Karlsruher Institut für Technologie

Module Handbook
Information Systems M.Sc.

SPO 2019

Winter term 2019/20

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KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT / KIT DEPARTMENT OF INFORMATICS

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1 Welcome to the new module handbook of your study programme

We are delighted that you have decided to study at the KIT Department of Economics and Management and KIT Department of Informatics. We wish you a good start into the new semester!

The following contact persons are at your disposal for questions and problems at any time.

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2 About this handbook

2.1 Notes and rules

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).

2.1.1 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.

2.1.2 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.

2.1.3 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.

2.1.4 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.

2.1.5 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.

2.1.6 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.

2.1.7 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.

2.1.8 Further information

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).

3 Why Information Systems?

Digitalization leads to profound changes in economy and society. The successful design of sustainable digital solutions requires competencies in the fields of information technology, business and law. By studying Information Systems, you will acquire the necessary qualifications for the digital world of work and life of the future. Become a designer of the digital economy and society with excellent, cross-sector career opportunities in start-ups, medium-sized businesses and large companies!

**Why Information Systems at KIT? Study Information Systems at KIT to successfully combine science and practice of digitization. KIT Information Systems is characterized by an interdisciplinary approach based on an interdisciplinary model. The central unique selling points and arguments for studying Information Systems at KIT are:

- Options**: You benefit from a high-quality and comprehensive range of courses offered by the two large KIT Departments of Informatics and Economics.
- Flexibility**: In both the Bachelor's and Master's programmes, you can set your own priorities and develop your personal profile. At KIT you can study both a technical and a more economic profile of Information Systems.
- Problem solving competence**: The obligatory team project for software development in the Bachelor's programme implements the KIT concept of research-oriented teaching. Students develop functional application software in a team using modern methods and tools. The further development of specific problem-solving skills also plays an important role in the Master's programme, for example in the form of design seminars in cooperation with practical experience.

The study programme Information Systems (B.Sc. / M.Sc.) will be offered at the Karlsruhe Institute of Technology (KIT) from the winter semester 2019/20.

Where can I get further information? Further information on the Bachelor's and Master's degree programmes is available at http://www.wirtschaftsinformatik.kit.edu.

3.1 Special features of the Master's programme

Interdisciplinary studies KIT Information Systems is characterized by a real interdisciplinary practice based on a cross-faculty model with the participation of the KIT Faculties of Informatics and Economics. 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. The Master's programme in Information Systems has a standard duration of four semesters and comprises 120 credit points. The contents of the Master's programme are organised in four pillars:

Subject	Scope
Information Systems	18 Credits
Informatics	30 Credits
Economics	18 Credit points
Law	18 Credit points

In the columns Information Systems, Informatics, Economics or Law, two seminars with 3 credit points each must be completed in total. The Master's thesis comprises 30 credit points.

Individual specialization opportunities The diverse and broad offerings of the two KIT Departments enable students to deepen their knowledge very flexibly according to their individual inclinations. The Information Systems modules cover both classical aspects of Information Systems, such as the development and management of business information systems, and more recent aspects of Information Systems, such as the design of digital business models. In the fields of Informatics, Economics and Law, students can choose from a wide range of modules. In Informatics this includes for example algorithms, data engineering, software engineering, robotics, artificial intelligence, telematics, security, and human-machine interaction. In Economics, there are choices in areas such as entrepreneurship, marketing, finance, production, operations research, econometrics or microeconomic theory. Another unique selling point of Karlsruhe Information Systems is the range of legal modules with a special focus on information technology.

Degree The study concludes in the 4th semester with a master thesis. Upon successful completion of the course, students are awarded the academic degree "Master of Science".

4 The study programme

4.1 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.

4.2 Structure according to SPO 2019

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.

Semester	Leistungs-punkte	Wirtschaftsinformatik	Informatik	Wirtschaftswissenschaften	Rechtswissenschaften	Seminare	Masterarbeit
1	33	Wirtschaftsinformatik 9 LP	Informatik 4 LP Informatik 4 LP Informatik 4 LP Informatik 4 LP	Wirtschafts-wissenschaften 9 LP	Rechtswissenschaften 9 LP	Seminarmodul Wirtschafts-informatik Informatik Wirtschafts-wissenschaften Rechts-wissenschaften 3 LP + 3 LP*	
2	27		Informatik 8 LP		Rechtswissenschaften 9 LP		
3	30	Wirtschaftsinformatik 9 LP	Informatik 6 LP	Wirtschafts-wissenschaften 9 LP			
4	30						Masterarbeit 30 LP
	120	18	30	18	18	6	30

* 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 Law, two seminars with 3 credit points each must be completed.

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.

5 Field of study structure

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

5.1 Master Thesis

Credits
30

Mandatory		
M-WIWI-104833	Module Master Thesis	30 CR

5.2 Information Systems

Credits
18

Election block: Wirtschaftsinformatik ()		
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

5.3 Informatics

Credits
30

Election block: Wahlmodule Informatik ()		
M-INFO-103046	Access Control Systems: Foundations and Practice	4 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	5 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-100768	Big Data Analytics	5 CR
M-INFO-102773	Big Data Analytics 2	3 CR
M-INFO-102226	Applied Differential Geometry	5 CR
M-INFO-103294	Wearable Robotic Technologies	4 CR
M-INFO-104447	Automated Planning and Scheduling	5 CR
M-INFO-100836	Selected Topics in Cryptography	3 CR
M-INFO-100723	Asymmetric Encryption Schemes	3 CR
M-INFO-100826	Automated Visual Inspection and Image Processing	6 CR
M-INFO-100764	Accessibility - Assistive Technologies for Visually Impaired Persons	3 CR
M-INFO-100722	Provable Security in Cryptography	3 CR
M-INFO-100755	Image Data Compression	3 CR
M-INFO-100814	Biologically Inspired Robot	3 CR
M-INFO-102968	Biometric Systems for Person Identification	3 CR
M-INFO-100856	Computer Graphics	6 CR
M-INFO-100810	Computer Vision for Human-Computer Interaction	6 CR
M-WIWI-104403	Critical Digital Infrastructures	9 CR
M-INFO-100739	Data and Storage Management	4 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-100769	Datamanagement in the Cloud	5 CR
M-INFO-104099	Deep Learning for Computer Vision	3 CR
M-INFO-104460	Deep Learning and Neural Networks	6 CR
M-INFO-100743	Digital Signatures	3 CR
M-INFO-100803	Real-Time Systems	6 CR
M-INFO-100736	Introduction to Video Analysis	3 CR
M-INFO-101885	Energy Informatics 1	5 CR
M-INFO-103044	Energy Informatics 2	5 CR
M-INFO-104117	Energy System Modelling	4 CR
M-INFO-104381	Decision Procedures with Applications to Software Verification	5 CR
M-INFO-100759	Embedded Systems for Multimedia and Image Processing	3 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-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-102560	Humanoid Robots - Practical Course	3 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	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-100720	Mechanisms and Applications of Workflow 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-103154	Multi-dimensional Signal Processing and Image Exploitation with Graphic Cards and Other Manycore-Processors	3 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-100788	Multicore Computers and Computer Clusters	4 CR
M-INFO-100825	Pattern Recognition	3 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-103705	Nonlinear Model Predictive Control - Theory and Applications	5 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-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-101663	Practical Course: Analyzing Big Data	4 CR
M-INFO-103166	Application Security Lab	4 CR
M-INFO-102411	Practical Course Automatic Speech Recognition	3 CR
M-INFO-103050	Practical Course Data Management and Data Analysis	4 CR
M-INFO-102353	Practical Course Circuit Design with Intel Galileo	3 CR
M-INFO-103138	Lab Course: Natural Language Processing and Software Engineering	5 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-103808	Lab: Designing Embedded Systems	4 CR
M-INFO-101631	Lab: Designing Embedded Application-Specific Processors	4 CR
M-INFO-102568	Practical Course Research Project: Hands-on Anthropomatics	8 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-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	3 CR
M-INFO-102977	Mobile Robots – Practical Course	6 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	3 CR
M-INFO-101889	Practical Course Applied Telematics	6 CR
M-INFO-101537	Practical Course: Programme Verification	3 CR
M-INFO-102092	Practical Course Protocol Engineering	4 CR
M-INFO-103291	Practical Course: Developing Safe & Secure Software for Microcontrollers in Interconnected Energy Systems	4 CR
M-INFO-101560	Laboratory in Security	4 CR
M-INFO-103235	Practical Course: Smart Data Analytics	6 CR
M-INFO-103227	Practical Course: Virtual Neurorobotics in the Human Brain Project	3 CR
M-INFO-101563	Practical Course: Visual Computing 1	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	3 CR
M-INFO-105105	Practical Course Computer Vision for Human-Computer Interaction incl. Scientific Report	6 CR
M-INFO-104072	Lab Course Heterogeneous Computing	6 CR
M-INFO-102383	Project Lab: Image Analysis and Fusion	6 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-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-102825	Practical SAT Solving	5 CR
M-WIWI-101457	Semantic Technologies	9 CR
M-WIWI-102827	Service Computing	9 CR
M-INFO-104119	Secure Multiparty Computation	3 CR
M-INFO-100834	Security	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-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-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-100899	Natural Language Processing and Dialog Modeling	3 CR
M-INFO-100761	Distributed Computing	4 CR
M-INFO-100738	Visualization	5 CR
M-INFO-100734	Web Applications and Service-Oriented Architectures (II)	4 CR
M-WIWI-101455	Web Data Management	9 CR

