algorithms	3 SWS	Lecture / Practice (/	Worsch
Exams					
ST 2022	75400002	Randomized Algorithms			Worsch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.315 Course: Rationale Splines [T-INFO-103544]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101857 - Rationale Splines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Irregular	2

T 6.316 Course: Rationale Splines [T-INFO-103543]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101853 - Rationale Splines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

T 6.317 Course: Real-Time Systems [T-INFO-101340]

Responsible: Prof. Dr.-Ing. Thomas Längle
Organisation: KIT Department of Informatics
Part of: M-INFO-100803 - Real-Time Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	24576	Real-Time Systems	4 SWS	Lecture / Practice (/	Längle, Ledermann
Exams					
ST 2022	750002	Real-Time Systems			Längle

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.318 Course: Recommender Systems [T-WIWI-102847]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Exams			
ST 2022	7900138	Recommender Systems	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 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.

Prerequisites
None

Recommendation
None

T 6.319 Course: Reconfigurable and Adaptive Systems [T-INFO-101258]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-100721 - Reconfigurable and Adaptive Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2424662	Reconfigurable and Adaptive Systems	2 SWS	Lecture / 🗣	Bauer, Henkel
Exams					
ST 2022	7500201	VL: Reconfigurable and Adaptive Systems			Henkel

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

Below you will find excerpts from events related to this course:

V Reconfigurable and Adaptive Systems

2424662, SS 2022, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
Overview:
The requirements regarding performance, flexibility and energy efficiency of today's embedded systems are increasing continuously and the market has to react faster than before to changing trends and developments (e.g. for smartphones, netbooks, etc.). Established approaches based on standard processors, application-specific circuits (ASICs) or application-specific processors (ASIPs) are no longer able to adequately meet all of the above criteria.

Reconfiguration is a technique that allows parts of the hardware circuits to be changed at runtime. This is achieved, for example, by field-programmable logic arrays (FPGAs) or ALU arrays that are integrated into the corresponding ICs. Reconfigurable adaptive systems use this potential to adapt dynamically to changing requirements. In addition, the reconfigurability of the hardware can be used in a targeted manner to improve the reliability / failure safety of the systems, as is already used today, for example, in radiation-polluted environments such as Mars probes or at CERN.

Organisation:
In summer term 2022 the lecture is planed to take place in -102. If needed, then it will be streamed live via zoom. Details can be found in the ILAS course.
The lecture slides are in English, but the lecture language is German.

Exams:
Exam number: 7500201
For exam dates, please fill out the form on our website: http://ces.itec.kit.edu/972.php
The success control takes place in the form of an oral examination of usually 25-30 minutes according to § 4 Abs. 2 Nr. 2 SPO.

Learning objectives: The students
• learn the basics of reconfigurable systems.
• understand the different characterizations of reconfigurable systems and their effects on the potential for adaptivity. • have an overview of the methods for managing adaptivity (runtime system).
• are able to design and use adaptive systems for a given problem by applying the conveyed characterizations and runtime systems.
• get access to current research topics.

Recommendations:
Knowledge of the basics from "Rechnerstrukturen" is helpful.
Knowledge of the basics from "Optimierung und Synthese Eingebetteter Systeme (ES1)" is helpful.

Organizational issues
Bitte im ILIAS zur Teilnahme anmelden.

T 6.320 Course: Regulation Theory and Practice [T-WIWI-102712]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	see Annotations	2

Competence Certificate
The lecture is not offered for an indefinite period of time.
Result of success is made by a 20-30 minutes oral examination. Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None

Recommendation
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.

Particularly helpful but not necessary: Industrial Economics and Principal-Agent- or Contract theories. Prior attendance of the lecture*Competition in Networks* [26240] is helpful in any case but not considered a formal precondition.

Annotation
The lecture is not offered for an indefinite period of time.

T 6.321 Course: Reinforcement Learning and Neural Networks in Robotics [T-INFO-109928]

Responsible: Dr.-Ing. Pascal Meißner
Organisation: KIT Department of Informatics
Part of: M-INFO-104894 - Reinforcement Learning and Neural Networks in Robotics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	2

T 6.322 Course: Reliable Computing I [T-INFO-101387]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: M-INFO-100850 - Reliable Computing I

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24071	Reliable Computing I	2 SWS	Lecture / 🗣	Tahoori
Exams					
ST 2022	7500027	Reliable Computing I			Tahoori
WT 22/23	7500167	Reliable Computing I			Tahoori

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V **Reliable Computing I** **Lecture (V)**
24071, WS 22/23, 2 SWS, Language: English, Open in study portal **On-Site**

T 6.323 Course: Requirements Engineering [T-INFO-101300]

Responsible: Prof. Dr.-Ing. Anne Koziolek
Organisation: KIT Department of Informatics
Part of: M-INFO-100763 - Requirements Engineering
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	2400050	Requirements Engineering	2 SWS	Lecture / 🗣	Koziolek
Exams					
ST 2022	7500059	Requirements Engineering			Koziolek
ST 2022	7500295	Requirements Engineering Second Exam VL 2400050			Koziolek

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Recommendation
Das Modul Softwaretechnik II wird empfohlen.

Below you will find excerpts from events related to this course:

V Requirements Engineering

2400050, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Having a good requirements specification is a critical prerequisite for any successful software project. This lecture gives an introduction to processes, methods and representation forms for specifying and managing requirements.

The topics include background and general overview, processes and methods for requirements elicitation, specification with natural language, object-oriented specification, use cases, UML, specification of quality requirements and constraints, as well as requirements validation and management.

General remarks: The lecture is held in English and all lecture material is in English. The lecture has been recorded and the recordings will be made available on the Ilias platform.

Literature
The lecture is based on slides and works by Martin Glinz, which is why there is no book that accompanies the lecture. Students are welcome to discuss differences between the lecture and the content of the course in class.

Main suggestion: Pohl, K. (2010). Requirements Engineering: Fundamentals, Principles, and Techniques. Springer Verlag. (will be available in library)

Further reading:

- I. Alexander, R. Stevens (2002). Writing Better Requirements. London: Addison-Wesley.
- A. Davis (2005). Just Enough Requirements Management. New York: Dorset House.
- D.C. Gause, G.M. Weinberg (1989). Exploring Requirements: Quality before Design. New York: Dorset House.
- M. Glinz (2013). A Glossary of Requirements Engineering Terminology, Version 1.5. International Requirements Engineering Board (IREB). Originally published in 2011. Available at http://www.ireb.org (check-out CPRE Glossary)
- E. Gottesdiener (2002). Requirements by Collaboration: Workshops for Defining Needs. Boston: Addison-Wesley.
- M.A. Jackson (1995). Software Requirements and Specifications: A Lexicon of Practice, Principles and Prejudices. Addison-Wesley (ACM Press books): Wokingham, etc.
- A. van Lamsweerde (2009). Requirements Engineering: From System Goals to UML Models to Software Specifications. Chichester: John Wiley & Sons.
- S. Robertson, J. Robertson (2006). Mastering the Requirements Process. 2nd edition. Boston: Addison-Wesley.
- K. Wiegers (2006). More About Software Requirements: Thorny Issues and Practical Advice. Redmond: Microsoft Press.

T 6.324 Course: Research Focus Class: Blockchain & Payment Channel Networks [T-INFO-111251]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-105620 - Research Focus Class: Blockchain & Payment Channel Networks

Type	Credits	Grading scale	Version
Completed coursework	3	pass/fail	1

Events					
ST 2022	2400041	Research Focus Class: Blockchain & Payment Channel Networks Lecture	1 SWS	Lecture / 🗣	Hartenstein, Grundmann
Exams					
ST 2022	7500304	Research Focus Class: Blockchain & Payment Channel Networks			Hartenstein

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

T 6.325 Course: Research Focus Class: Blockchain & Payment Channel Networks - Seminar [T-INFO-111252]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-105620 - Research Focus Class: Blockchain & Payment Channel Networks

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	1

Events					
ST 2022	2400039	Research Focus Class: Blockchain & Payment Channel Networks Seminar	2 SWS	Seminar / 🗣	Hartenstein, Grundmann
Exams					
ST 2022	7500302	Research Focus Class: Blockchain & Payment Channel Networks - Seminar			Hartenstein

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.326 Course: Research Project (Project, 1st Semester) - Oral Exam [T-INFO-110218]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-105037 - Research Project (Project, 1st Semester)

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	2

Events					
ST 2022	2400047	Research Project (Project, first semester)		/ 🗣	Beckert, Beigl, Reussner, Kirsten
Exams					
ST 2022	7500114	Team Project (Project, 1st Semester) - Oral Exam			Beckert, Beigl, Reussner
WT 22/23	7500079	Research Project (Project, 1st Semester) - Oral Exam			Beckert, Beigl, Reussner

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

T 6.327 Course: Research Project (Project, 1st Semester) - Presentation [T-INFO-110219]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-105037 - Research Project (Project, 1st Semester)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2400047	Research Project (Project, first semester)		/ 🗣	Beckert, Beigl, Reussner, Kirsten
Exams					
ST 2022	7500130	Team Project (Project, 1st Semester) - Presentation			Beckert, Beigl, Reussner
WT 22/23	7500080	Research Project (Project, 1st Semester) - Presentation			Beckert, Beigl, Reussner

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

T 6.328 Course: Research Project (Project, 1st Semester) - Project Proposal [T-INFO-110220]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-105037 - Research Project (Project, 1st Semester)

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

Events					
ST 2022	2400047	Research Project (Project, first semester)		/ 🗣	Beckert, Beigl, Reussner, Kirsten
Exams					
ST 2022	7500131	Team Project (Project, 1st Semester) - Project Proposal			Beckert, Beigl, Reussner
WT 22/23	7500081	Research Project (Project, 1st Semester) - Written Exam			Beckert, Beigl, Reussner

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

T 6.329 Course: Research Project (Project, 2nd Semester) - Oral Exam [T-INFO-110221]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-105038 - Research Project (Project, 2nd Semester)

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	2

Events					
ST 2022	2400053	Research Project (Project, second semester)		/ 🗣	Beckert, Beigl, Reussner, Kirsten
WT 22/23	2400070	Research Project (Project, second semester)			Beckert, Beigl, Reussner, Kirsten
Exams					
ST 2022	7500126	Team Project (Project, 2nd Semester) - Oral Exam			Beckert, Beigl, Reussner
WT 22/23	7500171	Research Project (Project, 2nd Semester) - Oral Exam			Beckert, Beigl, Reussner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.330 Course: Research Project (Project, 2nd Semester) - Presentation [T-INFO-110222]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-105038 - Research Project (Project, 2nd Semester)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2400053	Research Project (Project, second semester)		/ 🗣	Beckert, Beigl, Reussner, Kirsten
WT 22/23	2400070	Research Project (Project, second semester)			Beckert, Beigl, Reussner, Kirsten
Exams					
ST 2022	7500132	Team Project (Project, 2nd Semester) - Presentation			Beckert, Beigl, Reussner
WT 22/23	7500077	Research Project (Project, 2nd Semester) - Presentation			Beckert, Beigl, Reussner

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

T 6.331 Course: Research Project (Project, 2nd Semester) - Scientific Report [T-INFO-110223]

Responsible: Prof. Dr. Bernhard Beckert
Organisation: KIT Department of Informatics
Part of: M-INFO-105038 - Research Project (Project, 2nd Semester)

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

Events					
ST 2022	2400053	Research Project (Project, second semester)		/ 🗣	Beckert, Beigl, Reussner, Kirsten
WT 22/23	2400070	Research Project (Project, second semester)			Beckert, Beigl, Reussner, Kirsten
Exams					
ST 2022	7500133	Team Project (Project, 2nd Semester) - Scientific Report			Beckert, Beigl, Reussner
WT 22/23	7500078	Research Project (Project, 2nd Semester) - Written Exam			Beckert, Beigl, Reussner

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

T 6.332 Course: Research Project Autonomous Learning Robots [T-INFO-110861]

Responsible: Prof. Dr. Gerhard Neumann
Organisation: KIT Department of Informatics
Part of: M-INFO-105378 - Research Project Autonomous Learning Robots

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each summer term	1

Events					
ST 2022	2400112	Research Laboratory Autonomous Learning Robots	4 SWS	Practical course / 🧩	Neumann
Exams					
ST 2022	7500274	Research Project Autonomous Learning Robots			Neumann

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
- The discussed algorithms have to be implemented successfully.
- The experiments need to be conducted scientifically and need to be well documented.
- The final report is well written and well structured

Below you will find excerpts from events related to this course:

V Research Laboratory Autonomous Learning Robots

2400112, SS 2022, 4 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
Inhalt

Each student has to choose one of the offered topics from the area of robot learning / reinforcement learning / imitation learning or deep learning for robotics. The students will conduct a literature survey to acquire an understanding of the field and then implement one or several algorithms. The algorithms need to be evaluated against available baselines on standard benchmark tasks as well as on (custom-made) physically realistic simulations and/or a real robot platform. The experiments have to be documented in a report

Experience in Machine Learning is recommended

Organizational issues
Ein Rücktritt ist innerhalb von zwei Wochen nach Vergabe des Themas möglich.

Arbeitsaufwand180h

T 6.333 Course: Responsible Artificial Intelligence [T-WIWI-111385]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-103118 - Data Science: Data-Driven User Modeling
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Events					
WT 22/23	2545164	Responsible Artificial Intelligence	2 SWS	Lecture / 🗣	Hoffmann, Henni

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

Competence Certificate
The final grade is based on an examination of other type according to § 4 Par. 2 No. 3. It consists of

- The completion of an exercise including a short presentation (15 min)(max. 30 points)
- The completion of a case study including an oral exam (max. 60 points).

Further details are explained during the lecture.

Prerequisites
Readings will be provided to work through before the lecture.

T 6.334 Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2581992	Risk Management in Industrial Supply Networks	2 SWS	Lecture / 🗣	Schultmann
Exams					
ST 2022	7981992	Risk Management in Industrial Supply Networks			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. Depending on the respective pandemic situation, the exam may be offered as an open book exam (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Risk Management in Industrial Supply Networks

2581992, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn methods and tools to manage risks in complex and dynamically evolving supply chain networks. Students learn the key terms and concepts of risk management and decision theory, in particular expected utility theory. Based on the theoretic prerequisites, students are able to determine and analyze risk diversification, risk pooling, insurance mechanisms and get an overview on statistical risk measures and real options. These approaches are adapted to analyze supply chain risks in a network context. In this manner, students gain knowledge in basic notions of network theory, network metrics and network-strategies for supply chain decisions.

- Introduction
- Risks in decisions under uncertainty: Expected Utility Theory & risk preferences
- The newsvendor model; multivariate risks and insurance
- Risk measures & evaluation techniques: Value-at-Risk, Conditional Value at Risk, Monte Carlo and Real Options
- Transparency in complex supply chains
- Network risk: network basics and criticality
- Risk in supply networks: empirical approaches and insights

Literature
Wird in der Veranstaltung bekannt gegeben.

T 6.335 Course: Roadmapping [T-WIWI-102853]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	2545102	Roadmapping	2 SWS	Seminar / 🗣	Koch
Exams					
ST 2022	7900055	Roadmapping			Weissenberger-Eibl

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

Competence Certificate
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.

Below you will find excerpts from events related to this course:

V Roadmapping

2545102, SS 2022, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
Technology Assessment can play a role at different points in the innovation process and can be considered as decision support for or against certain technological options. The seminar Technology Assessment will focus on the early phase "fuzzy front end" in innovation management. The technology assessment will take place here under a high degree of uncertainty regarding future technological developments. The evaluation of technologies can be done with methods such as Technology Readiness, Technology Lifecycle Analysis, Portfolio Analysis, etc.. The early evaluation of technologies is particularly important against the background of limited resources in companies and uncertainty about future developments.

T 6.336 Course: Robotics - Practical Course [T-INFO-105107]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-INFO-102522 - Robotics - Practical Course

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each summer term	2

Events					
ST 2022	24870	Robotics - Practical Course	4 SWS	Practical course / 🗣	Asfour
Exams					
ST 2022	7500261	Robotics - Practical Course			Asfour

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Recommendation
Should have attended the lectures Robotics I - III, and Mechano-Informatics and Robotics.

Below you will find excerpts from events related to this course:

V **Robotics - Practical Course**
24870, SS 2022, 4 SWS, Language: German, Open in study portal
Practical course (P)
On-Site

T 6.337 Course: Robotics I - Introduction to Robotics [T-INFO-108014]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-INFO-100893 - Robotics I - Introduction to Robotics

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	2424152	Robotics I - Introduction to Robotics	3/1 SWS	Lecture / 🗣	Asfour
Exams					
ST 2022	7500218	Robotik I - Einführung in die Robotik			Asfour
WT 22/23	7500106	Robotics I - Introduction to Robotics			Asfour

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.338 Course: Robotics II - Humanoid Robotics [T-INFO-105723]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-INFO-102756 - Robotics II - Humanoid Robotics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	4

Events					
ST 2022	2400074	Robotics II: Humanoid Robotics	2 SWS	Lecture / 🗣	Asfour
Exams					
ST 2022	7500086	Robotics II: Humanoid Robotics			Asfour
WT 22/23	7500211	Robotics II: Humanoid Robotics			Asfour

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Robotics II: Humanoid Robotics

2400074, SS 2022, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
The lecture presents current work in the field of humanoid robotics that deals with the implementation of complex sensorimotor and cognitive abilities. In the individual topics different methods and algorithms, their advantages and disadvantages, as well as the current state of research are discussed.