5.4 Economics and Management

Credits
18

Election block: Betriebswirtschaftslehre ()		
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-103117	Data Science: Data-Driven Information Systems	9 CR
M-WIWI-101470	Data Science: Advanced CRM	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-105032	Data Science for Finance	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-101451	Energy Economics and Energy Markets	9 CR
M-WIWI-101409	Electronic 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-105036	FinTech Innovations	9 CR
M-WIWI-101471	Industrial Production II	9 CR
M-WIWI-101412	Industrial Production III	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-WIWI-101507	Innovation Management	9 CR
M-WIWI-101490	Marketing Management	9 CR
M-WIWI-101446	Market Engineering	9 CR
M-WIWI-101506	Service Analytics	9 CR
M-WIWI-101487	Sales Management	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-103119	Advanced Topics in Strategy and Management	9 CR
M-WIWI-101448	Service Management	9 CR
Election block: Volkswirtschaftslehre ()		
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-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
Election block: Operations Research ()		

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
Election block: Statistik ()		
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

5.5 Law

Credits
18

Election block: Wahlmodule Recht ()		
M-INFO-104810	European and National Technology Law	9 CR
M-INFO-101242	Governance, Risk & Compliance	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

5.6 Seminars

Credits
6

Election block: Seminare (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

6 Modules

M 6.1 Module: Access Control Systems Lab [M-INFO-104164]

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

Credits	Language	Level	Version
4	German/English	4	1

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
6 x (2h [Lab] + 10h [Task] + 2h [Troubleshooting] + 4h [Report] + 2h [Buffer]) = 120h

M 6.2 Module: Access Control Systems: Foundations and Practice [M-INFO-103046]

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

Credits	Recurrence	Language	Level	Version
4	Each summer term	English	4	1

Mandatory			
T-INFO-106061	Access Control Systems: Foundations and Practice	4 CR	Hartenstein

M 6.3 Module: Accessibility - Assistive Technologies for Visually Impaired Persons [M-INFO-100764]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101301	Accessibility - Assistive Technologies for Visually Impaired Persons	3 CR	Stiefelhagen

M 6.4 Module: Advanced Data Structures [M-INFO-102731]

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

Credits	Recurrence	Language	Level	Version
5	Each summer term	German	4	1

Mandatory			
T-INFO-105687	Advanced Data Structures	5 CR	Sanders

M 6.5 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 (Volkswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	4

Mandatory			
T-WIWI-102740	Public Management	4,5 CR	Wigger
Election block: Ergänzungsangebot (between 4,5 and 5 credits)			
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102739	Public Revenues	4,5 CR	Wigger

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

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

Competence Goal
The 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.

Prerequisites
The course "Public Management" is compulsory and must be examined.

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.

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

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.

M 6.6 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German	4	1

Election block: Wahlpflichtangebot (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.

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

Prerequisites
None

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.

Recommendation
None

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.

This module will be offered for the first time in the winter term 2017/18.

M 6.7 Module: Algorithm Engineering [M-INFO-100795]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101332	Algorithm Engineering	5 CR	Sanders, Wagner

M 6.8 Module: Algorithmic Graph Theory [M-INFO-100762]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German	4	1

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

M 6.9 Module: Algorithmic Methods for Network Analysis [M-INFO-102400]

Responsible: Prof. Dr. Henning Meyerhenke
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Language	Level	Version
5	Irregular	German	4	1

Mandatory			
T-INFO-104759	Algorithmic Methods for Network Analysis	5 CR	Meyerhenke

Workload
150 h

M 6.10 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	Recurrence	Language	Level	Version
5	Each winter term	German	4	1

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

M 6.11 Module: Algorithms for Routing [M-INFO-100031]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

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

M 6.12 Module: Algorithms for Visualization of Graphs [M-INFO-102094]

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

Credits	Recurrence	Language	Level	Version
5	Irregular	German	4	1

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

M 6.13 Module: Algorithms II [M-INFO-101173]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 semester	German	4	1

Mandatory			
T-INFO-102020	Algorithms II	6 CR	Prautzsch, Sanders, Wagner

M 6.14 Module: Algorithms in Cellular Automata [M-INFO-100797]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

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

M 6.15 Module: Analytics and Statistics [M-WIWI-101637]

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

Credits	Language	Level	Version
9	German	4	2

Mandatory			
T-WIWI-103123	Advanced Statistics	4,5 CR	Grothe
Election block: Ergänzungsangebot (between 4,5 and 5 credits)			
T-WIWI-106341	Machine Learning 2 – Advanced Methods	4,5 CR	Zöllner
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe

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.

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.

Prerequisites
The course "*Advanced Statistics*" is compulsory.

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

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

Credits	Language	Level	Version
4	German/English	4	1

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

M 6.17 Module: Applied Differential Geometry [M-INFO-102226]

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

Credits	Recurrence	Language	Level	Version
5	Each term	German	4	1

Mandatory			
T-INFO-104546	Applied Differential Geometry	5 CR	Prautzsch

M 6.18 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 (Volkswirtschaftslehre)

Credits	Language	Level	Version
9	German/English	4	3

Election block: Wahlpflichtangebot (1 item)			
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
T-WIWI-106623	Technical Conditions Met	0 CR	
Election block: Ergänzungsangebot (between 1 and 2 items as well as at least 4,5 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.

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.

Prerequisites
The course*Advanced Game Theory*is obligatory. Exception: The course*Introduction to Game Theory*[2520525] was completed.

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.

Recommendation
Basic knowledge in game theory is assumed.