The topics addressed are: biomechanical models of the human body, biologically inspired and data-driven methods of grasping, active perception, imitation learning and programming by demonstration as well as semantic representations of sensorimotor experience

Learning Objectives:

The students have an overview of current research topics in autonomous learning robot systems using the example of humanoid robotics. They are able to classify and evaluate current developments in the field of cognitive humanoid robotics.

The students know the essential problems of humanoid robotics and are able to develop solutions on the basis of existing research.

Organizational issues
Die Erfolgskontrolle erfolgt in Form einer schriftlichen Prüfung im Umfang von i.d.R. 60 Minuten nach § 4 Abs. 2 Nr. 1 SPO.

Arbeitsaufwand: 90 h

Voraussetzungen: Der Besuch der Vorlesungen *Robotik I – Einführung in die Robotik* und *Mechano-Informatik in der Robotik* wird vorausgesetzt

Zielgruppe: **Modul für Master Maschinenbau, Mechatronik und Informationstechnik, Elektrotechnik und Informationstechnik**

Literature
Weiterführende Literatur

Wissenschaftliche Veröffentlichungen zum Thema, werden auf der VL-Website bereitgestellt.

T 6.339 Course: Robotics III - Sensors and Perception in Robotics [T-INFO-109931]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-INFO-104897 - Robotics III - Sensors and Perception in Robotics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	2400067	Robotics III - Sensors and Perception in Robotics	2 SWS	Lecture / 🗣	Asfour
Exams					
ST 2022	7500242	Robotics III - Sensors and Perception in Robotics			Asfour
WT 22/23	7500207	Robotics III - Sensors and Perception in Robotics			Asfour

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

Below you will find excerpts from events related to this course:

V Robotics III - Sensors and Perception in Robotics

2400067, SS 2022, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
The lecture supplements the lecture Robotics I with a broad overview of sensors used in robotics. The lecture focuses on visual perception, object recognition, simultaneous localization and mapping (SLAM) and semantic scene interpretation. The lecture is divided into two parts:

In the first part a comprehensive overview of current sensor technologies is given. A basic distinction is made between sensors for the perception of the environment (exteroceptive) and sensors for the perception of the internal state (proprioceptive).

The second part of the lecture concentrates on the use of exteroceptive sensors in robotics. The topics covered include tactile exploration and visual data processing, including advanced topics such as feature extraction, object localization, simultaneous localization and mapping (SLAM) and semantic scene interpretation.

Learning Obejctives:

Students know the main sensor principles used in robotics and understand the data flow from physical measurement through digitization to the use of the recorded data for feature extraction, state estimation and environmental modeling.

Students are able to propose and justify suitable sensor concepts for common tasks in robotics.

Organizational issues
Die Erfolgskontrolle erfolgt in Form einer schriftlichen Prüfung im Umfang von i.d.R. 60 Minuten nach § 4 Abs. 2 Nr. 1 SPO.

Modul für Master Maschinenbau, Mechatronik und Informationstechnik, Elektrotechnik und Informationstechnik

Voraussetzungen: **Der Besuch der Vorlesung *Robotik I – Einführung in die Robotik* wird vorausgesetzt**

Zielgruppe: Die Vorlesung richtet sich an Studierende der Informatik, der Elektrotechnik und des Maschinenbaus sowie an alle Interessenten an der Robotik.

Arbeitsaufwand: 90 h

Literature
Eine Foliensammlung wird im Laufe der Vorlesung angeboten.

Begleitende Literatur wird zu den einzelnen Themen in der Vorlesung bekannt gegeben.

T 6.340 Course: Scientific Methods to Design and Analyze Secure Decentralized Systems [T-INFO-111568]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: M-INFO-105780 - Scientific Methods to Design and Analyze Secure Decentralized Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2400009	Scientific Methods to Design and Analyze Secure Decentralized Systems	3 SWS	Lecture / Practice (/ 🗣	Hartenstein, Jacob
Exams					
ST 2022	7500235	Scientific Methods to Design and Analyze Secure Decentralized Systems			Hartenstein

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

Recommendation
Prior knowledge on the abstract concepts as well as concrete use cases of decentralized systems is strongly recommended. The “Decentralized Systems: Fundamentals, Modeling, and Applications” lecture covers all necessary aspects, but equivalent lectures and / or self-study can also be sufficient.

T 6.341 Course: Security [T-INFO-101371]

Responsible: Prof. Dr. Dennis Hofheinz
Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-100834 - Security

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	24941	Security	3 SWS	Lecture / 🗣	Müller-Quade, Strufe, Wressnegger
Exams					
ST 2022	7524941	Security			Müller-Quade, Strufe, Wressnegger

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

T 6.342 Course: Selected Issues in Critical Information Infrastructures [T-WIWI-109251]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2512403	Advanced Lab Blockchain Hackathon (Master)		Practical course /	Sunyaev, Beyene, Kannengießer
ST 2022	2513401	Seminar Selected Issues in Critical Information Infrastructures (Master)		Seminar /	Sunyaev, Lins
WT 22/23	2513401	Seminar Selected Issues in Critical Information Infrastructures (Master)		Seminar	Sunyaev, Lins
Exams					
ST 2022	7900030	Lab Coding da Vinci - Cultural Heritage Hackathon (Master)			Sack
ST 2022	7900031	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev
WT 22/23	7900094	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO). Details will be announced in the respective course.

Prerequisites
None.

Annotation
T-WIWI-109251 "Selected Issues in Critical Information Infrastructures" serves to credit an extracurricular course in the module "Critical Digital Infrastructures".

T 6.343 Course: Selected Legal Issues of Internet Law [T-INFO-108462]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	24821	Selected legal issues of Internet law	2 SWS	Colloquium (K / 🗣)	Dreier
Exams					
ST 2022	7500099	Selected Legal Issues of Internet Law			Dreier, Matz

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.344 Course: Semantic Web Technologies [T-WIWI-110848]

Responsible: Dr. Tobias Christof Käfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101455 - Web Data Management
M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-105366 - Artificial Intelligence

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2511310	Semantic Web Technologies	2 SWS	Lecture /	Färber, Käfer, Braun
ST 2022	2511311	Exercises to Semantic Web Technologies	1 SWS	Practice /	Färber, Käfer
Exams					
ST 2022	79AIFB_SWebT_A4	Semantic Web Technologies (Registration until 18 July 2022)			Färber
WT 22/23	79AIFB_SWebT_A2	Semantic Web Technologies			Käfer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendation
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required.

Below you will find excerpts from events related to this course:

V Semantic Web Technologies

2511310, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals

Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

V **Exercises to Semantic Web Technologies** **Practice (Ü) Online**
2511311, SS 2022, 1 SWS, Language: English, Open in study portal

Content
The exercises are related to the lecture Semantic Web Technologies.

Multiple exercises are held that capture the topics, held in the lecture Semantic Web Technologies, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Organizational issues
Die Übungen finden im Rahmen der Termine der Blockvorlesung statt.

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

T 6.345 Course: Seminar in Business Administration A (Master) [T-WIWI-103474]

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102736 - Seminar Module Economic Sciences

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2400121	Interactive Analytics Seminar	2 SWS	/	Beigl, Mädche, Pescara
ST 2022	2500015	Innovation & Space	2 SWS	Seminar	Beyer
ST 2022	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar /	Mädche
ST 2022	2530372	Advances in Financial Machine Learning	2 SWS	Seminar	Ulrich
ST 2022	2530580	Seminar in Finance (Master): Machine Learning Stock Returns with Option Data		Seminar /	Uhrig-Homburg, Müller, Thimme
ST 2022	2540472	Digital Citizen Science	2 SWS	Seminar	Weinhardt, Knierim, Mädche
ST 2022	2540473	Business Data Analytics	2 SWS	Seminar	Badewitz, Weinhardt
ST 2022	2540475	Electronic Markets & User Behavior	2 SWS	Seminar	Knierim
ST 2022	2540477	Digital Experience & Participation	2 SWS	Seminar	Peukert, Fegert
ST 2022	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Staudt, Henni, Semmelmann, Qu, Bluhm, Golla
ST 2022	2540493	Data Science for the Industrial Internet of Things		Seminar /	Martin, Kühl
ST 2022	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2022	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar /	Mädche, Beigl
ST 2022	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar /	Mädche
ST 2022	2545002	Entrepreneurship Research	2 SWS	Seminar /	Terzidis, Dang, Kuschel
ST 2022	2571180	Seminar in Marketing and Sales (Master)	2 SWS	Seminar /	Klarmann, Mitarbeiter
ST 2022	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
ST 2022	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
ST 2022	2579909	Seminar Management Accounting	2 SWS	Seminar /	Wouters, Jaedeke
ST 2022	2579910	Entrepreneurial Strategy and Financing of Start-Ups	2 SWS	Seminar /	Burkardt
ST 2022	2579919	Seminar in Management Accounting - Special Topics	2 SWS	Seminar /	Ebinger
ST 2022	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar /	Dehler-Holland, Fichtner
ST 2022	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar /	Volk, Schultmann
ST 2022	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar /	Kraft, Fichtner
ST 2022	2581990		2 SWS	Seminar /	Schultmann
WT 22/23	2500019	Digital Citizen Science	2 SWS	Seminar /	Mädche, Nieken

WT 22/23	2500045	Digital Democracy - Challenges and Opportunities of the Digital Society	2 SWS	Seminar /	Fegert
WT 22/23	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar /	Mädche
WT 22/23	2530293		2 SWS	Seminar /	Ruckes, Hoang, Benz, Strych, Luedecke, Silbereis, Wiegratz
WT 22/23	2540473	Data Science in Service Management	2 SWS	Seminar /	Badewitz, Grote, Jaquart
WT 22/23	2540475	Digital Platforms, Markets & Work	2 SWS	Seminar /	Knierim, del Puppo, Bartholomeyczik
WT 22/23	2540477	Digital Experience and Participation	2 SWS	Seminar /	Peukert, Fegert, Greif-Winzrieth, Stein, Bezzaoui
WT 22/23	2540478	Smart Grids and Energy Markets	2 SWS	Seminar /	Golla, Henni, Bluhm, Semmelmann
WT 22/23	2540557	Information Systems and Design (ISSD) Seminar	2 SWS	Seminar /	Mädche
WT 22/23	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar /	Koch
WT 22/23	2571181	Seminar Digital Marketing (Master)	2 SWS	Seminar /	Kupfer
WT 22/23	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 22/23	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar /	Nieken, Mitarbeiter
WT 22/23	2579910	Entrepreneurial Strategy and Financing of Start-Ups	2 SWS	Seminar /	Burkardt
WT 22/23	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar /	Wouters, Dickemann
WT 22/23	2581030	Seminar in Energy Economics	2 SWS	Seminar /	Dehler-Holland, Fichtner
WT 22/23	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar /	Schultmann, Rudi
WT 22/23	2581980	Seminar in Energy Economics	2 SWS	Seminar /	Fichtner, Kraft, Zimmermann
WT 22/23	2581981	Seminar in Energy Economics	2 SWS	Seminar /	Ardone, Finck, Fichtner, Slednev
WT 22/23	2581990		2 SWS	Seminar	Schultmann
Exams					
ST 2022	7900018	Globalization of Innovation – Innovation for Globalization: Methods and Analyses			Schneider
ST 2022	7900019	Master Seminar in Data Science and Machine Learning			Geyer-Schulz
ST 2022	7900025	Successful Transformation Through Innovation			Busch
ST 2022	7900052	Entrepreneurship Research			Terzidis
ST 2022	7900055	Roadmapping			Weissenberger-Eibl
ST 2022	7900081	Erstellen einer Übersicht zu soziokulturellen Anforderungen an die technische Ausrüstung von Bauwerken für den Anwendungsfall „Wohngebäude“			Lützkendorf
ST 2022	7900093	Seminar in Business Administration A			Weinhardt
ST 2022	7900101	Seminar Human Resource Management (Master)			Nieken
ST 2022	7900127	Seminar in Finance (Master) - Machine Learning Stock Returns with Option Data			Uhrig-Homburg
ST 2022	7900166	Home Office Design Seminar: Digital Citizen Science			Mädche
ST 2022	7900180	Seminar in Business Administration			Weinhardt
ST 2022	7900190	Current Topics in Digital Transformation Seminar			Mädche
ST 2022	7900214	Seminar Business Data Analytics			Weinhardt

ST 2022	7900228	Seminar in Business Administration A (Master) -Vorhersagemodellierung von Bauteileigenschaften durch Data-Mining mit Prozessdaten	Satzger
ST 2022	7900231	Seminar Human Resources and Organizations (Master)	Nieken
ST 2022	7900233	Seminar in Marketing and Sales (Master)	Klarmann
ST 2022	7900239	Innovation & Space	Weissenberger-Eibl
ST 2022	7900249	Seminar in Business Administration A (Master) - FSOSR: A Clustering-based Approach for Differentiating Detected Unknown Data in Open-Set Recognition	Satzger
ST 2022	7900256	Seminar Digital Platforms, Markets & Work	Weinhardt
ST 2022	7900261	Information Systems and Design (ISSD) Seminar	Mädche
ST 2022	7900265	User-adaptive Systems Seminar	Mädche
ST 2022	7900272	Data Science for the Industrial Internet of Things	Satzger
ST 2022	7900284	Digital Transformation and Business Models	Weissenberger-Eibl
ST 2022	7900313	Social influences on decision making	Scheibehenne
ST 2022	7900372	Seminar Digital Citizen Science	Weinhardt
ST 2022	79-2579909-M	Seminar Management Accounting (Master)	Wouters
ST 2022	79-2579919-M	Seminar Management Accounting - Special Topics (Master)	Wouters
ST 2022	79-2579929-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
ST 2022	792581030	Seminar in Business Administration (Bachelor)	Fichtner
ST 2022	792581031	Seminar in Business Administration B (Master)	Plötz
ST 2022	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2022	7981977	Seminar in Production and Operations Management II	Schultmann
ST 2022	7981978	Seminar in Production and Operations Management III: Current Topics in Risk and Crisis Management	Schultmann
ST 2022	7981979	Seminar Energy Economics I	Fichtner
ST 2022	7981980	Seminar Energy Economics II	Fichtner
ST 2022	7981981	Seminar Energy Economics III	Fichtner
WT 22/23	7900069	Current Topics in Digital Transformation Seminar	Mädche
WT 22/23	7900106	Hospital Management	Hansis
WT 22/23	7900163	Seminar Human Resource Management (Master)	Nieken
WT 22/23	7900164	Seminar Human Resources and Organizations (Master)	Nieken
WT 22/23	7900184	Seminar in Finance (Master)	Ruckes
WT 22/23	7900237	Case Studies Seminar: Innovation Management	Weissenberger-Eibl
WT 22/23	7900239	Technologies for Innovation Management	Weissenberger-Eibl
WT 22/23	7900359	Methods in Innovation Management	Weissenberger-Eibl

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.

Below you will find excerpts from events related to this course:

V **Interactive Analytics Seminar**
2400121, SS 2022, 2 SWS, Language: English, Open in study portal **Online**

Content
Providing new and innovative ways for interacting with data is becoming increasingly important. In this seminar, an interdisciplinary team of students engineers a running software prototype of an advanced interactive system leveraging state-of-the-art hardware and software focusing on an analytical use case. The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). This seminar follows an interdisciplinary approach. Students the fields of computer science, information systems and industrial engineering work together in teams.

Learning Objectives

- Explore and specify a data-driven interaction challenge
- Suggest and evaluate different design solutions for addressing the identified problem
- Build interactive analytics prototypes using advanced interaction concepts and pervasive computing technologies

Prerequisites

Strong analytic abilities and profound skills in SQL as wells as Python and/or R are required.

Literature

Further literature will be made available in the seminar.

Organizational issues
nach Vereinbarung

V **Advances in Financial Machine Learning**
2530372, SS 2022, 2 SWS, Language: English, Open in study portal **Seminar (S)**

Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues
Location: Räume des Lehrstuhls, Blücherstraße 17, E-008

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

V **Data Science for the Industrial Internet of Things**
2540493, SS 2022, SWS, Language: English, Open in study portal **Seminar (S) On-Site**

Content
Learning Objectives

1. Gain practical experience in translating a business problem into a data modeling problem
2. Apply solid theoretical foundations from lectures to real-world data
3. Acquire hands-on experience with industrial data science tools
4. Learn how to communicate data science findings to business stakeholders

Course Credits

The practical seminar can be credited as Seminar Betriebswirtschaftslehre A [WIWI-103474] (3 ECTS). Other courses can be credited upon request.

Seminar Description

The Internet of Things is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, internet access, and economical sensors – physical products turn into cyber-physical smart products that create vast amounts of data.

Current airplanes for example have around 6.000 sensors, creating around 1 TB of data per flight. This data is about the size of all tweets in 3 months worldwide. And this number is growing tremendously. But only 3% of potentially useful data is tagged today, end even less is analyzed. Although Internet of Things use cases such as predictive maintenance are projected to help companies save $630 billion by 2025 (McKinsey, 2015), companies struggle to turn sensor data into actionable insights. To solve this challenge, substantive expertise needs to be combined with skills from software engineering and statistics and machine learning to generate valuable insights from machine data.

The practical seminar is held in cooperation with industry partners of the KSRI, which provide some real-word datasets. Students will then work in teams of three in a close and agile collaboration with the industry subject matter experts from around the world, making use of to the CRISP DM methodology (Chapman et al. 2000)

There will be four different topics and datasets, each assigned to a team of three students. The assignment will be done in the kickoff in calendar week 18. The exact date of the kickoff event will be determined when the participating students have been selected. Attendance at the kickoff event in calendar week 18 is mandatory and a prerequisite for participation.