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

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

M 6.19 Module: Asymmetric Encryption Schemes [M-INFO-100723]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101260	Asymmetric Encryption Schemes	3 CR	Müller-Quade

M 6.20 Module: Automated Planning and Scheduling [M-INFO-104447]

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

Credits	Language	Level	Version
5	English	4	1

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

M 6.21 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	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 term	German	4	1

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

M 6.22 Module: Big Data Analytics [M-INFO-100768]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101305	Big Data Analytics	5 CR	Böhm

M 6.23 Module: Big Data Analytics 2 [M-INFO-102773]

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

Credits	Recurrence	Language	Level	Version
3	Irregular	German	4	1

Mandatory			
T-INFO-105742	Big Data Analytics 2	3 CR	Böhm

M 6.24 Module: Biologically Inspired Robot [M-INFO-100814]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101351	Biologically Inspired Robot	3 CR	Dillmann

M 6.25 Module: Biometric Systems for Person Identification [M-INFO-102968]

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

Credits	Recurrence	Language	Level	Version
3	Each summer term	German	4	1

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

M 6.26 Module: Business & Service Engineering [M-WIWI-101410]

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

Credits	Language	Level	Version
9	German/English	4	3

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-102848	Personalization and Services	4,5 CR	Sonnenbichler
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-WIWI-102799	Practical Seminar Service Innovation	4,5 CR	Satzger
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.

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

Prerequisites
None

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.

Recommendation
None

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

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

M 6.27 Module: Cognitive Systems [M-INFO-100819]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 term	German	4	1

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

M 6.28 Module: Collective Decision Making [M-WIWI-101504]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	English	4	4

Election block: Wahlpflichtangebot ()			
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.

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.

Prerequisites
None

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

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

Credits	Recurrence	Duration	Language	Level	Version
5	Irregular	1 term	German	4	1

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

M 6.30 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	Recurrence	Language	Level	Version
6	Each term	German	4	1

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

M 6.31 Module: Computational Geometry [M-INFO-102110]

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

Credits	Recurrence	Language	Level	Version
5	Irregular	German	4	1

Mandatory			
T-INFO-104429	Computational Geometry	5 CR	Wagner

M 6.32 Module: Computer Architecture [M-INFO-100818]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101355	Computer Architecture	6 CR	Henkel, Karl

M 6.33 Module: Computer Graphics [M-INFO-100856]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 term	German	4	1

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

M 6.34 Module: Computer Vision for Human-Computer Interaction [M-INFO-100810]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101347	Computer Vision for Human-Computer Interaction	6 CR	Stiefelhagen

M 6.35 Module: Context Sensitive Systems [M-INFO-100728]

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

Credits	Language	Level	Version
5	German	4	2

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

M 6.36 Module: Critical Digital Infrastructures [M-WIWI-104403]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	2

Mandatory			
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
Election block: Wahlpflichtangebot (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-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.

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

Prerequisites
None

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.

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.

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.

M 6.37 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German/English	4	8

Mandatory			
T-WIWI-102885	Advanced Management Accounting	4,5 CR	Wouters
Election block: Ergänzungsangebot (4,5 credits)			
T-WIWI-110179	Advanced Management Accounting 2	4,5 CR	Wouters
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-102883	Pricing	4,5 CR	Feurer
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.

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

Prerequisites
The course "Advanced Management Accounting" is compulsory.

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

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.

Recommendation
None

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.

M 6.38 Module: Cryptographic Voting Schemes [M-INFO-100742]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

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

M 6.39 Module: Curves and Surfaces for Geometric Design [M-INFO-101231]

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

Credits	Recurrence	Language	Level	Version
5	Each winter term	German	4	1

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

M 6.40 Module: Curves and Surfaces in CAD I [M-INFO-100837]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

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

M 6.41 Module: Curves and Surfaces in CAD III [M-INFO-101213]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each term	1 semester	German	4	1

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

M 6.42 Module: Data and Storage Management [M-INFO-100739]

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

Credits	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 term	German	4	1

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

M 6.43 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	Language	Level	Version
3	German	4	1

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

M 6.44 Module: Data Science for Finance [M-WIWI-105032]

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

Credits	Language	Level	Version
9	English	4	1

Mandatory			
T-WIWI-102878	Computational Risk and Asset Management	6 CR	Ulrich
T-WIWI-110213	Python for Computational Risk and Asset Management	3 CR	Ulrich

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 and 3 of the examination regulation) of the single courses of this module.
The assessment of "Computational Risk and Asset Management" is carried out in form of a written exam (90 minutes), the assessment of "Python for Computational Risk and Asset Management" is carried out in form of twelve weekly Python programming tasks and offered each winter term.
The overall grade of the module is the grade of the written exam weighted with factor 0.75 and the grade for the Python programming tasks weighted with factor 0.25. The resulting grade is truncated after the first decimal.

Competence Goal
Students learn how to implement solutions for advanced and real-world challenges in portfolio management. The focus of this module is on the realization of statistical concepts in Python and enable students to solve a broad range of problems along the investment process on their own.

Content
The module covers several topics, among them:

- Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization
- Return Densities: Forecasting with Traditional and Machine Learning Approaches, Monte Carlo Simulation
- Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor
- Multi-Asset Valuation: DCF Approach, No-Arbitrage and Ito Calculus

Recommendation
Good knowledge of statistics and first programming experience with Python is recommended.

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module. The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.45 Module: Data Science: Advanced CRM [M-WIWI-101470]

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

Credits	Language	Level	Version
9	German	4	4

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-109921	Advanced Machine Learning	4,5 CR	Geyer-Schulz, Nazemi
T-WIWI-102762	Business Dynamics	4,5 CR	Geyer-Schulz
T-WIWI-103549	Intelligent CRM Architectures	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
T-WIWI-105778	Service Analytics A	4,5 CR	Fromm

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.

Competence Goal
The student

- understand service competition as a sustainable competitive strategy and understand the effects of service competition on the design of markets, products, processes and services,
- models, analyzes and optimizes the structure and dynamics of complex business applications,
- develops and realizes personalized services, especially in the field of recommendation services,
- analyzes social networks and knows their application field in CRM,
- works in teams.

Prerequisites
None

Content
Building on the basics of CRM from the Bachelor's degree program, the module "Data Science: Advanced CRM" is focusing on the use of information technology and its related economic issues in the CRM environment.The course "Intelligent CRM Architectures" deals with the design of modern intelligent systems. The focus is on the software architecture and design patterns that are relevant to learning systems. It also covers important aspects of machine learning that complete the picture of an intelligent system. Examples of presented systems are "Taste Map"-architectures, "Counting Services", as well as architectures of "Business Games".The impact of management decisions in complex systems are considered in the course "Business dynamics". The understanding, modeling and simulation of complex systems allows the analysis, the goal-oriented design and the optimization of markets, business processes and regulations throughout the company.Specific problems of intelligent systems are covered in the courses "Personalization and Services", "Recommender Systems", "Service Analytics" and "Social Network Analysis in CRM". The content includes procedures and methods to create user-oriented services. The measurement and monitoring of service systems, the design of personalized offers, and the generation of recommendations based on the collected data of products and customers are discussed. The importance of user modeling and -recognition, data security and privacy are adressed as well.

Recommendation
None

Annotation
The module has been renamed to "Data Science: Advanced CRM" in winter term 2016/2017.

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

M 6.46 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German/English	4	6

Election block: Wahlpflichtangebot ()			
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-106207	Practical Seminar: Data-Driven Information Systems	4,5 CR	Mädche, Setzer, Weinhardt
T-WIWI-105778	Service Analytics A	4,5 CR	Fromm

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.

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.

Prerequisites
None.

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

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

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

M 6.47 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German/English	4	4

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-108765	Practical Seminar: Advanced Analytics	4,5 CR	Weinhardt
T-WIWI-109863	Business Data Analytics: Application and Tools	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.