Expertise in Python and Data Science / Machine Learning is strongly recommended.

Contact

Dominik Martin – dominik.martin@kit.edu
Dr. Niklas Kühl – niklas.kuehl@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.

V **Master Seminar in Data Science and Machine Learning** — **Seminar (S)**
2540510, SS 2022, 2 SWS, Language: German/English, Open in study portal

V **User-Adaptive Systems Seminar** — **Seminar (S)** **Blended (On-Site/Online)**
2540553, SS 2022, 2 SWS, Language: English, Open in study portal

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 (Research Group ISSD, 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 **Information Systems and Service Design Seminar** — **Seminar (S)**
2540557, SS 2022, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
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 ISSD (Prof. Mädche). The research group "Information Systems & Service Design" (ISSD) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues
Termine werden bekannt gegeben

V **Entrepreneurship Research** — **Seminar (S)** **On-Site**
2545002, SS 2022, 2 SWS, Language: English, Open in study portal

Content
Content

The students independently develop a topic from entrepreneurship research in an international setting as a tandem with a partner. At first, there will be an introduction to the methodologies used such as systematic literature review, design science, qualitative and quantitative data analysis and more. As part of a written elaboration, the seminar topic must be presented scientifically on 15-20 pages. The results of the seminar paper will be presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

As part of the written elaboration, the basics of independent scientific work (literature research, argumentation + discussion, citing literature sources, application of qualitative, quantitative and simulative methods) are trained. The skills acquired in the seminar are used to prepare for a potential master thesis. The course is therefore particularly aimed at students who want to write their thesis at the Chair for Entrepreneurship and Technology Management.

Registration:

Registration is via the Wiwi portal.

Organizational issues
Termine werden noch bekannt gegeben.

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

Literature
Wird im Seminar bekannt gegeben.

V **Seminar Human Resource Management (Master)** — **Seminar (S)** **On-Site**
2573012, SS 2022, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V **Seminar Human Resources and Organizations (Master)** **Seminar (S)**
2573013, SS 2022, 2 SWS, Language: German, Open in study portal **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 Management Accounting** **Seminar (S)**
2579909, SS 2022, 2 SWS, Language: English, Open in study portal **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. You are to a large extent free to select your own topic. The seminar course is concentrated in four 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 of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

V

Seminar in Management Accounting - Special Topics

Seminar (S)
On-Site

2579919, SS 2022, 2 SWS, Language: English, Open in study portal

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

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 of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

V

Digital Citizen Science

2500019, WS 22/23, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Scheibehenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

V

Data Science in Service Management

2540473, WS 22/23, 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

Methoden im Innovationsmanagement

2545107, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

V

Seminar Human Resource Management (Master)

2573012, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V Seminar Human Resources and Organizations (Master)

2573013, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V Seminar Management Accounting - Special Topics

2579919, WS 22/23, 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 of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 16 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

T 6.346 Course: Seminar in Economic Policy [T-WIWI-102789]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Exams			
ST 2022	7900051	Seminar in Economic Policy	Ott

Competence Certificate
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted scored examinations (Essay 50%, 40% oral presentation, active participation 10%).

Prerequisites
None

Recommendation
At least one of the lectures "Theory of Endogenous Growth" or "Innovation Theory and Policy" should be attended in advance, if possible.

T 6.347 Course: Seminar in Economics A (Master) [T-WIWI-103478]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102736 - Seminar Module Economic Sciences

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2500013	Predictive Data Analytics - An Introduction to Machine Learning		Seminar / 🧩	Lerch, Koster
ST 2022	2520367	Strategische Entscheidungen	2 SWS	Seminar / 🧩	Ehrhart
ST 2022	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Görgen, Koster, Buse, Rüter
ST 2022	2560282	Seminar in economic policy	2 SWS	Seminar / 🗣	Ott, Assistenten
ST 2022	2560552	Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Master)	2 SWS	Seminar / 🧩	Szech, Zhao
ST 2022	2560555	Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Bachelor)	2 SWS	Seminar / 🧩	Szech, Rau
WT 22/23	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter, Görgen
WT 22/23	2560142	Moral Wiggle Room and Info Avoidance - Topics in Political Economy (Master)	2 SWS	Seminar / 🧩	Szech, Rosar, Rau
WT 22/23	2560143	Overcoming the Corona Crisis - Morals & Social Behavior (Master)	2 SWS	Seminar / 🧩	Szech, Zhao
WT 22/23	2560282	Seminar in economic policy	2 SWS	Seminar / 🗣	Ott, Assistenten
WT 22/23	2560400	Seminar in Macroeconomics I	2 SWS	Seminar / 🧩	Brumm, Krause, Pegorari, Hußmann
WT 22/23	2560401	Seminar in Macroeconomics II	2 SWS	Seminar / 🧩	Brumm, Krause, Pegorari, Hußmann
WT 22/23	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba
Exams					
ST 2022	7900009	Demographic Change and Pension Reforms			Brumm
ST 2022	7900033	Predictive Data Analytics			Lerch
ST 2022	7900051	Seminar in Economic Policy			Ott
ST 2022	7900059	Bounded Rationality - Theory and Experiments (Master)			Szech
ST 2022	7900064	Seminar: Do Groups Make Better Decisions? The "Wisdom of the Crowd" in Theory and Practice			Puppe
ST 2022	7900131	Shaping AI and Digitization (Master)			Szech
ST 2022	7900162	The Macroeconomics of Sanctions			Brumm
ST 2022	7900282	Digital IT-Solutions and Services Transforming the Field of Public Transportation			Mitusch
ST 2022	7900292	Seminar Strategic Decisons (Master A)			Ehrhart
ST 2022	79sefi2	Seminar Public Finance A (Master)			Wigger
WT 22/23	7900076	Economic Choices Over the Life Cycle			Brumm
WT 22/23	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)			Schienle

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.

Below you will find excerpts from events related to this course:

V **Predictive Data Analytics - An Introduction to Machine Learning** **Seminar (S)**
2500013, SS 2022, SWS, Language: English, Open in study portal **Blended (On-Site/Online)**

Content
Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

Organizational issues
The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

V **Advanced Topics in Econometrics** **Seminar (S)**
2521310, SS 2022, 2 SWS, Language: German/English, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V

Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Master)

2560552, SS 2022, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Participation will be limited to 12 students.

For Master 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

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 8–10 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). Students can improve their grades by 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
Blockveranstaltung:

Introductory Meeting April 20 (online)

Seminar Presentations June 3 (Präsenz or online)

V

Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Bachelor)

2560555, SS 2022, 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.

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

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 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
Blockveranstaltung:

Introductory Meeting April 19 (online)

Seminar Presentations May 30 (Präsenz or online)

V

Topics in Econometrics

2521310, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V

Moral Wiggle Room and Info Avoidance - Topics in Political Economy (Master)

2560142, WS 22/23, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
For Master 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

V **Overcoming the Corona Crisis - Morals & Social Behavior (Master)** **Seminar (S)**
2560143, WS 22/23, 2 SWS, Language: English, Open in study portal **Blended (On-Site/Online)**

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see 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

T 6.348 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102822 - Seminar Module Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar /	Oberweis, Forell, Frister, Fritsch, Rybinski, Schreiber, Schüler, Ullrich, Schiefer
ST 2022	2513219	Seminar Advanced Topics in Petri Net Modeling (Master)	2 SWS	Seminar /	Oberweis, Fritsch
ST 2022	2513309	Seminar Knowledge Discovery and Data Mining (Master)	3 SWS	Seminar /	Färber, Noullet, Saier, Popovic
ST 2022	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar /	Färber, Käfer, Kulbach, Thoma
ST 2022	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar /	Lins, Sunyaev, Thiebes
ST 2022	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar /	Lins, Sunyaev, Thiebes
ST 2022	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar /	Zöllner
ST 2022	2513553	Seminar E-Voting (Master)	2 SWS	Seminar /	Beckert, Müller-Quade, Volkamer, Dörre, Düzgün, Kirsten
WT 22/23	2400125	Security and Privacy Awareness	2 SWS	Seminar /	Seidel-Saul, Volkamer, Aldag
WT 22/23	2513219	Seminar Process Mining for process oriented Data Science (Master)	2 SWS	Seminar /	Oberweis, Alpers
WT 22/23	2513220	Seminar Verification of Software (Master)	2 SWS	Seminar /	Oberweis, Fritsch
WT 22/23	2513313	Seminar Linked Data and the Semantic Web (Master)	3 SWS	Seminar /	Färber, Käfer, Braun
WT 22/23	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/	Färber, Höllig, Thoma
WT 22/23	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/	Färber, Höllig, Thoma
WT 22/23	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar /	Zöllner, Daaboul
Exams					
ST 2022	7900031	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev
ST 2022	7900088	Seminar Business Information Systems (Master)			Oberweis
ST 2022	7900128	Seminar Emerging Trends in Internet Technologies (Master)			Sunyaev
ST 2022	7900146	Seminar Emerging Trends in Digital Health (Master)			Sunyaev
ST 2022	7900147	Cognitive Automobiles and Robots			Zöllner
ST 2022	7900198	Seminar Data Science & Real-time Big Data Analytics (Master)			Färber
ST 2022	7900200	Seminar E-Voting (Master)			Volkamer
ST 2022	7900202	Seminar Knowledge Discovery and Data Mining (Master)			Sure-Vetter

ST 2022	7900219	Seminar Advanced Topics in Petri Net Modeling (Master)	Oberweis
WT 22/23	7500220	Seminar Ubiquitous Computing	Beigl
WT 22/23	7900035	Seminar Verification of Software (Master)	Oberweis
WT 22/23	7900094	Seminar Selected Issues in Critical Information Infrastructures (Master)	Sunyaev
WT 22/23	7900102	Advanced Lab Information Service Engineering (Master)	Sack
WT 22/23	7900117	Seminar Process Mining for Process Oriented Data Science (Master)	Oberweis
WT 22/23	7900119	Seminar Cognitive Automobiles and Robots	Zöllner
WT 22/23	7900129	Security and Privacy Awareness	Volkamer
WT 22/23	7900304	Seminar Linked Data and the Semantic Web (Master)	Färber
WT 22/23	7900356	Seminar Real-World Challenges in Data Science and Analytics (Master)	Sure-Vetter

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.

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.

Below you will find excerpts from events related to this course:

V **Seminar Advanced Topics in Petri Net Modeling (Master)**
2513219, SS 2022, 2 SWS, Language: English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
A system should be correct and efficient. We specify discrete event systems by Petri nets to apply formal analysis techniques based on graph theory and linear algebra to prove correctness. Extended models, such as colored Petri nets, are applied to implement performance evaluation via simulation. We start from case studies using the modeling system Tina and its facilities of model checking for verification of communication protocols. Then we apply Petri nets for the control of robotic manufacturing and consider the sharing of resources in automated manufacturing. Colored Petri nets allow more precise specification of systems, which also leads to reduced abilities for applying formal techniques. So the basic method of investigation is simulation. Our case study concerns modern technology of networking and models are supplied with measuring components which compute statistical characteristics directly in the process of simulation. Finally, a review of modern theory of infinite Petri nets and Sleptsov net computing are provided with a view on cybersecurity of intelligent grids and clouds and hyper-performance concurrent computations.

Organizational issues
Die Veranstaltung findet auf Englisch statt. Die Bewerbung erfolgt über das Wiwi-Portal: https://portal.wiwi.kit.edu/ys/6074

Literature
Tools:
Tina https://projects.laas.fr/tina/index.php
CPN Tools https://cpntools.org/

References:
Zaitsev D.A. Clans of Petri Nets: Verification of protocols and performance evaluation of networks, LAP LAMBERT Academic Publishing, 2013, 292 p. (http://daze.ho.ua/daze-clans-covered-draft.djvu)
Zaitsev D.A., Shmeleva T.R. Simulating Telecommunication Systems with CPN Tools: Students' book // Odessa: ONAT, 2006. - 60 p. (http://daze.ho.ua/cpnmp2.pdf)
Recent developments in papers on http://daze.ho.ua

V Seminar Knowledge Discovery and Data Mining (Master)

2513309, SS 2022, 3 SWS, Language: English, Open in study portal

Seminar (S)
Online

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/.

Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

Literature
Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Seminar Data Science & Real-time Big Data Analytics (Master)

2513311, SS 2022, 2 SWS, Language: English, Open in study portal

Seminar (S)
Online

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues
Further information as well as the registration form can be found under the following link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

V Cognitive Automobiles and Robots

2513500, SS 2022, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
Online

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Seminar E-Voting (Master)

2513553, SS 2022, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
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).

Organizational issues
Die Anmeldung für das Seminar ist bis zum Sonntag 03.04.2022, 23:59 Uhr,
über die Seite https://portal.wiwi.kit.edu/ys/5915 möglich.

V Security and Privacy Awareness

2400125, WS 22/23, 2 SWS, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Note: The link to enrol is for every student, regardless of the study background!

Dates:

- Kick-Off : 22.10.21, 14:00 o'clock
- Final version: 23.01.2022
- Presentation: 04.02.2022, 13:00 o'clock

Topics will be assigned after the enrolment deadline, before the Kick-Off.

Consider that legal focused topics require you to speak and understand german legal texts.

Topics:

- Phishing for Difference: How Does Phishing Impact Visually-Impaired Users?
- Wann wird Marketing im Security-Kontext ethisch bedenklich?
- Untersuchung der Wahrnehmung von (technischen) Backdoors zur Strafverfolgung.
- Data-Governance-Act – Fluch oder Segen für den Datenschutz?
- Würde lieber kein Thema anbieten, notfalls "Was ist der Wert von Privatheit?"
- Massenüberwachung von Kommunikationsknotenpunkten und Chilling Effects -- Eine rechtliche und ethische Auseinandersetzung
- Verletzt algorithmische Analyse von personenbezogenen Daten durch KI Privatheit -- und wenn ja, wie schlimm ist das?

ATTENTION: The seminar is only for MASTER students!

V **Seminar Verification of Software (Master)** **Seminar (S)**
2513220, WS 22/23, 2 SWS, Language: English, Open in study portal **Blended (On-Site/Online)**

Content
The course presents a balance of theory and practice of software verification, including verification of parallel and distributed programs. These methods are the basis for the development of reliable (secure) software. Most information about the reliability of modern programs is based on testing methods that guarantee a certain probability of the program performing a given function. Formal proof of software correctness is the next step in improving the reliability of software for special applications in real-time systems, as well as in vital areas.

The goal of course is to form knowledge of basic terms and concepts of mathematical techniques and software verification; to study theoretical and practical foundations, principles and basic methods of software verification; as well as acquisition of practical skills to prove the correctness of applied algorithms, acquisition of skills which are necessary for further scientific and professional activities.

Topic 1. Tools for verification of serial and parallel programs written on algorithmic languages.

Topic 2.Verification of parallel software by Petri nets (PN).

Topic 3. Algebra and calculus of processes as verification technique of distributed programs.

Organizational issues
Die Veranstaltung findet auf Englisch statt. Die Bewerbung erfolgt über das Wiwi-Portal (https://portal.wiwi.kit.edu/ys/6475).

Literature
Laboratory work uses Tina modeling system, mCRL2 (http: /projects.laas/fr/tina, https://www.mcrl2.org), modern open source software and models located in the GitHub.

V **Seminar Linked Data and the Semantic Web (Master)** **Seminar (S)**
2513313, WS 22/23, 3 SWS, Language: German/English, Open in study portal **On-Site**

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V **Seminar Real-World Challenges in Data Science and Analytics (Bachelor)** **On-Site**
2513314, WS 22/23, 3 SWS, Language: German/English, Open in study portal

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V **Seminar Real-World Challenges in Data Science and Analytics (Master)** **On-Site**
2513315, WS 22/23, 3 SWS, Language: German/English, Open in study portal

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V **Seminar Cognitive Automobiles and Robots (Master)** **Seminar (S)**
Blended (On-Site/Online)
2513500, WS 22/23, 2 SWS, Language: German/English, Open in study portal

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

T 6.349 Course: Seminar in Information Systems (Master) [T-WIWI-109827]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104815 - Seminar Information Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar /	Mädche
ST 2022	2540472	Digital Citizen Science	2 SWS	Seminar	Weinhardt, Knierim, Mädche
ST 2022	2540473	Business Data Analytics	2 SWS	Seminar	Badewitz, Weinhardt
ST 2022	2540475	Electronic Markets & User Behavior	2 SWS	Seminar	Knierim
ST 2022	2540477	Digital Experience & Participation	2 SWS	Seminar	Peukert, Fegert
ST 2022	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Staudt, Henni, Semmelmann, Qu, Bluhm, Golla
ST 2022	2540493	Data Science for the Industrial Internet of Things		Seminar /	Martin, Kühl
ST 2022	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2022	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar /	Mädche, Beigl
ST 2022	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar /	Mädche
WT 22/23	2500019	Digital Citizen Science	2 SWS	Seminar /	Mädche, Nieken
WT 22/23	2500045	Digital Democracy - Challenges and Opportunities of the Digital Society	2 SWS	Seminar /	Fegert
WT 22/23	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar /	Mädche
WT 22/23	2540473	Data Science in Service Management	2 SWS	Seminar /	Badewitz, Grote, Jaquart
WT 22/23	2540475	Digital Platforms, Markets & Work	2 SWS	Seminar /	Knierim, del Puppo, Bartholomeyczik
WT 22/23	2540477	Digital Experience and Participation	2 SWS	Seminar /	Peukert, Fegert, Greif-Winzrieth, Stein, Bezzaoui
WT 22/23	2540478	Smart Grids and Energy Markets	2 SWS	Seminar /	Golla, Henni, Bluhm, Semmelmann

Exams			
ST 2022	7900019	Master Seminar in Data Science and Machine Learning	Geyer-Schulz
ST 2022	7900093	Seminar in Business Administration A	Weinhardt
ST 2022	7900166	Home Office Design Seminar: Digital Citizen Science	Mädche
ST 2022	7900180	Seminar in Business Administration	Weinhardt
ST 2022	7900190	Current Topics in Digital Transformation Seminar	Mädche
ST 2022	7900214	Seminar Business Data Analytics	Weinhardt
ST 2022	7900256	Seminar Digital Platforms, Markets & Work	Weinhardt
ST 2022	7900261	Information Systems and Design (ISSD) Seminar	Mädche
ST 2022	7900265	User-adaptive Systems Seminar	Mädche
ST 2022	7900272	Data Science for the Industrial Internet of Things	Satzger

ST 2022	7900372	Seminar Digital Citizen Science	Weinhardt
WT 22/23	7900069	Current Topics in Digital Transformation Seminar	Mädche

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 for WIWI-seminars are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Data Science for the Industrial Internet of Things** **Seminar (S) On-Site**
2540493, SS 2022, SWS, Language: English, Open in study portal

Content
Learning Objectives

1. Gain practical experience in translating a business problem into a data modeling problem
2. Apply solid theoretical foundations from lectures to real-world data
3. Acquire hands-on experience with industrial data science tools
4. Learn how to communicate data science findings to business stakeholders

Course Credits

The practical seminar can be credited as Seminar Betriebswirtschaftslehre A [WIWI-103474] (3 ECTS). Other courses can be credited upon request.