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

Prerequisites
None

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 6.48 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 (Betriebswirtschaftslehre)

Credits	Recurrence	Language	Level	Version
9	Once	German	4	5

Election block: Wahlpflichtangebot (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 rst decimal.

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

Prerequisites
Keine.

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.

Recommendation
None

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

M 6.49 Module: Datamanagement in the Cloud [M-INFO-100769]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101306	Datamanagement in the Cloud	5 CR	Böhm

M 6.50 Module: Decision Procedures with Applications to Software Verification [M-INFO-104381]

Responsible: Prof. Dr. Carsten Sinz
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Language	Level	Version
5	German/English	4	1

Mandatory			
T-INFO-108955	Decision Procedures with Applications to Software Verification	5 CR	Sinz

M 6.51 Module: Deep Learning and Neural Networks [M-INFO-104460]

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

Credits	Language	Level	Version
6	German	4	1

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

M 6.52 Module: Deep Learning for Computer Vision [M-INFO-104099]

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

Credits	Language	Level	Version
3	German/English	4	2

Mandatory			
T-INFO-109796	Deep Learning for Computer Vision	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 6.53 Module: Deployment of Database Systems [M-INFO-100780]

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

Credits	Duration	Language	Level	Version
5	1 term	German	4	1

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

M 6.54 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	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

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

M 6.55 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	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

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

M 6.56 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German/English	4	1

Mandatory			
T-WIWI-108461	Interactive Information Systems	4,5 CR	Mädche, Morana
Election block: Ergänzungsangebot (at most 4,5 credits)			
T-WIWI-105773	Digital Service Design	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.

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

Prerequisites
The course “Interactive Information Systems” is compulsory and must be examined.

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 6.57 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	Recurrence	Language	Level	Version
9	Each term	German	4	5

Election block: Wahlplfichtangebot (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
Election block: Ergänzungsangebot (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 Fachbereichs Informatik
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.

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.

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

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 6.58 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German	4	5

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr
T-WIWI-102822	Industrial Services	4,5 CR	Fromm
T-WIWI-107043	Liberalised Power Markets	3 CR	Fichtner
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CR	Nickel
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-106563	Practical Seminar Digital Service Systems	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

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.

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

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.

Recommendation
None

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.

M 6.59 Module: Digital Signatures [M-INFO-100743]

Responsible: Prof. Dr. Dennis Hofheinz
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101280	Digital Signatures	3 CR	Hofheinz

Competence Goal
The student
- knows important signature schemes that are relevant in theory and practice (such as DSA and tree-based signatures),
- understands basic security notions and their relation (such as existential unforgeability under chosen-message attacks),
- is able to understand and apply basic proof techniques (such as reductions and hybrid arguments)

Content
Digital signatures are a fundamental primitive of modern cryptography. Their practical applications include, for instance, authenticated e-mail or certificate hierarchies on the internet.

This lecture will give an overview of important signature schemes with theoretical or practical relevance. This includes:
- One-time signatures, tree-based signatures, and chameleon hash functions
- RSA-based signatures
- Signatures in bilinear groups

Goal of this lecture is not only to describe these schemes, but also to discuss their security. Therefore we will introduce various security notions for digital signatures, and analyze whether the presented schemes provably meet these notions (under certain hardness assumptions).

Depending on the student's preferences, the remaining time will be used to discuss advanced topics, such as:
- Schnorr signatures
- Programmable hash functions
- Tightness of reductions
- Analysis of hardness assumptions in the generic group model

Workload
90 h

M 6.60 Module: Distributed Computing [M-INFO-100761]

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

Credits	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101298	Distributed Computing	4 CR	Streit

M 6.61 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 (Statistik)

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	3

Mandatory			
T-WIWI-103125	Applied Econometrics	4,5 CR	Schienle
Election block: Ergänzungsangebot (between 4,5 and 5 credits)			
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
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-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller

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

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.

Prerequisites
The course "*Advanced Statistics*" [2520020] is compulsory and must be examined.

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

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

M 6.62 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 (Statistik)

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	2

Election block: Wahlplfichtangebot (between 9 and 10 credits)			
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
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-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-103129	Stochastic Calculus and Finance	4,5 CR	Safarian

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.

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.

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

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 6.63 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 (Volkswirtschaftslehre)

Credits	Language	Level	Version
9	German/English	4	4

Election block: Wahlpflichtangebot (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
Election block: Ergänzungsangebot (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.

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

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

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 6.64 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German	4	1

Election block: Wahlpflichtangebot (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

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.

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.

Prerequisites
None.

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

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

Credits	Language	Level	Version
9	German	4	4

Election block: Wahlpflichtangebot (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
T-WIWI-102886	Business Administration in Information Engineering and Management	5 CR	Geyer-Schulz
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
Please note that the course "Business Administration in Information Engineering and Management" is no longer offered and that the examination is only offered in exceptional cases (see description of T-WIWI-102886).

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.

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.

Prerequisites
None

Content
What are the conditions that make electronic markets develop and how can one analyse 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 llike bounded rationality and information assymetries (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

Recommendation
None

Annotation
The course Price Management is offered for the first time in summer term 2016.

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

M 6.66 Module: Embedded Systems for Multimedia and Image Processing [M-INFO-100759]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	English	4	1

Mandatory			
T-INFO-101296	Embedded Systems for Multimedia and Image Processing	3 CR	Henkel

M 6.67 Module: Empirical Software Engineering [M-INFO-100798]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 term	German	4	1

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

M 6.68 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 (Betriebswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	5

Mandatory			
T-WIWI-107043	Liberalised Power Markets	3 CR	Fichtner
Election block: Ergänzungsangebot (at least 6 credits)			
T-WIWI-102691	Energy Trade and Risk Management	4 CR	Cremer, Keles
T-WIWI-102607	Energy Policy	3,5 CR	Wietschel
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-108016	Simulation Game in Energy Economics	3 CR	Genoese
T-WIWI-107446	Quantitative Methods in Energy Economics	3 CR	Keles, 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. Additional courses might be accredited upon request.

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.

Prerequisites
The lecture Liberalised Power Markets has to be examined.

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

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.

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

M 6.69 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 (Betriebswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	4

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-102793	Efficient Energy Systems and Electric Mobility	3,5 CR	Jochem, McKenna
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.

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.

Prerequisites
None

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

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

Credits	Language	Level	Version
5	German/English	4	1

Mandatory			
T-INFO-103582	Energy Informatics 1	5 CR	Hagenmeyer

M 6.71 Module: Energy Informatics 2 [M-INFO-103044]

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

Credits	Recurrence	Language	Level	Version
5	Each summer term	German/English	4	1

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

M 6.72 Module: Energy System Modelling [M-INFO-104117]

Responsible: Dr. Thomas William Brown
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Language	Level	Version
4	English	4	1

Mandatory			
T-INFO-108532	Energy System Modelling	4 CR	Brown

Competence Goal
Qualifikationsziel:After the completion of the course students will have obtained basic knowledge of energy system modelling and optimisation, and be able to analyse different concepts for the integration of renewable energy, such as network reinforcement, storage, demand-side management and sector coupling.

Lernziele: Students are in the position to:

- describe and explain the challenges when integrating renewable energy in energy systems
- critically evaluate different concepts for the integration of renewable energy
- do model calculations for power systems based on renewable energies

- describe the basics of electricity market theory and operation
- program energy system models using standard open source tools

Content
This module will cover the many factors that influence future energy system design, with a focus on renewable energies and their interactions with energy networks.

Topics include:

- Time series analysis of wind, solar and energy demand in Europe.
- Complex network theory.
- Power flow in electrical networks.
- Modelling storage, the role of storage versus networks.
- Basics of optimisation, Karush-Kuhn-Tucker conditions.
- Basics of microeconomics.
- Economics of electricity markets.
- Short-run versus long-run efficiency.
- Network optimisation, storage optimisation.
- Programming energy system models.
- Coupling electricity to other energy sectors.
- Role of renewables in electricity markets.

Additional topics may also include:

- Dynamics in power networks.
- Contingency analysis.
- Effects of climate change on energy systems.

Recommendation
Basic knowledge of network theory and optimisation theory are helpful, but not required. Programming will be in Python.
Basic knowledge of mathematics, differential equations, statistics and programming is assumed.

M 6.73 Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	4	8

Election notes
The courses "Business Planning for Founders - EUCOR" and the course "International Selling - EUCOR" must be taken together.

Election block: Pflichtbestandteil (1 item)			
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
Election block: Wahlpflichtangebot (1 item)			
T-WIWI-102865	Business Planning	3 CR	Terzidis
T-WIWI-110389	Business Planning for Founders - EUCOR	3 CR	Terzidis
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management	3 CR	Terzidis
T-WIWI-102894	Entrepreneurship Research	3 CR	Terzidis
T-WIWI-110381	International Selling – EUCOR	3 CR	Casenave , Klarmann
Election block: Ergänzungsangebot (1 item)			
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-102851	Developing Business Models for the Semantic Web	3 CR	Sure-Vetter
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management	3 CR	Terzidis
T-WIWI-102894	Entrepreneurship Research	3 CR	Terzidis
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-102865	Business Planning	3 CR	Terzidis
T-WIWI-110389	Business Planning for Founders - EUCOR	3 CR	Terzidis
T-WIWI-110374	Firm creation in IT security	3 CR	Terzidis
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
T-WIWI-110381	International Selling – EUCOR	3 CR	Casenave , Klarmann
T-WIWI-109064	Joint Entrepreneurship Summer School	6 CR	Terzidis
T-WIWI-102612	Managing New Technologies	3 CR	Reiß
T-WIWI-102853	Roadmapping	3 CR	Koch

Competence Certificate
See German version.

Competence Goal
See German version.

Prerequisites
None

Recommendation
None

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

M 6.74 Module: Environmental Economics [M-WIWI-101468]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	1

Election block: Wahlpflichtangebot (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	5 CR	Walz
T-WIWI-102616	Environmental and Resource Policy	4 CR	Walz
T-INFO-101348	Environmental Law	3 CR	Bäcker

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.

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

Prerequisites
None

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.

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

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

M 6.75 Module: European and National Technology Law [M-INFO-104810]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: Law

Credits	Language	Level	Version
9	German	4	1

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

M 6.76 Module: Experimental Economics [M-WIWI-101505]

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

Credits	Language	Level	Version
9	German	4	5

Election block: Wahlpflichtangebot (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.

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.

Prerequisites
None.

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.

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

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.

M 6.77 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 (Betriebswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	1

Election block: Wahlpflichtangebot (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.

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

Prerequisites
None

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 6.78 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 (Betriebswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	5

Election block: Wahlpflichtangebot (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-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-109941	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102644	Fixed Income Securities	4,5 CR	Uhrig-Homburg
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-102645	Credit Risk	4,5 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes
T-WIWI-102621	Valuation	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 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.

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.

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.

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 6.79 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 (Betriebswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	5

Election block: Wahlpflichtangebot (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-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-109941	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102644	Fixed Income Securities	4,5 CR	Uhrig-Homburg
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-102645	Credit Risk	4,5 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes
T-WIWI-102621	Valuation	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 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.

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.

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.

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

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

M 6.80 Module: FinTech Innovations [M-WIWI-105036]

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

Credits	Language	Level	Version
9	English	4	1

Mandatory			
T-WIWI-106193	Engineering FinTech Solutions	9 CR	Ulrich

Competence Certificate
The assessment is carried out in form of a written thesis based on the course "Engineering FinTech Solutions".

Competence Goal
Students with a strong technological background and/or a strong interest for software development and investments will learn how to build a prototype that automates essential steps for a fully automated investment and risk management process. Students also learn to organize themselves efficiently in teams of several developers in order to complete a prototype in a limited amount of time. Moreover, students deepen their understanding of finance and technology and learn how to combine both in an effective way. Students will hence be well prepared to become leaders and pioneers for upcoming FinTech innovations (and beyond) to help society to better invest for the future and to better protect from adverse risks.

Prerequisites
see T-WIWI-106193 "Engineering FinTech Solutions"

Content
The module is targeted to students with strong knowledge in the field of computational risk and asset management and strong programming skills. It offers students the opportunity to develop an algorithmic solution and hence ample their programming experience and their understanding of financial economics or asset and risk management.

Recommendation
None

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

M 6.81 Module: Formal Systems [M-INFO-100799]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101336	Formal Systems	6 CR	Beckert

M 6.82 Module: Formal Systems II: Application [M-INFO-100744]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

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

M 6.83 Module: Formal Systems II: Theory [M-INFO-100841]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

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

M 6.84 Module: Fuzzy Sets [M-INFO-100839]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101376	Fuzzy Sets	6 CR	Hanebeck

M 6.85 Module: Geometric Optimization [M-INFO-100730]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Irregular	1 term	German	4	1

Mandatory			
T-INFO-101267	Geometric Optimzation	3 CR	Prautzsch

M 6.86 Module: Governance, Risk & Compliance [M-INFO-101242]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	5

Mandatory			
T-INFO-101288	Corporate Compliance	3 CR	Dreier
Election block: Governance, Risk & Compliance (at least 1 item as well as at least 6 credits)			
T-INFO-101316	Law of Contracts	3 CR	Dreier
T-INFO-108405	Data Protection by Design	3 CR	Raabe
T-INFO-102047	Seminar: Governance, Risk & Compliance	3 CR	Dreier
T-INFO-109910	IT- Security Law	3 CR	Raabe

M 6.87 Module: Graph Partitioning and Graph Clustering in Theory and Practice [M-INFO-100758]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101295	Graph Partitioning and Graph Clustering in Theory and Practice	5 CR	Sanders

M 6.88 Module: Growth and Agglomeration [M-WIWI-101496]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	3

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102785	Theory of Endogenous Growth	4,5 CR	Ott
T-WIWI-103107	Spatial Economics	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.

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

Prerequisites
None

Content
The module includes the contents of the lectures *Endogenous Growth Theory* [2561503], *Spatial Economics* [2561260] and *International Economic Policy* [2560254]. While the first two lectures have a more formal-analytic focus, the third lecture approaches fundamental ideas and problems from the field of international economic policy from a more verbal perspective.

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

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.

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

M 6.89 Module: Hands-on Bioinformatics Practical [M-INFO-101573]

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

Credits	Language	Level	Version
3	German	4	1

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

M 6.90 Module: Heterogeneous Parallel Computing Systems [M-INFO-100822]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

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

M 6.91 Module: Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy [M-INFO-100725]

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

Credits	Recurrence	Duration	Language	Level	Version
3	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	Dillmann, Spetzger

M 6.92 Module: Human Computer Interaction [M-INFO-100729]

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

Credits	Recurrence	Duration	Language	Level	Version
6	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 6.93 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	1

Mandatory			
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-109271	Advanced Lab User Studies in Security	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.