Seminar Description

The Internet of Things is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, internet access, and economical sensors – physical products turn into cyber-physical smart products that create vast amounts of data.

Current airplanes for example have around 6.000 sensors, creating around 1 TB of data per flight. This data is about the size of all tweets in 3 months worldwide. And this number is growing tremendously. But only 3% of potentially useful data is tagged today, end even less is analyzed. Although Internet of Things use cases such as predictive maintenance are projected to help companies save $630 billion by 2025 (McKinsey, 2015), companies struggle to turn sensor data into actionable insights. To solve this challenge, substantive expertise needs to be combined with skills from software engineering and statistics and machine learning to generate valuable insights from machine data.

The practical seminar is held in cooperation with industry partners of the KSRI, which provide some real-word datasets. Students will then work in teams of three in a close and agile collaboration with the industry subject matter experts from around the world, making use of to the CRISP DM methodology (Chapman et al. 2000)

There will be four different topics and datasets, each assigned to a team of three students. The assignment will be done in the kickoff in calendar week 18. The exact date of the kickoff event will be determined when the participating students have been selected. Attendance at the kickoff event in calendar week 18 is mandatory and a prerequisite for participation.

Expertise in Python and Data Science / Machine Learning is strongly recommended.

Contact

Dominik Martin – dominik.martin@kit.edu
Dr. Niklas Kühl – niklas.kuehl@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.

V **Master Seminar in Data Science and Machine Learning** — **Seminar (S)**
2540510, SS 2022, 2 SWS, Language: German/English, Open in study portal

V **User-Adaptive Systems Seminar** — **Seminar (S)** **Blended (On-Site/Online)**
2540553, SS 2022, 2 SWS, Language: English, Open in study portal

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 (Research Group ISSD, 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 **Information Systems and Service Design Seminar** — **Seminar (S)**
2540557, SS 2022, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
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 ISSD (Prof. Mädche). The research group "Information Systems & Service Design" (ISSD) 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 **Digital Citizen Science**
2500019, WS 22/23, 2 SWS, Language: German/English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Scheibehenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

V **Data Science in Service Management**
2540473, WS 22/23, 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

T 6.350 Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-102736 - Seminar Module Economic Sciences

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
ST 2022	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar / 🏵	Rebennack, Warwicker
ST 2022	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🏵	Nickel, Mitarbeiter
WT 22/23	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
WT 22/23	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar / 🏵	Rebennack, Warwicker
WT 22/23	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🏵	Nickel, Mitarbeiter
Exams					
ST 2022	7900018_SS2022	Seminar in Operations Research A (Master)			Stein
ST 2022	7900199	Digitization in the Steel Industry			Nickel
ST 2022	7900243	Seminar: Modern OR and Innovative Logistics			Nickel
ST 2022	7900348	Seminar on Power Systems Optimization (Master)			Rebennack
ST 2022	7900349	Seminar Recent Topics in Optimization (Master)			Rebennack
WT 22/23	7900011_WS2223	Seminar in Operations Research B (Bachelor)			Stein

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.

Below you will find excerpts from events related to this course:

V

Seminar: Modern OR and Innovative Logistics

2550491, SS 2022, 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.

V

Seminar on Methodical Foundations of Operations Research (B)

2550131, WS 22/23, 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 22/23, 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
wird auf der Homepage bekannt gegeben

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

T 6.351 Course: Seminar in Statistics A (Master) [T-WIWI-103483]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102736 - Seminar Module Economic Sciences

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2500013	Predictive Data Analytics - An Introduction to Machine Learning		Seminar /	Lerch, Koster
ST 2022	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Görgen, Koster, Buse, Rüter
ST 2022	2550561	Spezielle fortgeschrittene Themen der Datenanalyse und Statistik	2 SWS	Seminar /	Grothe, Kaplan, Kächele
WT 22/23	2500042	Interpretable Statistical and Machine Learning Models	2 SWS	Seminar /	Lerch
WT 22/23	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter, Görgen
Exams					
ST 2022	00010	Seminar in Statistics A (Master)			Grothe
ST 2022	7900033	Predictive Data Analytics			Lerch
ST 2022	7900150	Advanced Topics in Econometrics, Seminar in Statistics A (Master)			Schienle, Krüger
ST 2022	7900250	Data Mining and Applications (Projectseminar)			Nakhaeizadeh
WT 22/23	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)			Schienle

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.

Below you will find excerpts from events related to this course:

V **Predictive Data Analytics - An Introduction to Machine Learning**
2500013, SS 2022, SWS, Language: English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

Organizational issues
The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

V **Advanced Topics in Econometrics** **Seminar (S)**
2521310, SS 2022, 2 SWS, Language: German/English, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V **Topics in Econometrics** **Seminar (S)**
2521310, WS 22/23, 2 SWS, Language: German, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

T 6.352 Course: Seminar Informatics A [T-INFO-104336]

Responsible: Prof. Dr. Sebastian Abeck
Organisation: KIT Department of Informatics
Part of: M-INFO-102822 - Seminar Module Informatics

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	1

Events					
ST 2022	2400011	Hot Topics in Bioinformatics	2 SWS	Seminar /	Stamatakis
ST 2022	2400072	Seminar: Service-oriented Architectures		Seminar /	Abeck, Schneider, Sänger
ST 2022	2400075	Undergraduate Seminar Software Disasters	2 SWS	Proseminar (/	Reussner
ST 2022	2400076	Proseminar Software Requirements and Design	2 SWS	Proseminar (/	Koziolek
ST 2022	2400086	Proseminar Algorithms for NP-hard Problems	2 SWS	Proseminar (/	Ueckerdt, Merker, Weyand, Feilhauer
ST 2022	2400110	Novel and non-mainstream advances in Data Science		Seminar /	Böhm, Bielski
ST 2022	2400137	Embedded Machine Learning		Seminar /	Rapp, Sikal, Pfeiffer, Zervakis, Khdr, Henkel
ST 2022	2400144	Can Statistics Prove Cause and Effect?	2 SWS	Seminar /	Janzing
ST 2022	2400148	Embedded Security and Architectures		Seminar /	Hussain, Nassar, Bauer, Khdr, Gonzalez, Henkel
ST 2022	24336	Robotics and Medicine	2 SWS	Seminar /	Mathis-Ullrich
ST 2022	24344	Advanced Methods of Information Fusion	2 SWS	Seminar /	Hanebeck, Reith-Braun
ST 2022	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar /	Mädche
ST 2022	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar /	Mädche, Beigl
ST 2022	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar /	Mädche
WT 22/23	2400078	Seminar: Neuronale Netze und künstliche Intelligenz		Seminar	Waibel, Retkowski
WT 22/23	2400092	Internet of Things		Seminar /	Zervakis, Bauer, Henkel
WT 22/23	2400137	Embedded Machine Learning		Seminar /	Rapp, Sikal, Pfeiffer, Balaskas, Zervakis, Khdr, Henkel
WT 22/23	2400148	Embedded Security and Architectures		Seminar /	Hussain, Nassar, Bauer, Khdr, Gonzalez, Sikal, Henkel
WT 22/23	24344	Advanced Methods of Information Fusion	2 SWS	Seminar /	Hanebeck, Reith-Braun
WT 22/23	24844	Seminar: Ubiquitous Systems	2 SWS	Seminar	Beigl, Zhou, Pescara
WT 22/23	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar /	Mädche
Exams					
ST 2022	7500013	Advanced Methods of Information Fusion			Hanebeck
ST 2022	7500014	Seminar: Hot Topics in Bioinformatics			Stamatakis
ST 2022	7500040	Seminar Information Systems			Böhm

ST 2022	750006	Seminar Robotics and Medicine	Mathis-Ullrich
ST 2022	7500106	Title not available	Bless, Hartenstein, Mädche, Zitterbart, Boehm, Sunyaev
ST 2022	7500162	Seminar: Ubiquitous Systems	Beigl, Riedel
ST 2022	7500177	Seminar Hot Topics in Networking	Zitterbart
ST 2022	7500276	Seminar: Can Statistics Prove Cause and Effect?	Janzing
ST 2022	7500297	Seminar: Hot Topics in Decentralized Systems	Hartenstein
ST 2022	7500301	Seminar: Proofs from THE BOOK	Sanders
ST 2022	7500335	CES - Seminar: Machine Learning	Henkel
ST 2022	75104740	Seminar: Service-Oriented Architectures	Abeck
ST 2022	7900261	Information Systems and Design (ISSD) Seminar	Mädche
ST 2022	7900265	User-adaptive Systems Seminar	Mädche
WT 22/23	7500021	Advanced Methods of Information Fusion	Hanebeck
WT 22/23	7500133	Seminar Information Systems	Böhm
WT 22/23	7500220	Seminar Ubiquitous Computing	Beigl

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Below you will find excerpts from events related to this course:

V

Hot Topics in Bioinformatics

2400011, SS 2022, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content

Prerequisites: CS Master's level seminar. Participants must have attended and passed the course on "Introduction to Bioinformatics for Computer Scientists" in one of the preceding winter terms.

Task: You will need to select papers to present, give a presentation and write a report.

This main seminar allows students to understand and present the contents of current papers in Bioinformatics such as published for instance in the journals *Bioinformatics*, *BMC Bioinformatics*, *Journal of Computational Biology*etc. or at conferences such as *ISMB* or *RECOMB*.

We will provide a list of interesting papers, but students can also propose papers they are interested in. Students may also chose to cover broader topics of more general interest such as multiple sequence alignment, Bayesian phylogenetic inference, read assembly etc.

Each student will be assigned a lab member for help with understanding the article and preparing the slides as well as the report.

Students should give a 35 minute presentation on their topic of choice and write a report (Seminararbeit) comprising 8 pages.

Goals: Participants are able to understand, critically assess, and compare current research papers in Bioinformatics. They are able to present algorithms and models from current research papers in oral and written form at a level that corresponds to that of scientific publications and conference presentations. Participants are able to suggest extension to current methods.

Credits: 3 ECTS

Organizational issues

IMPORTANT: Register for the seminar mailing list by sending an email to Alexandros.Stamatakis@h-its.org.

All information on the seminar is provided at: Seminar page Information about how we will start virtually is also provided there. We will start in the first week of the summer term. For all further information, students are requested to regularly read their emails.

V

Embedded Machine Learning

2400137, SS 2022, SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
In our seminars, students learn about cutting-edge research in the research fields presented below. Students are offered topics by the supervisors, but also can suggest their own topics in these fields. The seminar is offered in both English and German.
Machine learning on on-chip systems

Machine learning and on-chip systems form a symbiosis where each research area benefits from advances in the other. In this seminar, students review cutting-edge research on both areas.

Machine learning (ML) gains importance in all aspects of information systems. From high-level algorithms like image recognition to lower-level intelligent CPU management - ML is ubiquitous. On-chip systems also benefit from advances in ML techniques. Examples include adaptive resource management or workload prediction. However, ML techniques also benefit from advances in on-chip systems. A prominent example is acceleration of neural networks in recent desktop GPUs and even smartphone chips.

In this seminar, students will review cutting-edge state-of-the-art research (publications) on a specific topic related to ML on on-chip systems. The findings will be summarized in a seminar report and presented to the other members of the course. Students are welcome to suggest their own topics, but this is not required. The seminar can be held in English or German.

Approximate Computing for Efficient Machine Learning

Nowadays, energy efficiency is a first-class design constraint in the ICT sector. Approximate computing emerges as a new design paradigm for generating energy efficient computing systems. There is a large body of resource-hungry applications (eg, image processing and machine learning) that exhibit an intrinsic resilience to errors and produce outputs that are useful and of acceptable quality for the users despite their underlying computations being performed in an approximate manner. By exploiting this inherent error tolerance of such applications, approximate computing trades computational accuracy for savings in other metrics, eg, energy consumption and performance. Machine learning, a very common and top trending workload of both data centers and embedded systems, is a perfect candidate for approximate computing application since, by definition, it delivers approximate results. Performance as well as energy efficiency (especially in the case of embedded systems) are crucial for machine learning applications and thus, approximate computing techniques are widely adopted in machine learning (eg, TPU) to improve its energy profile as well as performance.

Machine Learning methods for DNN compilation and mapping
Deep neural networks have achieved great success in challenging tasks such as image classification and object detection. There is a great demand for deploying these networks in different devices, ranging from cloud servers to embedded devices.
Mapping DNNs to these devices is a challenging task since each of these devices has different characteristics in terms of memory organization, compute units, etc. . There have been efforts to automate the process of mapping/compiling DNNs to hardware with different characteristics.
In this seminar, we will discuss the efforts that have been done in mapping/compiling DNNs over hardware using machine learning methods.

Organizational issues
Please register in ILIAS to participate.

V **Embedded Security and Architectures** — **Seminar (S)**
2400148, SS 2022, SWS, Language: German/English, Open in study portal — **Blended (On-Site/Online)**

Content
In our seminars, students learn about cutting-edge research in the research fields presented below. Students are offered topics by the supervisors, but also can suggest their own topics in these fields. The seminar is offered in both English and German.

Dependability for Reconfigurable Architectures

Dependability has become one of the prime concerns in recent nano-era. Reliability (the ability of the system to deliver services as specified) and Security (the ability of the system to protect itself against deliberate or accidental intrusion) are the two crucial attributes of dependable systems. Among the other reliability threats due to physical limits of CMOS technology, radiation induced soft errors or transient faults are also the most challenging threat to be handled. During this seminar, we will explore state-of-the-art for the power-efficient soft-error reliability and study different research solutions to improve soft-error resiliency in power efficient manner leveraging power-performance-reliability trade-offs. During this seminar, the students will also be able to understand hardware security in reconfigurable architectures,

Thermal and Power Aware Embedded Systems

Power densities are continuously increasing along with technology scaling and the integration of more transistors into smaller areas, potentially resulting in thermal emergencies on the chip. To mitigate such emergencies, power and thermal management techniques are employed. The state-of-the-art power and thermal management techniques can be classified into several categories, such as reactive and proactive techniques, centralized and distributed ones. Recently, machine learning algorithms are employed in power and thermal management techniques to make them more proactive and adaptive. Those various categories of the state-of-the-art techniques need to be reviewed in this seminar to demonstrate the advantage and disadvantage of each of them.

Security of Reconfigurable Embedded Systems

Various types of (re)configurable systems have emerged in recent years. The spectrum ranges from one-time configurable systems that are programmed at the design time for product-specific requirements, to reconfigurable systems that can also be adapted after commissioning, to dynamically reconfigurable systems whose configuration can be changed at runtime and their ability to dynamic reconfiguration is an important part of their system functionality.
This seminar focuses on the runtime reconfigurable systems, their security aspects and methods. It investigates the current state of research for securing the runtime reconfigurable systems, as well as the feasibility of using the security measures from general processing architectures to runtime reconfigurable systems.

Security in Resource Management

Efficient resource management in many-core systems (ie, systems with more than 100 cores, not only a dozen) has become a research challenge in the last years. As complexity and the demand for scalability increase, this new paradigm should also consider new security features to avoid or mitigate the effects of malicious applications both on critical information and the system as a whole.