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

Prerequisites
None

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

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

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

M 6.95 Module: Humanoid Robots - Practical Course [M-INFO-102560]

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

Credits	Recurrence	Language	Level	Version
3	Each winter term	German	4	1

Mandatory			
T-INFO-105142	Humanoid Robots - Practical Course	3 CR	Asfour

M 6.96 Module: Image Data Compression [M-INFO-100755]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	English	4	1

Mandatory			
T-INFO-101292	Image Data Compression	3 CR	Beyerer, Pak

M 6.97 Module: Industrial Production II [M-WIWI-101471]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each winter term	1 semester	German/English	4	2

Mandatory			
T-WIWI-102631	Planning and Management of Industrial Plants	5,5 CR	Schultmann
Election block: Ergänzungsangebot aus dem Modul Industrielle Produktion III (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	Wiens
T-WIWI-102828	Supply Chain Management in the Automotive Industry	3,5 CR	Heupel, Lang
T-WIWI-103134	Project Management	3,5 CR	Schultmann
Election block: Ergänzungsangebot (at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-102882	International Management in Engineering and Production	3,5 CR	Sasse
T-WIWI-110512	Life Cycle Assessment	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.

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.

Prerequisites
The course *Planning and Managing of Industrial Plants* [2581952] and at least one additional activity are compulsory and must be examined.

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

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German/English	4	2

Mandatory			
T-WIWI-102632	Production and Logistics Management	5,5 CR	Schultmann
Election block: Ergänzungsangebot aus dem Modul Industrielle Produktion II (at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-102882	International Management in Engineering and Production	3,5 CR	Sasse
T-WIWI-110512	Life Cycle Assessment	3,5 CR	Schultmann
Election block: Ergänzungsangebot (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	Wiens
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.

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.

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

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

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

Credits	Recurrence	Language	Level	Version
6	Each summer term	German	4	1

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

M 6.100 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German	4	2

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-108461	Interactive Information Systems	4,5 CR	Mädche, Morana
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.

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

Prerequisites
None

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 6.101 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	Language	Level	Version
9	German	4	2

Election block: Wahlpflichtangebot ()			
T-WIWI-110373	Advanced Information Systems	5 CR	Mädche, Weinhardt
T-INFO-101305	Big Data Analytics	5 CR	Böhm
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-INFO-101317	Deployment of Database Systems	5 CR	Böhm
T-WIWI-103549	Intelligent CRM Architectures	4,5 CR	Geyer-Schulz
T-WIWI-108461	Interactive Information Systems	4,5 CR	Mädche, Morana
T-INFO-107499	Context Sensitive Systems	5 CR	Beigl
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-WIWI-102809	Service Analytics	4,5 CR	Fromm, Setzer
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 6.102 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	Language	Level	Version
9	German	4	2

Election block: Wahlpflichtangebot ()			
T-WIWI-110373	Advanced Information Systems	5 CR	Mädche, Weinhardt
T-INFO-106061	Access Control Systems: Foundations and Practice	4 CR	Hartenstein
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
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
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer

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 6.103 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	Language	Level	Version
9	German	4	2

Election block: Wahlpflichtangebot ()			
T-WIWI-110373	Advanced Information Systems	5 CR	Mädche, Weinhardt
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-105773	Digital Service Design	4,5 CR	Mädche
T-WIWI-110280	Digital Services: Business Models and Transformation	4,5 CR	Satzger
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
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.

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 6.104 Module: Innovation and Growth [M-WIWI-101478]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	3

Election block: Wahlpflichtangebot (between 9 and 10 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102785	Theory of Endogenous Growth	4,5 CR	Ott
T-WIWI-102840	Innovationtheory and -Policy	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.

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

Prerequisites
None

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.

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.

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.

M 6.105 Module: Innovation Economics [M-WIWI-101514]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	4	2

Election block: Wahlpflichtangebot (between 9 and 10 credits)			
T-WIWI-102840	Innovationtheory 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.

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

Prerequisites
None

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.

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.

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

M 6.106 Module: Innovation Management [M-WIWI-101507]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Mandatory			
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
Election block: Wahlpflichtangebot (1 item)			
T-WIWI-102873	Current Issues in Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-108875	Digital Transformation and Business Models	3 CR	Koch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
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-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
Election block: Ergänzungsangebot (1 item)			
T-WIWI-102873	Current Issues in Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-102866	Design Thinking	3 CR	Terzidis
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-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
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-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.

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.

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.

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.

Recommendation
None

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

M 6.107 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	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 term	German	4	1

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

M 6.108 Module: Integrated Network and Systems Management [M-INFO-100747]

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

Credits	Recurrence	Duration	Language	Level	Version
4	Each summer term	1 term	German	4	1

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

Recommendation
Siehe Teilleistung

M 6.109 Module: Intellectual Property Law [M-INFO-101215]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	3

Election block: Recht des Geistigen Eigentums (at least 1 item as well as at least 9 credits)			
T-INFO-102036	Computer Contract Law	3 CR	Dreier
T-INFO-101308	Copyright	3 CR	Dreier
T-INFO-101310	Patent Law	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 Isues of Internet Law	3 CR	Dreier

Prerequisites
None

M 6.110 Module: Intelligent Systems and Services [M-WIWI-101456]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Election block: Wahlpflichtangebot (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 Fachbereichs Informatik
T-WIWI-102666	Knowledge Discovery	4,5 CR	Sure-Vetter

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).

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.

Prerequisites
None

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

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

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

M 6.112 Module: Internet of Everything [M-INFO-100800]

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

Credits	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 term	German	4	1

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

M 6.113 Module: Introduction to Bioinformatics for Computer Scientists [M-INFO-100749]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

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

M 6.114 Module: Introduction to Video Analysis [M-INFO-100736]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

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

M 6.115 Module: IT-Security Management for Networked Systems [M-INFO-100786]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German	4	1

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

M 6.116 Module: Lab Course Heterogeneous Computing [M-INFO-104072]

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

Credits	Language	Level	Version
6	German/English	4	1

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

Prerequisites
None

M 6.117 Module: Lab Course: Natural Language Processing and Software Engineering [M-INFO-103138]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Language	Level	Version
5	German	4	1

Mandatory			
T-INFO-106239	Lab Course: Natural Language Processing and Software Engineering	5 CR	Tichy

M 6.118 Module: Lab: Designing Embedded Application-Specific Processors [M-INFO-101631]

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

Credits	Language	Level	Version
4	German	4	1

Mandatory			
T-INFO-103115	Lab: Designing Embedded Application-Specific Processors	4 CR	Henkel

M 6.119 Module: Lab: Designing Embedded Systems [M-INFO-103808]

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

Credits	Language	Level	Version
4	English	4	1

Mandatory			
T-INFO-107689	Lab: Designing Embedded Systems	4 CR	Henkel

Prerequisites
None

M 6.120 Module: Lab: Efficient parallel C++ [M-INFO-103506]

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

Credits	Language	Level	Version
6	German/English	4	1

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

M 6.121 Module: Lab: Graph Visualization in Practice [M-INFO-103302]

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

Credits	Language	Level	Version
5	German	4	1

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

M 6.122 Module: Lab: Internet of Things (IoT) [M-INFO-103706]

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

Credits	Language	Level	Version
4	English	4	1

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

Prerequisites
None

M 6.123 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	Language	Level	Version
3	English	4	1

Mandatory			
T-INFO-108323	Lab: Low Power Design and Embedded Systems	3 CR	Henkel

M 6.124 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	Recurrence	Language	Level	Version
6	Each term	German/English	4	1

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

M 6.125 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	Recurrence	Language	Level	Version
3	Each term	German	4	1

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

M 6.126 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	Recurrence	Language	Level	Version
3	Each term	German	4	1

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

M 6.127 Module: Laboratory in Security [M-INFO-101560]

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

Credits	Recurrence	Language	Level	Version
4	Each term	German	4	1

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

M 6.128 Module: Localization of Mobile Agents [M-INFO-100840]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 term	German	4	1

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

M 6.129 Module: Low Power Design [M-INFO-100807]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

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

M 6.130 Module: Machine Learning [M-WIWI-103356]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	2

Election block: Wahlpflichtangebot (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.

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.

Prerequisites
None

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 6.131 Module: Machine Translation [M-INFO-100848]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101385	Machine Translation	6 CR	Waibel

M 6.132 Module: Management Accounting [M-WIWI-101498]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	English	4	2

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.

Prerequisites
None

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

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	5

Mandatory			
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
Election block: Ergänzungsangebot (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-109941	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-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.

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.

Prerequisites
The course *Market Engineering: Information in Institutions* [2540460] is compulsory and must be examined.

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.

Recommendation
None

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.

M 6.134 Module: Marketing Management [M-WIWI-101490]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German/English	4	11

Election block: Wahlpflichtangebot (at least 1 item)			
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-102883	Pricing	4,5 CR	Feurer
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
Election block: Ergänzungsangebot (at most 1 item)			
T-WIWI-106137	Country Manager Simulation	1,5 CR	Feurer
T-WIWI-102835	Marketing Strategy Business Game	1,5 CR	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.

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

Prerequisites
None

Content
The aim of this module is to deepen central marketing contents in different areas. Therefore the students can choose between the following marketing courses:

- Product and Innovation Management
- Market Research – this course has to be completed successfully by students interested in seminar or master thesis positions at the chair of marketing
- Marketing Strategy Business Game
- Country Manager Simulation

Annotation
Please note that only one of the listed 1,5-ECTS courses can be chosen in the Marketing Management module.

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

M 6.135 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Election block: Wahlpflichtangebot (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-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
Election block: Ergänzungsangebot (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-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

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.

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.

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.

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 6.136 Module: Mechanisms and Applications of Workflow Systems [M-INFO-100720]

Responsible: Jutta Mülle
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101257	Mechanisms and Applications of Workflow Systems	5 CR	Mülle

M 6.137 Module: Medical Robotics [M-INFO-100820]

Responsible: Prof. Dr.-Ing. Torsten Kröger
Jun.-Prof. Dr. Franziska Mathis-Ullrich
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101357	Medical Robotics	3 CR	Kröger, Mathis-Ullrich

M 6.138 Module: Meshes and Point Clouds [M-INFO-100812]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each term	1 term	German	4	1

Mandatory			
T-INFO-101349	Meshes and Point Clouds	3 CR	Prautzsch

M 6.139 Module: Microeconomic Theory [M-WIWI-101500]

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

Credits	Language	Level	Version
9	German/English	4	3

Election block: Wahlpflichtangebot (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.

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?

Prerequisites
None

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 6.140 Module: Mobile Communication [M-INFO-100785]

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

Credits	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101322	Mobile Communication	4 CR	Waldhorst, Zitterbart

M 6.141 Module: Mobile Robots – Practical Course [M-INFO-102977]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 semester	German	4	1

Mandatory			
T-INFO-105951	Mobile Robots – Practical Course	6 CR	Dillmann

M 6.142 Module: Model-Driven Software Development [M-INFO-100741]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101278	Model Driven Software Development	3 CR	Reussner

Prerequisites
None

M 6.143 Module: Models of Parallel Processing [M-INFO-100828]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101365	Models of Parallel Processing	5 CR	Worsch

Recommendation
Siehe Teilleistung

M 6.144 Module: Module Master Thesis [M-WIWI-104833]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: Master Thesis

Credits	Language	Level	Version
30	German	3	1

Mandatory			
T-WIWI-103142	Master Thesis	30 CR	Studiendekan der KIT-Fakultät für Informatik, Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

Competence Certificate
Examination by two examiners from the two faculties. For details refer to examination regulation. 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.

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.

Prerequisites
Regulated in §14 of the examination regulation.

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 6.145 Module: Multicore Computers and Computer Clusters [M-INFO-100788]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101325	Multicore Computers and Computer Clusters	4 CR	Tichy

M 6.146 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	Recurrence	Language	Level	Version
6	Each winter term	German	4	1

Mandatory			
T-INFO-101565	Multicore Programming in Practice: Tools, Models, Languages	6 CR	Tichy

M 6.147 Module: Multi-dimensional Signal Processing and Image Exploitation with Graphic Cards and Other Manycore-Processors [M-INFO-103154]

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

Credits	Language	Level	Version
3	German	4	1

Mandatory			
T-INFO-106278	Multi-Dimensional Signal Processing and Image Exploitation with Graphic Cards and Other Manycore-Processors	3 CR	Beyerer, Perschke

Competence Goal
The student will gain an overview about the current parallel hardware architectures, which can be used for solving image processing problems. They will be able to analyse, parallelize and optimize image processing algorithms with respect to different hardware platforms. The introduction into OpenCL will give them the ability to implement the algorithms on graphic cards and multi-core processors.

Content
The lecture will give an overview about the different forms of parallelism of an algorithm and the corresponding mapping on hardware architectures. It will introduce the different layouts of the hardware architectures and the different programming models.

To allow for a common programming model for both graphic cards and multi-core processors, the introduction into OpenCL will be very detailed. The OpenCL programming model, the API and the OpenCL C language will be explained. For an optimized use of OpenCL it is mandatory to understand the underlying memory model in all its details. With tutorials during the lecture the, students will get the opportunity to implement image processing algorithms on different architectures and optimize them accordingly. A graphic card and a Xeon-Phi accelerator board will be provided.

M 6.148 Module: Natural Language Dialog Systems [M-INFO-102414]

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

Credits	Recurrence	Language	Level	Version
3	Irregular	German	4	1

Mandatory			
T-INFO-104780	Practical Course Natural Language Dialog Systems	3 CR	Waibel

M 6.149 Module: Natural Language Processing and Dialog Modeling [M-INFO-100899]

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

Credits	Recurrence	Language	Level	Version
3	Each winter term	German	4	1

Mandatory			
T-INFO-101473	Natural Language Processing and Dialog Modeling	3 CR	Waibel

M 6.150 Module: Natural Language Processing and Software Engineering [M-INFO-100735]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101272	Natural Language Processing and Software Engineering	3 CR	Tichy

M 6.151 Module: Network Economics [M-WIWI-101406]

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

Credits	Language	Level	Version
9	German/English	4	2

Election block: Wahlpflichtangebot (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.

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.

Prerequisites
None

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.

Recommendation
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

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

M 6.152 Module: Network Security: Architectures and Protocols [M-INFO-100782]

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

Credits	Recurrence	Duration	Language	Level	Version
4	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101319	Network Security: Architectures and Protocols	4 CR	Zitterbart

M 6.153 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	Recurrence	Duration	Language	Level	Version
4	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101321	Next Generation Internet	4 CR	Bless, Zitterbart

M 6.154 Module: Nonlinear Model Predictive Control - Theory and Applications [M-INFO-103705]

Responsible: Dr. Timm Faulwasser
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Language	Level	Version
5	English	4	2

Mandatory			
T-INFO-107492	Nonlinear Model Predictive Control - Theory and Applications	5 CR	Faulwasser

M 6.155 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	Language	Level	Version
9	German	4	6

Election block: Wahlpflichtangebot (at most 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
Election block: Ergänzungsangebot (at most 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	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-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel

Competence Certificate
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.

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.

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.

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.

Recommendation
Basic knowledge as conveyed in the module*Introduction toOperations Research*[WI1OR] is assumed.