In this seminar, we will focus on the state-of-the-art of security attacks such as Side Channel Attacks (SCA), Covert channel attacks, as well as other similar resource-based attacks and their effects on other critical applications running on many-core systems. During this seminar, student will dive into the security aspects of resource management, while investigating answers to the following research questions:

- How do these attacks work?
- Which are the associated vulnerabilities? What resources are vulnerable?
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Organizational issues
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V **Advanced Methods of Information Fusion** **Seminar (S)**
24344, SS 2022, 2 SWS, Language: German/English, Open in study portal **On-Site**

Content
The growing spread and performance of modern information and communication technologies produces an ever-increasing amount data .It is one of the central challenges of our time to extract meaningful information from these data sets. The approach to address these issues, often called data science, combines strategies and methods from the fields of machine learning, mathematics, state estimation, visualization and pattern recognition. During this seminar, the students will familiarize themselves with concepts and methods particularly focusing on estimation theory and its application

The seminar targets master students in computer science and bachelor students in Information engineering and management.

V **User-Adaptive Systems Seminar** **Seminar (S)**
2540553, SS 2022, 2 SWS, Language: English, Open in study portal **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 (Research Group ISSD, 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 **Information Systems and Service Design Seminar** — **Seminar (S)**
2540557, SS 2022, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
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 ISSD (Prof. Mädche). The research group "Information Systems & Service Design" (ISSD) 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 **Seminar: Neuronale Netze und künstliche Intelligenz** — **Seminar (S)**
2400078, WS 22/23, SWS, Language: German/English, Open in study portal

Content
In many tasks that appear natural to us, the fastest computers are unable to match the performance of the human brain. Neural networks attempt to simulate the parallel and distributed architecture of the brain in order to master these skills with learning algorithms. In this context, focus is being put on neural network approaches to computer vision and speech recognition, robotics and other areas.

In this seminar students will acquaint themselves with literature from provided topics and will present their results as a talk supported by slides to the other participants of the seminar.

Recommendations:

- Finishing the module "Kognitive Systeme" prior to the seminar is recommended.
- Attending the lecture "Deep Learning und Neuronale Netze" prior to the seminar is of advantage

V **Internet of Things** — **Seminar (S)**, **Blended (On-Site/Online)**
2400092, WS 22/23, SWS, Language: German/English, Open in study portal

Content
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Security in Internet of Things (IoT)

Welcome to the era of the Internet of Things (IoT), where millions of connected devices together in almost all aspects of our daily life, including our homes, offices, cars, and even our bodies, from TVs, fridges, and cars to health monitors and wearables. As a matter of fact, IoT is growing very fast and spreads very quickly. According to ARM, it is expected that the number of IoT devices will exceed 1 Trillion devices by 2025.

New applications and software always present new security threats; because it is developed very quickly and the developers cannot expect all threats, and it may need a decade to make these systems secure. For the IoT devices, these threats may have serious effects on our life; since Internet threats, today can steal credit cards, disable home security systems, personal data, webcam control, and even more.
Unfortunately, there is no “silver bullet” that can effectively mitigate every possible cyber threat. And these will open the need for improving the proposed security found in the IoT domain to keep malicious activity off and to cover personal privacy, financial transactions, and the threat of cyber theft to make IoT not only reliable but also safer.

Kubernetes for Edge and IoT

Kubernetes, originally developed by Google, is an open-source orchestration system for automating the deployment, scaling, monitoring, and management of containerized workloads/applications/services. Kubernetes was first announced by Google in mid-2014 and quickly became the industry standard for container orchestration. Kubernetes initially targeted on-premises, hybrid, or public cloud environments. Edge computing is gaining a lot of attraction lately with the need for mission-critical decisions to be made in real-time at the edge, the ML-powered IoT devices, and the move towards 5G. Hence, due to the increasing need to embrace cloud-native technology and containers, Kubernetes was quickly adopted in Edge/IoT environments opening up a new ecosystem for Edge Computing. However, to achieve this transition and enable leveraging Kubernetes on Edge an IoT, we have to overcome several challenges such as footprint of Kubernetes, energy constrained execution, scalability outside of the confines of data centers etc.

Kubernetes for Edge and IoT is offered only in English.

Organizational issues
Bitte im ILIAS zur Teilnahme anmelden.

V **Embedded Machine Learning**
2400137, WS 22/23, SWS, Language: German/English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

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DNN Pruning and Quantization
As DNNs become more computationally hungry, their hardware implementation becomes more challenging, since embedded devices have limited resources. DNN compression techniques, such as pruning and quantization, can be applied for efficient utilization of computational resources. While pruning involves removing unimportant elements of a DNN structure (connections, filters, channels etc), quantization decreases the precision for representing DNN-related tensors (weights and activations). Both promise to trade-off some of the application’s accuracy for limited energy consumption and reduced memory footprint. Students will review state-of-the-art research works on hardware-aware DNN pruning and quantization. The findings will be summarized in a seminar report and presented to the other members of the course.

Organizational issues
Bitte im ILIAS zur Teilnahme anmelden.

V **Embedded Security and Architectures**
2400148, WS 22/23, SWS, Language: German/English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

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Organizational issues
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V

Advanced Methods of Information Fusion

24344, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
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The seminar targets master students in computer science and bachelor students in Information engineering and management.

T 6.353 Course: Seminar Informatics Master [T-INFO-111205]

Organisation: KIT Department of Informatics
Part of: M-INFO-102822 - Seminar Module Informatics

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	1

Events					
ST 2022	2400035	Seminar Image Analysis and Fusion	2 SWS	Seminar / 🗣	Beyerer
ST 2022	2400039	Research Focus Class: Blockchain & Payment Channel Networks Seminar	2 SWS	Seminar / 🗣	Hartenstein, Grundmann
ST 2022	2400044	Seminar Cryptanalysis	2 SWS	Seminar / 🧩	Geiselmann, Müller-Quade, Tiepelt
ST 2022	2400084	Seminar: Robot Reinforcement Learning	2 SWS	Seminar / 🧩	Neumann
ST 2022	2400085	Quantum Information Theory	2 SWS	Seminar / 🧩	Müller-Quade, Tiepelt, Ottenhues, Maier, Strufe, Fruböse
ST 2022	2400089	Decentralized Systems: Fundamentals, Modeling, and Applications	4 SWS	Lecture / Practice (/ 🗣	Stengele, Hartenstein
ST 2022	2400137	Embedded Machine Learning		Seminar / 🧩	Rapp, Sikal, Pfeiffer, Zervakis, Khdr, Henkel
ST 2022	2400148	Embedded Security and Architectures		Seminar / 🧩	Hussain, Nassar, Bauer, Khdr, Gonzalez, Henkel
ST 2022	24336	Robotics and Medicine	2 SWS	Seminar / 🗣	Mathis-Ullrich
ST 2022	24344	Advanced Methods of Information Fusion	2 SWS	Seminar / 🗣	Hanebeck, Reith-Braun
ST 2022	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / 🧩	Mädche
ST 2022	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar / 🧩	Mädche, Beigl
ST 2022	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar / 🧩	Mädche
WT 22/23	2400013	Seminar: Energy Informatics	2 SWS	Seminar / 🗣	Wagner, Hagenmeyer, Fichtner, Gritzbach, Wolf, Heidrich, Phipps, Ueckerdt, Bläsius, Göttlicher
WT 22/23	2400047	Seminar Algorithmentechnik	2 SWS	Seminar / 🗣	Ueckerdt, Wilhelm, Feilhauer, Katzmann, Bläsius, Gottesbüren, Gritzbach, Jungeblut, Merker, Sauer, Wolf, Zeitz, Weyand, Göttlicher
WT 22/23	2400092	Internet of Things		Seminar / 🧩	Zervakis, Bauer, Henkel
WT 22/23	2400108	Continuous Software Engineering	2 SWS	Seminar	Koziolek
WT 22/23	2400126	Post-Quantum Cryptography	2 SWS	Seminar / 🧩	Ottenhues, Tiepelt, Müller-Quade, Coijanovic, Klooß, Fruböse, Gröll, Beskorovajnov
WT 22/23	2400129	Seminar Digital Accessibility and Assisitive Technologies	2 SWS	Seminar / 🧩	Stiefelhagen, Schwarz

WT 22/23	2400137	Embedded Machine Learning		Seminar /	Rapp, Sikal, Pfeiffer, Balaskas, Zervakis, Khdr, Henkel
WT 22/23	2400148	Embedded Security and Architectures		Seminar /	Hussain, Nassar, Bauer, Khdr, Gonzalez, Sikal, Henkel
WT 22/23	2400239	Selected Topics in Public-Key-Cryptography	2 SWS	Seminar /	Müller-Quade, Agrikola, Fetzer, Bayreuther
WT 22/23	24344	Advanced Methods of Information Fusion	2 SWS	Seminar /	Hanebeck, Reith-Braun
WT 22/23	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar /	Mädche
Exams					
ST 2022	7500013	Advanced Methods of Information Fusion			Hanebeck
ST 2022	750006	Seminar Robotics and Medicine			Mathis-Ullrich
ST 2022	7500108	Seminar: Advanced Algorithms in Computer Graphics			Dachsbacher
ST 2022	7500284	Decentralized Systems: Fundamentals, Modeling, and Applications			Hartenstein
ST 2022	7500297	Seminar: Hot Topics in Decentralized Systems			Hartenstein
ST 2022	7500302	Research Focus Class: Blockchain & Payment Channel Networks - Seminar			Hartenstein
ST 2022	7500335	CES - Seminar: Machine Learning			Henkel
ST 2022	7500345	Decentralized Systems: Fundamentals, Modeling, and Applications			Hartenstein
WT 22/23	7500021	Advanced Methods of Information Fusion			Hanebeck
WT 22/23	7500069	Seminar Accessibility - Assistive Technologies for Visually Impaired Persons			Stiefelhagen

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Below you will find excerpts from events related to this course:

V **Seminar Image Analysis and Fusion** — **Seminar (S) On-Site**
2400035, SS 2022, 2 SWS, Language: German, Open in study portal

Organizational issues
Termin und Ort der Einführungsveranstaltung werden vor Semesterbeginn auf der Webseite bekannt gegeben.

Findet - sofern Präsenz-Veranstaltung erlaubt - im Fraunhofer IOSB statt.

V **Decentralized Systems: Fundamentals, Modeling, and Applications** — **Lecture / Practice (VÜ) On-Site**
2400089, SS 2022, 4 SWS, Language: English, Open in study portal

Content
Decentralized Systems (like blockchain-based systems) represent distributed systems that are controlled by multiple parties who make their own independent decisions. In this course, we cover fundamental theoretical aspects as well as up-to-date decentralized systems and connect theory with current practice. We thereby address fault tolerance, security & trust, as well as performance aspects. Furthermore, we address measurements, modeling and simulation of decentralized systems and applications like Bitcoin and Matrix.

Prior knowledge in Foundations of IT-Security and Computer Networks is recommended.

Learning Objectives

1. Fundamentals & Modeling
    1. The student is able to recognize and distinguish distributed, federated, and decentralized systems.
    2. The student understands consensus, consistency and coordination within the context of networked and decentralized systems.
    3. The student understands the concept of Sybil attacks in relation to distributed and decentralized systems.
    4. The student is familiar with decentralized algorithms for leader election and mutual exclusion for execution contexts with various guarantees.
    5. The student understands the formally proven limits of fault tolerance and their underlying assumptions. This includes an understanding of synchronous and asynchronous network models which underpin the respective proofs. The student also understands several models for fault tolerance, notably silent and noisy crash as well as byzantine fault tolerance within the context of decentralized and distributed systems.
    6. The student knows various models for and levels of consistency. In particular, strictly ordered, causally ordered, partially ordered consistency as well as numerical and temporal relaxations thereof.
2. Applications
    1. The student understands conflict-free replicated data types and their use in decentralized systems like Matrix.
    2. The student has a fundamental understanding of blockchain-based cryptocurrencies (e.g. Bitcoin/Ethereum), Payment Channels, and decentralized communication systems like Matrix.
    3. The student understands trust relations in distributed and decentralized systems.
    4. The student is able to understand how the previously introduced theoretical foundations relate to networked and decentralized systems in practice.

V

Embedded Machine Learning

2400137, SS 2022, SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

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Organizational issues
Please register in ILIAS to participate.

V **Advanced Methods of Information Fusion** **Seminar (S)**
24344, SS 2022, 2 SWS, Language: German/English, Open in study portal **On-Site**

Content
The growing spread and performance of modern information and communication technologies produces an ever-increasing amount data .It is one of the central challenges of our time to extract meaningful information from these data sets. The approach to address these issues, often called data science, combines strategies and methods from the fields of machine learning, mathematics, state estimation, visualization and pattern recognition. During this seminar, the students will familiarize themselves with concepts and methods particularly focusing on estimation theory and its application

The seminar targets master students in computer science and bachelor students in Information engineering and management.

V **User-Adaptive Systems Seminar** **Seminar (S)**
2540553, SS 2022, 2 SWS, Language: English, Open in study portal **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 (Research Group ISSD, 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 **Information Systems and Service Design Seminar** — **Seminar (S)**
2540557, SS 2022, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
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 ISSD (Prof. Mädche). The research group "Information Systems & Service Design" (ISSD) 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 **Internet of Things** — **Seminar (S)**
2400092, WS 22/23, SWS, Language: German/English, Open in study portal — **Blended (On-Site/Online)**

Content
In our seminars, students learn about cutting-edge research in the research fields presented below. Students are offered topics by the supervisors, but also can suggest their own topics in these fields. The seminar is offered in both English and German.

Security in Internet of Things (IoT)

Welcome to the era of the Internet of Things (IoT), where millions of connected devices together in almost all aspects of our daily life, including our homes, offices, cars, and even our bodies, from TVs, fridges, and cars to health monitors and wearables. As a matter of fact, IoT is growing very fast and spreads very quickly. According to ARM, it is expected that the number of IoT devices will exceed 1 Trillion devices by 2025.

New applications and software always present new security threats; because it is developed very quickly and the developers cannot expect all threats, and it may need a decade to make these systems secure. For the IoT devices, these threats may have serious effects on our life; since Internet threats, today can steal credit cards, disable home security systems, personal data, webcam control, and even more.
Unfortunately, there is no "silver bullet" that can effectively mitigate every possible cyber threat. And these will open the need for improving the proposed security found in the IoT domain to keep malicious activity off and to cover personal privacy, financial transactions, and the threat of cyber theft to make IoT not only reliable but also safer.

Kubernetes for Edge and IoT

Kubernetes, originally developed by Google, is an open-source orchestration system for automating the deployment, scaling, monitoring, and management of containerized workloads/applications/services. Kubernetes was first announced by Google in mid-2014 and quickly became the industry standard for container orchestration. Kubernetes initially targeted on-premises, hybrid, or public cloud environments. Edge computing is gaining a lot of attraction lately with the need for mission-critical decisions to be made in real-time at the edge, the ML-powered IoT devices, and the move towards 5G. Hence, due to the increasing need to embrace cloud-native technology and containers, Kubernetes was quickly adopted in Edge/IoT environments opening up a new ecosystem for Edge Computing. However, to achieve this transition and enable leveraging Kubernetes on Edge an IoT, we have to overcome several challenges such as footprint of Kubernetes, energy constrained execution, scalability outside of the confines of data centers etc.

Kubernetes for Edge and IoT is offered only in English.

Organizational issues
Bitte im ILIAS zur Teilnahme anmelden.

V

Continuous Software Engineering

2400108, WS 22/23, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Content
Modern software engineering happens in short cycles, which allow fast feedback. Technologies like build servers and containerization support fast, frequent and automated deployment of software to production systems and fast feedback to development (devops).

The term "continuous software engineering" combines different aspects of this intertwinement of different software engineering activities.

In this seminars, students will work on a topic in the context of continuous software engineering. Some of the addressed topics will be concerned with challenges when engineering systems with machine-learning components.

Literature
Fitzgerald, Brian, and Klaas-Jan Stol. "Continuous software engineering: A roadmap and agenda." Journal of Systems and Software 123 (2017): 176-189.

V

Embedded Machine Learning

2400137, WS 22/23, SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
In our seminars, students learn about cutting-edge research in the research fields presented below. Students are offered topics by the supervisors, but also can suggest their own topics in these fields. The seminar is offered in both English and German.

Machine Learning on On-Chip Systems

Machine learning and on-chip systems form a symbiosis where each research area benefits from advances in the other. In this seminar, students review cutting-edge research on both areas.

Machine learning (ML) gains importance in all aspects of information systems. From high-level algorithms like image recognition to lower-level intelligent CPU management - ML is ubiquitous. On-chip systems also benefit from advances in ML techniques. Examples include adaptive resource management or workload prediction. However, ML techniques also benefit from advances in on-chip systems. A prominent example is acceleration of neural networks in recent desktop GPUs and even smartphone chips.

In this seminar, students will review cutting-edge state-of-the-art research (publications) to a specific topic related to ML on on-chip systems. The findings will be summarized in a seminar report and presented to the other members of the course. Students are welcome to suggest own topics, but this is not required. The seminar can be held in English or German.

DNN Pruning and Quantization
As DNNs become more computationally hungry, their hardware implementation becomes more challenging, since embedded devices have limited resources. DNN compression techniques, such as pruning and quantization, can be applied for efficient utilization of computational resources. While pruning involves removing unimportant elements of a DNN structure (connections, filters, channels etc), quantization decreases the precision for representing DNN-related tensors (weights and activations). Both promise to trade-off some of the application's accuracy for limited energy consumption and reduced memory footprint. Students will review state-of-the-art research works on hardware-aware DNN pruning and quantization. The findings will be summarized in a seminar report and presented to the other members of the course.

Organizational issues
Bitte im ILIAS zur Teilnahme anmelden.

V

Embedded Security and Architectures

2400148, WS 22/23, SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
In our seminars, students learn about cutting-edge research in the research fields presented below. Students are offered topics by the supervisors, but also can suggest their own topics in these fields. The seminar is offered in both English and German.

Dependability for Reconfigurable Architectures

Dependability has become one of the prime concerns in recent nano-era. Reliability (the ability of the system to deliver services as specified) and Security (the ability of the system to protect itself against deliberate or accidental intrusion) are the two crucial attributes of dependable systems. Among the other reliability threats due to physical limits of CMOS technology, radiation induced soft errors or transient faults are also the most challenging threat to be handled. During this seminar, we will explore state-of-the-art for the power-efficient soft-error reliability and study different research solutions to improve soft-error resiliency in power efficient manner leveraging power-performance-reliability trade-offs. During this seminar, the students will also be able to understand hardware security in reconfigurable architectures,

Thermal and Power Aware Embedded Systems

Power densities are continuously increasing along with technology scaling and the integration of more transistors into smaller areas, potentially resulting in thermal emergencies on the chip. To mitigate such emergencies, power and thermal management techniques are employed. The state-of-the-art power and thermal management techniques can be classified into several categories, such as reactive and proactive techniques, centralized and distributed ones. Recently, machine learning algorithms are employed in power and thermal management techniques to make them more proactive and adaptive. Those various categories of the state-of-the-art techniques need to be reviewed in this seminar to demonstrate the advantage and disadvantage of each of them.

Security of Reconfigurable Embedded Systems

Various types of (re) configurable systems have emerged in recent years. The spectrum ranges from one-time configurable systems that are programmed at the design time for product-specific requirements, to reconfigurable systems that can also be adapted after commissioning, to dynamically reconfigurable systems whose configuration can be changed at runtime and their ability to dynamic reconfiguration is an important part of their system functionality.
This seminar focuses on the runtime reconfigurable systems, their security aspects and methods. It investigates the current state of research for securing the runtime reconfigurable systems, as well as the feasibility of using the security measures from general processing architectures to runtime reconfigurable systems.

Security in Resource Management

Efficient resource management in many-core systems (ie, systems with more than 100 cores, not only a dozen) has become a research challenge in the last years. As complexity and the demand for scalability increase, this new paradigm should also consider new security features to avoid or mitigate the effects of malicious applications both on critical information and the system as a whole.

In this seminar, we will focus on the state-of-the-art of security attacks such as Side Channel Attacks (SCA), Covert channel attacks, as well as other similar resource-based attacks and their effects on other critical applications running on many-core systems. During this seminar, student will dive into the security aspects of resource management, while investigating answers to the following research questions:

- How do these attacks work?
- Which are the associated vulnerabilities? What resources are vulnerable?
- What's their impact on critical information or other resources?
- What are the current countermeasures for the attacks?

Organizational issues
Please register in ILIAS to participate.

V

Advanced Methods of Information Fusion

24344, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The growing spread and performance of modern information and communication technologies produces an ever-increasing amount data .It is one of the central challenges of our time to extract meaningful information from these data sets. The approach to address these issues, often called data science, combines strategies and methods from the fields of machine learning, mathematics, state estimation, visualization and pattern recognition. During this seminar, the students will familiarize themselves with concepts and methods particularly focusing on estimation theory and its application

The seminar targets master students in computer science and bachelor students in Information engineering and management.

T 6.354 Course: Seminar Laboratory: Machine Learning and Intelligent Systems [T-INFO-112105]

Responsible: Michael Fennel
Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-INFO-105959 - Seminar Laboratory: Machine Learning and Intelligent Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
ST 2022	24004	Seminar Laboratory Machine Learning and Intelligent Systems	2 SWS	Seminar / 🗣	Hanebeck, Fennel
Exams					
ST 2022	7500049	Seminar Laboratory Machine Learning and Intelligent Systems			Hanebeck
WT 22/23	7500135	Seminar Laboratory Machine Learning and Intelligent Systems			Hanebeck

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

T 6.355 Course: Seminar Methods along the Innovation process [T-WIWI-110987]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Competence Certificate
Alternative exam assessment.

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

T 6.356 Course: Seminar: Commercial and Corporate Law in the IT Industry [T-INFO-111405]

Responsible: Prof. Dr. Thomas Dreier
Dr. Georg Nolte
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2400165	Seminar Commercial and Corporate Law in Information Technology	2 SWS	Seminar /	Nolte
Exams					
WT 22/23	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.357 Course: Seminar: IT- Security Law [T-INFO-111404]

Responsible: Martin Schallbruch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24389	Seminar "IT-Sicherheitsrecht"	2 SWS	Seminar	Schallbruch
Exams					
WT 22/23	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe

T 6.358 Course: Seminar: Legal Studies I [T-INFO-101997]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101218 - Seminar Module Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2400005	Governance, Risk & Compliance	2 SWS	Seminar / 🗣	Herzig
ST 2022	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar / 🗣	Bless, Boehm, Hartenstein, Mädche, Zitterbart, Volkamer
ST 2022	2400078	Die Bedeutung von ISMS im Datensicherheitsrecht	2 SWS	Seminar / 🗣	Raabe
ST 2022	2400168	„Vom Original zur Kopie und vom Analogen zum Digitalen“	2 SWS	Seminar / 🗣	Dreier, Jehle
ST 2022	2400240	Grundlagen Ethik und IT	2 SWS	Seminar / 🗣	Dreier
ST 2022	24820	Current Issues in Patent Law	2 SWS	Seminar / 🧩	Melullis
WT 22/23	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / 🗣	Reussner, Raabe, Werner, Müller-Quade
WT 22/23	2400142	Seminar Urheberrecht	2 SWS	Seminar / 🗣	Dreier
WT 22/23	2513214	Seminar Information security and Data protection (Bachelor)	2 SWS	Seminar / 🧩	Oberweis, Volkamer, Boehm, Alpers, Düzgün, Schiefer, Veit, Ballreich, Gottschalk
Exams					
ST 2022	7500106	Title not available			Bless, Hartenstein, Mädche, Zitterbart, Boehm, Sunyaev
ST 2022	7500140	Seminar: Legal Studies I			Dreier, Boehm, Melullis, Matz
WT 22/23	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe
WT 22/23	7500232	Seminar Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection			Reussner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung

2400061, SS 2022, 2 SWS, Open in study portal

Seminar (S)
On-Site

Content

- Registration via https://portal.wiwi.kit.edu/ys/5877

Organizational issues
nach Vereinbarung

T 6.359 Course: Seminar: Patent Law [T-INFO-111403]

Responsible: Markus Dammler
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24186	Seminar Patent Law	2 SWS	Seminar /	Dammler
Exams					
WT 22/23	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 6.360 Course: Service Design Thinking [T-WIWI-102849]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101503 - Service Design Thinking

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	12	Grade to a third	Irregular	4

Exams			
ST 2022	7900258	Practical Seminar Service Innovation	Satzger
ST 2022	7900314	Service Design Thinking	Satzger

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

Annotation
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

T 6.361 Course: Service Innovation [T-WIWI-102641]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101448 - Service Management
M-WIWI-102754 - Service Economics and Management
M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-102808 - Digital Service Systems in Industry
M-WIWI-104813 - Information Systems: Internet-Based Markets and Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2595468	Service Innovation	2 SWS	Lecture / 🗣	Satzger
Exams					
ST 2022	7900266	Service Innovation			Satzger
WT 22/23	7900091	Service Innovation			Satzger

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

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

The assessment consists of a written exam (60 min.). A bonus can be acquired through successful participation in the exercise. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by one grade (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

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

Below you will find excerpts from events related to this course:

V Service Innovation

2595468, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Continuous innovation is a prerequisite for firms to stay competitive. While innovation in manufacturing or agriculture can build on a considerable body of research, experience and best practices, innovation in services has not reached the same level of maturity.

This course takes a close look at the topic of service innovation. We will lay the foundations with an initial overview of service innovation including the basic concepts, challenges and innovation processes. We will compare product and service innovation and understand how innovation diffusion works.

The second part focuses on applicable methods and tools for service innovation: we will cover possible sources of innovations, ways to identify opportunities for innovations and the potential of service innovations built on data. For example, open and closed innovation approaches will be contrasted, the benefits of leveraging user communities to drive innovation will be explored and the human-centric innovation approach (Service) Design Thinking will be introduced. We will also look into the opportunities that technology offers for service innovation.

The last part of the lecture covers the management of service innovation and insights from practice. You will understand obstacles and enablers, and learn how to manage, incentivize and foster service innovation.

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

Literature

- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.) (2015). Fundamentals of service systems (Vol. 12). Heidelberg: Springer.
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- Christensen, C. M. (2013). The Innovator's Dilemma - when new technologies cause great firms to fail. Boston, Massachusetts: Harvard Business Review Press.
- Rogers, S. (2003). Diffusion of Innovations. 5. ed. New York: Free Press.
- Vargo, S. L., Akaka, M. A., and Wieland, H. (2020). Rethinking the Process of Diffusion in Innovation: A Service-Ecosystems and Institutional Perspective, Journal of Business Research, 116(1), 526–534.
- Chesbrough, H. (2011). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons.
- Uebernickel, F., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2015). Design Thinking: Das Handbuch. Frankfurt am Main: Frankfurter Allgemeine Buch.
- Runco, M. A. (2014). Creativity: Theories and Themes: Research, Development, and Practice (2nd ed.). Amsterdam: Academic Press.
- Stryja, C., Satzger, G. (2018). Digital nudging to overcome cognitive resistance in innovation adoption decisions. Service Industries Journal, 1-17.
- Satzger, G., Benz, C., Böhmann, T., Roth, A. (2022). Servitization and Digitalization as Siamese Twins – Concepts and Research Agenda. To appear in: Edvardsson/Tronvoll (eds.): Handbook of Service Management.

T 6.362 Course: Signals and Codes [T-INFO-101360]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-100823 - Signals and Codes

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Irregular	1

Events					
WT 22/23	24137	Signals and Codes	2 SWS	Lecture /	Geiselmann, Müller-Quade
Exams					
ST 2022	7500179	Signals and Codes			Geiselmann, Müller-Quade

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Below you will find excerpts from events related to this course:

V Signals and Codes

24137, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this lecture, bounds for codes (Hamming, Gilbert-Varshamov, Singleton) are presented. Coding and decoding for classical algebraic codes (linear, cyclic, Reed Solomon-, Goppa- und Reed Muller-codes) will be presented as well as concatanated codes.

Literature
Shu Lin, Daniel Costello, 'Error Control Coding', 2nd Ed., Pearson Prentice Hall, 2004
Todd Moon, 'Error Correction Coding', Wiley, 2005
Weitere Literatur wird in der Vorlesung bekannt gegeben.

Weiterführende Literatur

Wird in der Vorlesung bekannt gegeben.

T 6.363 Course: Simulation Game in Energy Economics [T-WIWI-108016]

Responsible: Dr. Massimo Genoese
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	2581025	Simulation Game in Energy Economics	3 SWS	Lecture / Practice (/	Genoese, Zimmermann
Exams					
ST 2022	7981025	Simulation Game in Energy Economics			Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Prerequisites
None

Recommendation
Visiting the course "Introduction to Energy Economics"

Annotation
The number of participants is limited.
There is a registration procedure via CAS followed by a selection of the participants.

Below you will find excerpts from events related to this course:

V Simulation Game in Energy Economics

2581025, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

Assessment: presentation and written summary

Prerequisites: Basics in Energy economics ad markets are advantageous.

Organizational issues
CIP-Pool West, Raum 102, Geb. 06.41 - siehe Institutsaushang

Literature
Weiterführende Literatur:

Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

T 6.364 Course: Smart Energy Infrastructure [T-WIWI-107464]

Responsible: Dr. Armin Ardone
Dr. Dr. Andrej Marko Pustisek
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2581023	(Smart) Energy Infrastructure	2 SWS	Lecture / 🗣	Ardone, Pustisek
Exams					
ST 2022	7981023	Smart Energy Infrastructure			Fichtner

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.

Below you will find excerpts from events related to this course:

V (Smart) Energy Infrastructure

2581023, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Basic terms and concepts
- Meaning of infrastructure
- Excursus: regulation of infrastructure
- Natural gas transportation
- Natural gas storage
- Electricity transmission
- (Overview) Crude oil and oil product transportation

Organizational issues
Blockveranstaltung, Termine s. Aushang

T 6.365 Course: Smart Grid Applications [T-WIWI-107504]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2540452	Smart Grid Applications	2 SWS	Lecture / 🗣	Henni
WT 22/23	2540453	Übung zu Smart Grid Applications	1 SWS	Lecture / 🗣	Henni

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

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be read for the first time in winter term 2018/19.

T 6.366 Course: Social Choice Theory [T-WIWI-102859]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-101504 - Collective Decision Making

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2520537	Social Choice Theory	2 SWS	Lecture / 🗣	Müller, Kretz
ST 2022	2520539	Übung zu Social Choice Theory	1 SWS	Practice / 🗣	Kretz, Müller
Exams					
ST 2022	7900039	Social Choice Theory			Puppe
ST 2022	7900045	Social Choice Theory (Make-up Date)			Puppe

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

Competence Certificate
The assessment consists of an alternative exam assessment (open book exam). The exam takes place in every summer semester.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Social Choice Theory

2520537, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
How should (political) candidates be elected? What are good ways of merging individual judgments into collective judgments? Social Choice Theory is the systematic study and comparison of how groups and societies can come to collective decisions.

The course offers a rigorous and comprehensive treatment of judgment and preference aggregation as well as voting theory. It is divided into two parts. The first part deals with (general binary) aggregation theory and builds towards a general impossibility result that has the famous Arrow theorem as a corollary. The second part treats voting theory. Among other things, it includes prooving the Gibbard-Satterthwaite theorem.

Literature
Main texts:

- Hervé Moulin: Axioms of Cooperative Decision Making, Cambridge University Press, 1988
- Christian List and Clemens Puppe: Judgement Aggregation. A survey, in: Handbook of rational & social choice, P.Anand,P.Pattanaik, C.Puppe (Eds.), Oxford University Press 2009.

Secondary texts:

- Amartya Sen: Collective Choice and Social Welfare, Holden-Day, 1970
- Wulf Gaertner: A Primer in Social Choice Theory, revised edition, Oxford University Press, 2009
- Wulf Gaertner: Domain Conditions in Social Choice Theory, Oxford University Press, 2001

T 6.367 Course: Sociotechnical Information Systems Development [T-WIWI-109249]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
ST 2022	2512400	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	3 SWS	Practical course / 🖥	Sunyaev, Pandl, Goram
ST 2022	2512401	Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course / 🖥	Sunyaev, Pandl, Goram
Exams					
ST 2022	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev
WT 22/23	7900080	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)			Sunyaev
WT 22/23	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev

Legend: 🖥 Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The alternative exam assessment consists of an implementation and a final thesis documenting the development and use of the application.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Advanced Lab Development of Sociotechnical Information Systems (Bachelor)

Practical course (P)
Online

2512400, SS 2022, 3 SWS, Language: German/English, Open in study portal

Content
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

V Development of Sociotechnical Information Systems (Master)

Practical course (P)
Online

2512401, SS 2022, 3 SWS, Language: German/English, Open in study portal

Content
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

T 6.368 Course: Software Architecture and Quality [T-INFO-101381]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: M-INFO-100844 - Software Architecture and Quality
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24667	Software Architecture and Quality	2 SWS	Lecture / 🗣	Reussner
Exams					
ST 2022	7500021	Software Architecture and Quality			Reussner
WT 22/23	7500032	Software Architecture and Quality			Reussner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.369 Course: Software Development for Modern, Parallel Platforms [T-INFO-101339]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-100802 - Software Development for Modern, Parallel Platforms

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

T 6.370 Course: Software Engineering II [T-INFO-101370]

Responsible: Prof. Dr.-Ing. Anne Koziolek
Prof. Dr. Ralf Reussner
Prof. Dr. Walter Tichy

Organisation: KIT Department of Informatics

Part of: M-INFO-100833 - Software Engineering II

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24076	Software Engineering II	4 SWS	Lecture / 🗣	Reussner
Exams					
ST 2022	7500207	Software Engineering II			Reussner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Software Engineering II

24076, WS 22/23, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Craig Larman, Applying UML and Patterns, 3rd edition, Prentice Hall, 2004. Weitere Literaturhinweise werden in der Vorlesung gegeben.

T 6.371 Course: Software Lab Parallel Numerics [T-INFO-105988]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: M-INFO-102998 - Software Lab Parallel Numerics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	2

Events					
ST 2022	2424880	Projektorientiertes Softwarepraktikum (Parallele Numerik)	6 SWS	Practical course /	Karl, Alefeld, Hoffmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.372 Course: Software Product Line Engineering [T-INFO-111017]

Responsible: Dr. Thomas Kühn
Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: M-INFO-105471 - Software Product Line Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2402501	Software Product Line Engineering	2 SWS	Lecture / 🗣	Kühn
Exams					
ST 2022	7500280	Software Product Line Engineering			Reussner, Kühn
WT 22/23	7502501	Software Product Line Engineering			Kühn

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Software Product Line Engineering

2402501, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This module teaches students the methods and techniques for the development and maintenance of multi-variant software systems by means of software product line engineering. The lecture provides an overview of the basic goals, methods, concepts and techniques for the development and maintenance of software product lines.

Organizational issues
https://sdqweb.ipd.kit.edu/wiki/Vorlesung_Software-Produktlinien-Entwicklung_WS_2020/21

Literature
Software Product Line Engineering: Foundations, Principles and Techniques von Klaus Pohl, Günter Böckle , Frank J. van der Linden, Springer 2011.

Feature-Oriented Software Product Lines: Concepts and Implementation von Sven Apel, Don Batory, Christian Kästner, Springer 2013.

Mastering Software Variability with FeatureIDE von Jens Meinicke, Thomas Thüm, Reimar Schröter, Springer, 2017.

T 6.373 Course: Software Quality Management [T-WIWI-102895]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101477 - Development of Business Information Systems
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2511208	Software Quality Management	2 SWS	Lecture / 🗣	Alpers
ST 2022	2511209	Übungen zu Software-Qualitätsmanagement	1 SWS	Practice / 🗣	Frister, Forell
Exams					
ST 2022	79AIFB_STQM_A5	Software Quality Management (Registration until 18 July 2022)			Oberweis
WT 22/23	79AIFB_STQM_C1	Software Quality Management			Oberweis

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 in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Software Quality Management

2511208, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

Learning objectives:

Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of sofware certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

Recommendations:

Programming knowledge in Java and basic knowledge of computer science are expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 2008
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Weitere Literatur wird in der Vorlesung bekanntgegeben.

T 6.374 Course: Software-Evolution [T-INFO-101256]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: M-INFO-100719 - Software-Evolution

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	24164	Software Evolution	2 SWS	Lecture / 🗣	Heinrich
Exams					
ST 2022	7500023	Software-Evolution			Reussner
WT 22/23	7500004	Software-Evolution			Reussner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.375 Course: Spatial Economics [T-WIWI-103107]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101485 - Transport Infrastructure Policy and Regional Development
M-WIWI-101496 - Growth and Agglomeration

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2561260	Spatial Economics	2 SWS	Lecture / 🗣	Ott
WT 22/23	2561261	Exercise for Spatial Economics	1 SWS	Practice / 🗣	Ott, Assistenten
Exams					
ST 2022	7900103	Spatial Economics			Ott
WT 22/23	7900075	Spatial Economics			Ott

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

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as an open-book examination, or as a 60-minute written examination.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses "Economics I" [2600012], and "Economics II" [2600014]. In addition, an interest in quantitative-mathematical modeling is required. The attendance of the course "Introduction to economic policy" [2560280] is recommended.

Annotation
Due to the research semester of Prof. Dr. Ingrid Ott, the course will not be offered in the winter semester 2021/22. The exam will take place. Preparation materials can be found in ILIAS.

Below you will find excerpts from events related to this course:

V **Spatial Economics** — **Lecture (V) On-Site**
2561260, WS 22/23, 2 SWS, Language: English, Open in study portal

Content
The course covers the following topics:

- Geography, trade and development
- Geography and economic theory
- Core models of economic geography and empirical evidence
- Agglomeration, home market effect, and spatial wages
- Applications and extensions

Learning objectives:

The student

- analyses how spatial distribution of economic activity is determined.
- uses quantitative methods within the context of economic models.
- has basic knowledge of formal-analytic methods.
- understands the link between economic theory and its empirical applications.
- understands to what extent concentration processes result from agglomeration and dispersion forces.
- is able to determine theory based policy recommendations.

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. An interest in mathematical modeling is advantageous.

Workload:

The total workload for this course is approximately 135 hours.

- Classes: ca. 30 h
- Self-study: ca. 45 h
- Exam and exam preparation: ca. 60 h

Assessment:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Literature
Steven Brakman, Harry Garretsen, Charles van Marrewijk (2009): The New Introduction to Geographical Economics, 2nd ed, Cambridge University Press.

Weitere Literatur wird in der Vorlesung bekanntgegeben.
(Further literature will be announced in the lecture.)

T 6.376 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-101410 - Business & Service Engineering
M-WIWI-101506 - Service Analytics
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Exams			
ST 2022	7900224	Special Topics in Information Systems	Weinhardt
ST 2022	7900286	Sustainability through Digitalization: Development of a Low-cost Do-it-Yourself Smart Meter Infrastructure together with an Energy App	Weinhardt

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 6.377 Course: Startup Experience [T-WIWI-111561]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
ST 2022	2545004	Startup Experience	4 SWS	Seminar / 🗣	González, Finner, Terzidis
WT 22/23	2545004	Startup Experience	4 SWS	Seminar / 🧩	González, Finner, Manthey
Exams					
ST 2022	7900186	Startup Experience			Terzidis
WT 22/23	7900186	Startup Experience			Terzidis

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment. Details on the design of the examination performance of other types will be announced in the course.The grade is composed of a presentation and a written paper (plus any specified documentation, e.g. work results, experience diary, reflection).

Recommendation
Lecture Entrepreneurship already completed

Annotation
The language in the seminar is English. The seminar contents will be published on the chair homepage.

Below you will find excerpts from events related to this course:

V **Startup Experience** — **Seminar (S) On-Site**
2545004, SS 2022, 4 SWS, Language: English, Open in study portal

Content
Content

From the conception of an idea to the final pitch, experience the life of a founder yourself through the seminar Startup X. Challenge yourself to experience the life of an entrepreneur and learn how to attain resources to realize your vision.

Go through the different districts with us to let your idea become a validated business model. You will start your entrepreneurial journey in the **Opportunity district**, where you will open your eyes to the world's needs and discover your core values and competencies. In the **Problem** and **Solutiondistricts**, you will find out the pains of your customers and how you can design, build and test a solution for them. In the **Market district**, you will identify the competitors and learn how to reach your customers. The **Company district** will enable you to set up your own organization, including the core people, core assets, and key activities. Your ability to express your business idea to investors and stakeholders will be developed in the **Communication district**. Prototyping, business model development, and pitching are part of the seminar.

Learning Objectives

The pedagogical approach is that of action learning. In a team, you will experience typical challenges and processes related to setting up a new business and develop the corresponding entrepreneurial competences.

After completing this course, the course participants will be able to:

- Describe why personal and team core values are essential for team formation and how they can affect startup projects
- Develop a sound value proposition for a target customer
- Recognize Business Opportunities
- Build a Prototype
- Create concrete Business Model
- Pitch their Business Ideas to potential investors

Organizational issues
Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

V **Startup Experience**
2545004, WS 22/23, 4 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Content

In the Startup Experience course, you develop entrepreneurial competences that enable you to develop a new venture. In an entrepreneurial project, you have three main goals:

1. Identify and develop an opportunity. Who is your target customer and what problem or task does he or she have? How attractive and how big is this market?

2. How will you provide value for them? How can you use specific resources, including technology to develop a solution?

3. How can you conceive and set up a viable organization? Which business model do you suggest to create, deliver, and capture value?

After the teams are formed, a teambuilding session follows so that the team members get to know each other better and establish the cornerstones for working together. In this way, they create a basis for their joint project.

The focus of the seminar is on technology-based venturing. In this context, we will use the TAS (Technology-Application-Selection) approach developed at the EnTechnon. By default, we start from KIT patents (but you can also 'bring with you' other new technologies). We analyze the technology and use creativity techniques to find potential applications. Among other approaches, we will systematically explore applications around the UN sustainable development goals. Prototyping, business model development, and pitching are part of the seminar.

Learning Objectives

You will be able to explore deep technology venturing opportunities and create new products and services. The pedagogical approach is that of action learning. In a team, you will experience typical challenges and processes related to setting up a new business and develop the corresponding entrepreneurial competences.

After completing this course, the course participants will be able to:

- Characterize the core process of Deep Tech Venturing,
- Work effectively in a cohesive team,
- Use a technology characterization canvas to extract the core characteristics of a technology,
- Apply creativity techniques to ideate potential applications,
- Use utility analysis approaches to select a promising technology application,
- Develop a value proposition based on techniques like the value proposition canvas or the jobs-to-be-done method,
- Use approaches of technology impact assessment to implement responsible innovation processes,
- Apply advanced business modeling methods to develop a sound business concept,
- Develop and deliver a concise presentation ("pitch") to communicate you project.

Additional information:

Alternative exam assessment. The grade consists of the presentation and the written elaboration. Potentially, a 'project diary' of the seminar progress may be part of the deliverables (depends on tutor and will be communicated at the kick-off).

For a successful course completion, we expect you to submit a Business Plan with the following features:

- Scope: 9000 words,
- Sound and clear structure,
- Expression and spelling are correct
- Complete and correct references, quotations, etc.
- Visual elements are chosen appropriately
- Documentation and traceability of data acquisition, analysis and evaluation,
- Content is developed according to the course instructions.

Furthermore, we expect you to deliver a team Pitch.

- Duration: will be communicated (typically 5-10 minutes)
- Content: Introduction/Purpose; Problem; Solution; Business Model; Prototype; Competition; Management Team; Current Status and next steps,
- Layout and form: appropriate choice,
- Appearance: appropriate amount of visual elements,
- Data: well researched and organized visually
- Story Line: is sound; clear and convincing.

Organizational issues
Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation. The seminars will be held in English.

T 6.378 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-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II
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 22/23	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture	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 22/23, 2 SWS, Open in study portal **Lecture (V)**

Content
Learning objectives:

The student has profound knowledge of generalized regression models.

Requirements:

Knowledge of the contents covered by the course *Economics III: Introduction in Econometrics" [2520016].*

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

T 6.379 Course: Stochastic Calculus and Finance [T-WIWI-103129]

Responsible: Dr. Mher Safarian
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2521331	Stochastic Calculus and Finance	2 SWS	Lecture	Safarian

Competence Certificate
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.).

Prerequisites
None

Annotation
For more information see http://statistik.econ.kit.edu/

Below you will find excerpts from events related to this course:

V Stochastic Calculus and Finance
2521331, WS 22/23, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
Learning objectives:

After successful completion of the course students will be familiar with many common methods of pricing and portfolio models in finance. Emphasis we be put on both finance and the theory behind it.

Content:

The course will provide rigorous yet focused training in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus: Stochastic Processes, Brownian Motion and Martingales, Entropy, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes, Stable and Levy processes.
2. Mathematical Finance: Pricing Models, The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Incomplete Markets, Markets with Transaction Costs, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem, CAPM), Equilibrium models, Numerical Methods.

Workload:

Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours

Organizational issues
Blockveranstaltung, Termine werden über Ilias bekannt gegeben

Literature

- Dynamic Asset Pricing Theory, Third Edition by D. Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models by S. E. Shreve, Springer, 2003
- Stochastic Finance: An Introduction in Discrete Time by H. Föllmer, A. Schied, de Gruyter, 2011
- Methods of Mathematical Finance by I. Karatzas, S. E. Shreve, Springer, 1998
- Markets with Transaction Costs by Yu. Kabanov, M. Safarian, Springer, 2010
- Introduction to Stochastic Calculus Applied to Finance by D.Lamberton, B. Lapeyre, Chapman&Hall,1996

T 6.380 Course: Stochastic Information Processing [T-INFO-101366]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-INFO-100829 - Stochastic Information Processing

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24113	Stochastic Information Processing	3 SWS	Lecture / 🗣	Hanebeck, Frisch
Exams					
ST 2022	7500010	Stochastic Information Processing			Hanebeck
WT 22/23	7500031	Stochastic Information Processing			Hanebeck

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

Below you will find excerpts from events related to this course:

V Stochastic Information Processing

24113, WS 22/23, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In order to handle complex dynamic systems (e.g., in robotics), an in-step estimation of the system's internal state (e.g., position and orientation of the actuator) is required. Such an estimation is ideally based on the system model (e.g., a discretized differential equation describing the system dynamics) and the measurement model (e.g., a nonlinear function that maps the state space to a measurement subspace). Both system and measurement model are uncertain (e.g., include additive or multiplicative noise).

For continuous state spaces, an exact calculation of the probability densities is only possible in a few special cases. In practice, general nonlinear systems are often traced back to these special cases by simplifying assumptions. One extreme is linearization with subsequent application of linear estimation theory. However, this often leads to unsatisfactory results and requires additional heuristic measures. At the other extreme are numerical approximation methods, which only evaluate the desired distribution densities at discrete points in the state space. Although the working principle of these procedures is usually quite simple, a practical implementation often turns out to be difficult and especially for higher-dimensional systems it is computationally complex.

As a middle ground, analytical nonlinear estimation methods would therefore often be desirable. In this lecture the main difficulties in the development of such estimation methods are presented and corresponding solution modules are presented. Based on these building blocks, some analytical estimation methods are discussed in detail as examples, which are very suitable for practical implementation and offer a good compromise between computing effort and performance. Useful applications of these estimation methods are also discussed. Both known methods and the results of current research are presented.

Organizational issues
Der Prüfungstermin ist per E-Mail (gambichler@kit.edu) zu vereinbaren.

Literature
Weiterführende Literatur

Skript zur Vorlesung

T 6.381 Course: Strategic Finance and Technology Change [T-WIWI-110511]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each summer term	1

Exams			
ST 2022	7900268	Strategic Finance and Technoloy Change	Ruckes

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

Prerequisites
None

Recommendation
Attending the lecture "Financial Management" is strongly recommended.

T 6.382 Course: Strategic Foresight China [T-WIWI-110986]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Alternative exam assessment.

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

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

T 6.383 Course: Strategic Management of Information Technology [T-WIWI-102669]

Responsible: Prof. Dr. Thomas Wolf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101477 - Development of Business Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Competence Certificate
Please note that the exam for first writers will be offered for the last time in winter semester 2019/2020. A last examination possibility exists in the summer semester 2020 (only for repeaters).

The assessment of this course is a written (60 min.) or (if necessary) oral examination according (30 min.) to §4(2) of the examination regulation.

Prerequisites
None

T 6.384 Course: Strategy and Management Theory: Developments and “Classics” [T-WIWI-106190]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 22/23	2577921	Strategy and Management Theory: Developments and "Classics" (Master)	2 SWS	Seminar / 🗣	Lindstädt

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

Competence Certificate
The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a conclusion meeting. Details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V **Strategy and Management Theory: Developments and "Classics" (Master)** — **Seminar (S) On-Site**
2577921, WS 22/23, 2 SWS, Language: German, Open in study portal

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a final meeting. Details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

Organizational issues
siehe Homepage

T 6.385 Course: Subdivision Algorithms [T-INFO-103551]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101863 - Subdivision Algorithms

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Irregular	1

T 6.386 Course: Subdivision Algorithms [T-INFO-103550]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101864 - Subdivision Algorithms

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Irregular	1

Exams			
ST 2022	7500143	Subdivision Algorithms	Prautzsch

T 6.387 Course: Successful Transformation Through Innovation [T-WIWI-111823]

Responsible: Malte Busch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Exams			
ST 2022	7900025	Successful Transformation Through Innovation	Busch

Competence Certificate
Alternative exam assessments. The grade consists of an presentation of the results (50%) and a seminar paper (50%).

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

T 6.388 Course: Supplement Enterprise Information Systems [T-WIWI-110346]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101477 - Development of Business Information Systems

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.

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.

T 6.389 Course: Supply Chain Management in the Automotive Industry [T-WIWI-102828]

Responsible: Tilman Heupel
Hendrik Lang

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Exams			
ST 2022	7981957	Supply Chain Management in the Automotive Industry	Schultmann

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. Depending on the respective pandemic situation, the exam may be offered as an open book exam (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be offered for the next time in the summer semester 2023.

T 6.390 Course: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]

Responsible: Claus J. Bosch
Dr. Mathias Göbelt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581961	Supply Chain Management with Advanced Planning Systems	2 SWS	Lecture / 🗣	Göbelt, Bosch
Exams					
ST 2022	7981961	Supply Chain Management with Advanced Planning Systems			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. 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

Recommendation
None

Below you will find excerpts from events related to this course:

V **Supply Chain Management with Advanced Planning Systems** — **Lecture (V) On-Site**
2581961, SS 2022, 2 SWS, Language: English, Open in study portal

Content
This lecture deals with supply chain management from a practitioner's perspective with a special emphasis Advanced Planning Systems (APS) and the planning domain. The software solution SAP SCM, one of the most widely used Advanced Planning Systems, is used as an example to show functionality and application of an APS in practice.

First, the term supply chain management is defined and its scope is determined. Methods to analyze supply chains as well as indicators to measure supply chains are derived. Second, the structure of an APS (advanced planning system) is discussed in a generic way. Later in the lecture, the software solution SAP SCM is mapped to this generic structure. The individual planning tasks and software modules (demand planning, supply network planning / sales & operations planning, production planning / detailed scheduling, deployment, transportation planning, global available-to-promise) are presented by discussing the relevant business processes, providing academic background, describing typical planning processes and showing the user interface and user-related processes in the software solution. At the end of the lecture, implementation methodologies and project management approaches for SAP SCM are covered.

Contents

1. Introduction to Supply Chain Management

1.1. Supply Chain Management Fundamentals

1.2. Supply Chain Management Analytics

2. Structure of Advanced Planning Systems

3. SAP SCM

3.1. Introduction / SCM Solution Map

3.2. Demand Planning

3.3. Supply Network Planning / Sales & Operations Planning

3.4. Production Planning and Detailed Scheduling

3.5. Deployment

3.6. Transportation Planning / Global Available to Promise

3.7. Cloud-based Supply Chain Planning

4. SAP SCM in Practice

4.1. Project Management and Implementation

4.2. SAP Implementation Methodology

Literature
will be announced in the course

T 6.391 Course: Symmetric Encryption [T-INFO-101390]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-100853 - Symmetric Encryption

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24629	Symmetric encryption	2 SWS	Lecture / 🗣	Müller-Quade, Geiselmann
Exams					
ST 2022	7500070	Symmetric Encryption			Geiselmann, Müller-Quade

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

Competence Certificate
Es wird empfohlen, das Modul Sicherheit zu belegen.

Below you will find excerpts from events related to this course:

V **Symmetric encryption** — **Lecture (V) On-Site**
24629, SS 2022, 2 SWS, Language: German, Open in study portal

T 6.392 Course: Tax Law [T-INFO-111437]

Responsible: Detlef Dietrich
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24646	Tax Law	2 SWS	Lecture / 🗣	Dietrich
Exams					
ST 2022	7500120	Tax Law			Dreier, Matz

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

T 6.393 Course: Technologies for Innovation Management [T-WIWI-102854]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	2

Events					
WT 22/23	2545106	Technologies for Innovation Management	2 SWS	Seminar / 🗣	Koch
Exams					
WT 22/23	7900239	Technologies for Innovation Management			Weissenberger-Eibl

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

Competence Certificate
Presentation and individual paper (ca. 15 pages) as alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovationsmanagement: Konzepte, Strategien und Methoden is recommended.

Below you will find excerpts from events related to this course:

V Technologies for Innovation Management

2545106, WS 22/23, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar “Technologies for Innovation Management” will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 6.394 Course: Technology Assessment [T-WIWI-102858]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.

T 6.395 Course: Telecommunication and Internet Economics [T-WIWI-102713]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101409 - Electronic Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2561232	Telecommunication and Internet Economics	2 SWS	Lecture /	Mitusch
WT 22/23	2561233	Übung zu Telekommunikations- und Internetökonomie	1 SWS	Practice /	Mitusch, Wisotzky, Corbo
Exams					
ST 2022	7900276	Telecommunication and Internet Economics			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
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.

Particularly helpful but not necessary: Industrial Economics. Prior attendance of the lecture „Competition in Networks" [26240] or "Industrial Organisation" is helpful in any case but not considered a formal precondition. The english taught course "Communications Economics" is complementary and recommendet for anyone interested in the sector.

Annotation
Due to the research semester of Prof. Mitusch the course for partial performance will not be offered in the winter semester 2020/2021. An examination will be offered in each semester.

Below you will find excerpts from events related to this course:

V Telecommunication and Internet Economics

2561232, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
J.-J. Laffont, J. Tirole (2000): Competition in Telecommunications, MIT Press.

Zarnekow, Wulf, Bronstaedt (2013): Internetwirtschaft: Das Geschäft des Datentransports im Internet.

Weitere Literatur wird in den einzelnen Veranstaltungen angegeben

T 6.396 Course: Telecommunications Law [T-INFO-101309]

Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	24632	Telekommunikationsrecht	2 SWS	Lecture / 🗣	Döveling
Exams					
ST 2022	7500085	Telecommunications Law			Dreier

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

T 6.397 Course: Telematics [T-INFO-101338]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-100801 - Telematics

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	24128	Telematics	3 SWS	Lecture / 🗣	Heseding, Kopmann, Seehofer, Zitterbart
Exams					
ST 2022	7500115	Telematics			Zitterbart

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

Below you will find excerpts from events related to this course:

V Telematics

24128, WS 22/23, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

The lecture covers (i.a.) protocols, architectures, as well as methods and algorithms, for routing and establishing reliable end-to-end connections in the Internet. In addition to various methods for media access control in local area networks, the lecture also covers other communication systems, e.g. circuit-switched systems such as ISDN. Participants should also have understood the possibilities for managing and administering networks.

Familiary with the contents of the lecture *Einführung in Rechnernetze* or comparable lectures is assumed.

Learning Objectives

After attending this lecture, the students will

- have a profound understanding of protocols, architectures, as well as procedures and algorithms used for routing and for establishing reliable end-to-end connections in the Internet
- have a profound understanding of different media access control procedures in local networks and other communication systems like circuit-switched ISDN
- have a profound understanding of the problems that arise in large scale dynamic communication systems and are familiar with mechanism to deal with these problems
- be familiar with current developments such as SDN and data center networking
- be familiar with different aspects and possibilities for network management and administration

Students have a profound understanding of the basic protocol mechanisms that are necessary to establish reliable end-to-end communication. Students have detailed knowledge about the congestion and flow control mechanisms used in TCP and can discuss fairness issue in the context of multiple parallel transport streams. Students can analytically determine the performance of transport protocols and know techniques for dealing with specific constraints in the context of TCP, e.g., high data rates and low latencies. Students are familiar with current topics such as the problem of middle boxes on the Internet, the usage of TCP in data centers or multipath TCP. Students are also familiar with practical aspects of modern transport protocols and know practical ways to overcome heterogeneity in the development of distributed applications.

Students know the functions of (Internet) routing and routers and can explain and apply common routing algorithms. Students are familiar with routing architectures and different alternatives for buffer placement as well as their advantages and disadvantages. Students understand the classification into interior and exterior gateway protocols and have in-depth knowledge of the functionality and features of common protocols such as RIP, OSPF, and BGP. Students are also familiar with current topics such as label switching, IPv6 and SDN.

Students know the function of media access control and are able to classify and analytically evaluate different media access control mechanisms. Students have an in-depth knowledge of Ethernet and various Ethernet variants and characteristics, which especially includes current developments such as real-time Ethernet and data center Ethernet. Students can explain and apply the Spanning Tree Protocol.

Students know the architecture of ISDN and can reproduce the peculiarities of setting up the ISDN subscriber line. Students are familiar with the technical features of DSL.

Literature

S. Keshav. An Engineering Approach to Computer Networking. Addison-Wesley, 1997 J.F. Kurose, K.W. Ross. Computer Networking: A Top-Down Approach Featuring the Internet. 4rd Edition, Addison-Wesley, 2007 W. Stallings. Data and Computer Communications. 8th Edition, Prentice Hall, 2006 Weiterführende Literatur •D. Bertsekas, R. Gallager. Data Networks. 2nd Edition, Prentice-Hall, 1991 •F. Halsall. Data Communications, Computer Networks and Open Systems. 4th Edition, Addison-Wesley Publishing Company, 1996 •W. Haaß. Handbuch der Kommunikationsnetze. Springer, 1997 •A.S. Tanenbaum. Computer-Networks. 4th Edition, Prentice-Hall, 2004 •Internet-Standards •Artikel in Fachzeitschriften

T 6.398 Course: Testing Digital Systems I [T-INFO-101388]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: M-INFO-100851 - Testing Digital Systems I

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Exams			
ST 2022	7500008	Testing Digital Systems I	Tahoori
WT 22/23	7500039	Testing Digital Systems I	Tahoori

T 6.399 Course: Testing Digital Systems II [T-INFO-105936]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: M-INFO-102962 - Testing Digital Systems II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2400014	Testing Digital Systems II (findet im SS 2022 nicht statt)	2 SWS	Lecture / 🖳	Tahoori
Exams					
ST 2022	7500069	Testing Digital Systems II			Tahoori
WT 22/23	7500147	Testing Digital Systems II			Tahoori

Legend: 🖳 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Testing Digital Systems II (findet im SS 2022 nicht statt)

2400014, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content

Testing of digital circuits plays a critical role during the design and manufacturing cycles. It also ensures the quality of parts shipped to the customers. Test generation and design for testability are integral parts of automated design flow of all electronic products. The objective of this course is to provide more advanced topics on testing of digital systems and complement the foundation covered in Testing Digital Systems I.

Topics include Functional and Structural Testing (design verification vectors, exhaustive test, pseudo-exhaustive test, pseudo-random testing), Essentials of Test Generation for Sequential Circuits (state-machine initialization, time-frame expansion method), Built-in Self Test (test economics of BIST, test pattern generation, output respone analysis, BIST architectures), Boundry Scan (Boundry scan architectures, BS test methodology), Delay Testing (path delay test, hazard-free, robust, and non-robust delay tests), transition faults, delay test schemes), Current-Based Testing (motivation, test vectores for IDDQ, variations of IDDQ), Memory Test (memory test algorithm, memory BIST, memory repair), and DFT for System-on-Chip.

The objective of this course is to provide more advanced topics on testing of digital systems and complement the foundation covered in Testing Digital Systems I.

T 6.400 Course: The negotiation of open innovation [T-WIWI-110867]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Non exam assessment.

The following aspects are included in the evaluation:

- Exposé of the seminar paper (15%)
- Preparation of the methodology (15%) (interview guide, quantitative survey, etc.)
- informed participation and preparation of the simulation game (20%)
- written elaboration (50%).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

Annotation
The course will be discontinued in the winter semester 2022/23.

T 6.401 Course: Theoretical Foundations of Cryptography [T-INFO-111199]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-105584 - Theoretical Foundations of Cryptography

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	2400237	Theoretische Grundlagen der Kryptographie	4 SWS	Lecture /	Müller-Quade, Klooß, Berger
Exams					
WT 22/23	7500274	Theoretical Foundations of Cryptography			Müller-Quade

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 6.402 Course: Topics in Experimental Economics [T-WIWI-102863]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101505 - Experimental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Competence Certificate
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

Annotation
The course is offered in summer 2020 for the next time, not in summer 2018.

T 6.403 Course: Topics in Stochastic Optimization [T-WIWI-112109]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

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

Competence Certificate
Students will be given problem sets on which they work in groups. The problem sets will involve the implementation of the models presented in the course, and exploring features of these models. The groups will present their findings in front of the class. The grading will be based on the presentation.

Recommendation
A solid understanding of Stochastic Optimization and/or Optimization under Uncertainty as well as optimization in general is highly recommended, since we will heavily build upon basics of these areas.

T 6.404 Course: Trademark and Unfair Competition Law [T-INFO-101313]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
ST 2022	24609	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
WT 22/23	24136	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
Exams					
ST 2022	7500051	Trademark and Unfair Competition Law			Dreier, Matz

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

T 6.405 Course: Transport Economics [T-WIWI-100007]

Responsible: Prof. Dr. Kay Mitusch
Dr. Eckhard Szimba

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101406 - Network Economics
M-WIWI-101468 - Environmental Economics
M-WIWI-101485 - Transport Infrastructure Policy and Regional Development

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2560230	Transport Economics	2 SWS	Lecture	Mitusch, Szimba
ST 2022	2560231	Übung zu Transportökonomie	1 SWS	Practice	Mitusch, Szimba, Wisotzky
Exams					
ST 2022	7900275	Transport Economics			Mitusch

Competence Certificate
The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Below you will find excerpts from events related to this course:

V Transport Economics

2560230, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticans and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport
- empirical analysis of transport demand
- assessment of transport infrastructure projects
- external effects in transport
- transport policy
- cost structures of transport infrastructure
- Project evaluation from the perspective of the public sector

Literature
Literatur:

Aberle, G: Transportwirtschaft: einzelwirtschaftliche und gesamtwirtschaftliche Grundlagen München; Wien: Oldenbourg, 2003.

Blauwens, G., De Baere, P. and Van der Voorde, E. (2006): Transport Economics.

Frerich, J; Müller, G: Europäische Verkehrspolitik, Landverkehrspolitik München; Wien: Oldenbourg, 2004.

Dasgupta, A, Pearce, D (1972): Cost-Benefit Analysis, MacMillan, London.

Europäische Kommission (2008): Guide to Cost Benefit Analysis of Investment Projects, online unter http://ec.europa.eu/regional_policy/sources/Ben-Akiva, M., Meerseman, H., and Van de Voorde, E. (2008): Recent developments in transport modelling: Lessons for the freight sector.

Ortúzar, J. d. D. and Willumsen, L. (1990): Modelling Transport.

T 6.406 Course: Ubiquitous Computing [T-INFO-101326]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-INFO-100789 - Ubiquitous Computing
M-WIWI-101458 - Ubiquitous Computing
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	24146	Ubiquitäre Informationstechnologien	2+1 SWS	Lecture / Practice (	Beigl
Exams					
ST 2022	7500286_04.04.22	Ubiquitous Computing			Beigl
ST 2022	7500288_11.04.22	Ubiquitous Computing			Beigl
ST 2022	7500290_30.05.22	Ubiquitous Computing			Beigl
ST 2022	75002922_18.07.22	Ubiquitous Computing			Beigl
ST 2022	75002931_30.09.22	Ubiquitous Computing			Beigl

T 6.407 Course: Valuation [T-WIWI-102621]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2530212	Valuation	2 SWS	Lecture /	Ruckes
WT 22/23	2530213	Übungen zu Valuation	1 SWS	Practice /	Ruckes, Luedecke
Exams					
ST 2022	7900072	Valuation			Ruckes
WT 22/23	7900057	Valuation			Ruckes

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Valuation

2530212, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Literature
Weiterführende Literatur

Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T 6.408 Course: Visualization [T-INFO-101275]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-100738 - Visualization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	2400175	Visualisierung	2 SWS	Lecture / 🗣	Dachsbacher, Piochowiak
Exams					
ST 2022	7500193	Visualization			Dachsbacher

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

T 6.409 Course: Wearable Robotic Technologies [T-INFO-106557]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-INFO-103294 - Wearable Robotic Technologies

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	3

Events					
ST 2022	2400062	Wearable Robotic Technologies	2 SWS	Lecture / 🗣	Asfour, Beigl
ST 2022	5016643	BUT - Attractive Robot Technologies		Lecture / 🏵	Asfour
Exams					
ST 2022	7500219	Wearable Robotic Technologies			Asfour
WT 22/23	7500073	Wearable Robotic Technologies			Asfour

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Wearable Robotic Technologies

2400062, SS 2022, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
The lecture starts with an overview of wearable robot technologies (exoskeletons, prostheses and ortheses) and its potentials, followed by the basics of wearable robotics. In addition to different approaches to the design of wearable robots and their related actuator and sensor technology, the lecture focuses on modeling the neuromusculoskeletal system of the human body and the physical and cognitive human-robot interaction for tightly coupled hybrid human-robot systems. Examples of current research and various applications of lower, upper and full body exoskeletons as well as prostheses are presented.

Learning Objectives:

The students have received fundamental knowledge about wearable robotic technologies and understand the requirements for the design, the interface to the human body and the control of wearable robots. They are able to describe methods for modelling the human neuromusculoskeletal system, the mechatronic design, fabrication and composition of interfaces to the human body. The students understand the symbiotic human–machine interaction as a core topic of Anthropomatics and have knowledge of state of the art examples of exoskeletons, ortheses and protheses.

Organizational issues
Die Erfolgskontrolle erfolgt in Form einer schriftlichen Prüfung im Umfang von i.d.R. 60 Minuten nach § 4 Abs. 2 Nr. 1 SPO.

Modul für Master Maschinenbau, Mechatronik und Informationstechnik, Elektrotechnik und Informationstechnik, Sportwissenschaften

Voraussetzungen: Der Besuch der Vorlesung *Mechano-Informatik in der Robotik* wird empfohlen.

Arbeitsaufwand: 120h

Literature
Vorlesungsfolien und ausgewählte aktuelle Literaturangaben werden in der Vorlesung bekannt gegeben und als pdf unter http://www.humanoids.kit.edu verfügbar gemacht.

T 6.410 Course: Web App Programming for Finance [T-WIWI-110933]

Responsible: TT-Prof. Dr. Julian Thimme
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Once	1

Competence Certificate
Non exam assessment according to § 4 paragraph 3 of the examination regulation. (Anmerkung: gilt nur für SPO 2015). The grade is made up as follows: 50% result of the project (R-code), 50% presentation of the project.

Prerequisites
None

Recommendation
The content of the bachelor course Investments is assumed to be known and necessary to follow the course.

T 6.411 Course: Web Applications and Service-Oriented Architectures (II) [T-INFO-101271]

Responsible: Prof. Dr. Sebastian Abeck
Organisation: KIT Department of Informatics
Part of: M-INFO-100734 - Web Applications and Service-Oriented Architectures (II)
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	24677	Web Applications and Service oriented Architectures (II)	2 SWS	Lecture / 🗣	Abeck, Schneider, Sänger, Throner
Exams					
ST 2022	7500138	Web Applications and Service-oriented Architectures (II)			Abeck

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 6.412 Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
ST 2022	2577922	Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)	2 SWS	Seminar / 🗣	Lindstädt
Exams					
ST 2022	7900071	Workshop Business Wargaming – Analyzing Strategic Interactions			Lindstädt

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

Competence Certificate
In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

Below you will find excerpts from events related to this course:

V **Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)** **Seminar (S) On-Site**
2577922, SS 2022, 2 SWS, Language: German, Open in study portal

Content
In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

Learning Objectives:

Students

- are able to analyze business strategies and derive recommendations for the management
- learn to express their position through compelling reasoning in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

T 6.413 Course: Workshop Current Topics in Strategy and Management [T-WIWI-106188]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
ST 2022	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar / 🗣	Lindstädt
WT 22/23	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar / 🗣	Lindstädt
Exams					
ST 2022	7900122	Workshop Current Topics in Strategy and Management			Lindstädt

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

Competence Certificate
The evaluation of the performance takes place through the active participation in the discussion rounds; an appropriate preparation is expressed here and a clear understanding of the topic and framework becomes recognizable. Further details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V Workshop aktuelle Themen Strategie und Management (Master)

2577923, SS 2022, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

The assessment of performance is made through active participation in the discussion rounds; adequate preparation is expressed here and a clear understanding of the topic and framework becomes evident. Further details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

V **Workshop aktuelle Themen Strategie und Management (Master)** **Seminar (S) On-Site**
2577923, WS 22/23, 2 SWS, Language: German, Open in study portal

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

The assessment of performance is made through active participation in the discussion rounds; adequate preparation is expressed here and a clear understanding of the topic and framework becomes evident. Further details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.