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

M 6.156 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	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101367	Optimization and Synthesis of Embedded Systems (ES1)	3 CR	Henkel

M 6.157 Module: Parallel Algorithms [M-INFO-100796]

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

Credits	Duration	Language	Level	Version
5	1 term	German	4	1

Mandatory			
T-INFO-101333	Parallel Algorithms	5 CR	Sanders

M 6.158 Module: Parallel Computer Systems and Parallel Programming [M-INFO-100808]

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

Credits	Recurrence	Duration	Language	Level	Version
4	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101345	Parallel Computer Systems and Parallel Programming	4 CR	Streit

M 6.159 Module: Pattern Recognition [M-INFO-100825]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101362	Pattern Recognition	3 CR	Beyerer

M 6.160 Module: Photorealistic Rendering [M-INFO-100731]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101268	Photorealistic Rendering	5 CR	Dachsbacher

M 6.161 Module: Practical Course Applied Telematics [M-INFO-101889]

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

Credits	Recurrence	Language	Level	Version
6	Each winter term	German	4	1

Mandatory			
T-INFO-103585	Practical Course Applied Telematics	6 CR	Zitterbart

M 6.162 Module: Practical Course Automatic Speech Recognition [M-INFO-102411]

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

Credits	Recurrence	Language	Level	Version
3	Each winter term	German	4	1

Mandatory			
T-INFO-104775	Practical Course Automatic Speech Recognition	3 CR	Waibel

M 6.163 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	Recurrence	Language	Level	Version
3	Each term	German/English	4	1

Mandatory			
T-INFO-105580	Practical Course Circuit Design with Intel Galileo	3 CR	Tahoori

M 6.164 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	Recurrence	Language	Level	Version
3	Annual	German	4	1

Mandatory			
T-INFO-105943	Practical Course Computer Vision for Human-Computer Interaction	3 CR	Stiefelhagen

M 6.165 Module: Practical Course Computer Vision for Human-Computer Interaction incl. Scientific Report [M-INFO-105105]

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

Credits	Recurrence	Language	Level	Version
6	Annual	German	4	1

Mandatory			
T-INFO-110325	Practical Course Computer Vision for Human-Computer Interaction incl. Scientific Report	6 CR	Stiefelhagen

M 6.166 Module: Practical Course Data Management and Data Analysis [M-INFO-103050]

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

Credits	Recurrence	Language	Level	Version
4	Each term	German/English	4	1

Mandatory			
T-INFO-106066	Practical Course Data Management and Data Analysis	4 CR	Streit

M 6.167 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	Recurrence	Language	Level	Version
4	Irregular	German	4	1

Mandatory			
T-INFO-106063	Practical Course Decentralized Systems and Network Services	4 CR	Hartenstein

M 6.168 Module: Practical Course FPGA Programming [M-INFO-102661]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Language	Level	Version
3	Each term	English	4	1

Mandatory			
T-INFO-105576	Practical Course FPGA Programming	3 CR	Tahoori

M 6.169 Module: Practical Course Model-Driven Software Development [M-INFO-101579]

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

Credits	Language	Level	Version
6	German	4	1

Mandatory			
T-INFO-103029	Practical Course Model-Driven Software Development	6 CR	Reussner

M 6.170 Module: Practical Course Protocol Engineering [M-INFO-102092]

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

Credits	Recurrence	Language	Level	Version
4	Each winter term	German	4	1

Mandatory			
T-INFO-104386	Practical Course Protocol Engineering	4 CR	Zitterbart

M 6.171 Module: Practical Course Research Project: Hands-on Anthropomatics [M-INFO-102568]

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

Credits	Recurrence	Language	Level	Version
8	Each summer term	German	4	1

Mandatory			
T-INFO-105278	Practical Course Research Project: Hands-on Anthropomatics	8 CR	Hanebeck

M 6.172 Module: Practical Course Software Defined Networking [M-INFO-101891]

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

Credits	Recurrence	Language	Level	Version
6	Each summer term	German	4	1

Mandatory			
T-INFO-103587	Practical Course Software Defined Networking	6 CR	Zitterbart

M 6.173 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	Recurrence	Language	Level	Version
4	Each term	English	4	1

Mandatory			
T-INFO-105796	Practical Course: Analysis of Complex Data Sets	4 CR	Böhm

M 6.174 Module: Practical Course: Analyzing Big Data [M-INFO-101663]

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

Credits	Recurrence	Language	Level	Version
4	Each summer term	German	4	1

Mandatory			
T-INFO-103202	Analyzing Big Data - Laboratory Course	4 CR	Böhm

M 6.175 Module: Practical Course: Database Systems [M-INFO-101662]

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

Credits	Recurrence	Language	Level	Version
4	Each winter term	German	4	1

Mandatory			
T-INFO-103201	Practical Course: Database Systems	4 CR	Böhm

M 6.176 Module: Practical Course: Developing Safe & Secure Software for Microcontrollers in Interconnected Energy Systems [M-INFO-103291]

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

Credits	Language	Level	Version
4	German/English	4	1

Mandatory			
T-INFO-106554	Practical Course: Developing Safe & Secure Software for Microcontrollers in Interconnected Energy Systems	4 CR	Hagenmeyer

M 6.177 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	Recurrence	Language	Level	Version
3	Each winter term	English	4	1

Mandatory			
T-INFO-105565	Practical Course Digital Design & Test Automation Flow	3 CR	Tahoori

M 6.178 Module: Practical Course: Discrete Freeform Surfaces [M-INFO-101667]

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

Credits	Recurrence	Language	Level	Version
6	Each winter term	German	4	1

Mandatory			
T-INFO-103208	Practical Course: Discrete Freeform Surfaces	6 CR	Prautzsch

M 6.179 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	Recurrence	Duration	Language	Level	Version
3	Each term	1 term	German	4	2

Mandatory			
T-INFO-109914	Practical Course: General-Purpose Computation on Graphics Processing Units	3 CR	

M 6.180 Module: Practical Course: Geometric Modeling [M-INFO-101666]

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

Credits	Recurrence	Language	Level	Version
3	Each winter term	German	4	1

Mandatory			
T-INFO-103207	Practical Course: Geometric Modeling	3 CR	Prautzsch

M 6.181 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	Language	Level	Version
6	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 6.182 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	Language	Level	Version
4	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 6.183 Module: Practical Course: Neural Network Exercises [M-INFO-103143]

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

Credits	Language	Level	Version
3	German/English	4	1

Mandatory			
T-INFO-106259	Practical Course: Neural Network Exercises	3 CR	Waibel

M 6.184 Module: Practical Course: Programme Verification [M-INFO-101537]

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

Credits	Language	Level	Version
3	German	4	1

Mandatory			
T-INFO-102953	Practical Course: Programme Verification	3 CR	Beckert

M 6.185 Module: Practical Course: Smart Data Analytics [M-INFO-103235]

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

Credits	Recurrence	Language	Level	Version
6	Each summer term	German	4	1

Mandatory			
T-INFO-106426	Practical Course: Smart Data Analytics	6 CR	Beigl

M 6.186 Module: Practical Course: Virtual Neurorobotics in the Human Brain Project [M-INFO-103227]

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

Credits	Language	Level	Version
3	German/English	4	1

Mandatory			
T-INFO-106417	Practical Course: Virtual Neurorobotics in the Human Brain Project	3 CR	Dillmann

Competence Goal

- Students understand the basic of neuroscience, neuro-robotics and neuro-informatics
- Students are able to model functional networks of artificial spiking neurons for robot control.
- They are familiar with neural and physical simulation environments (especially the simulator developed in the Human Brain Project) and can design and conduct scientific experiments within.

Content
In this practical course, students have the opportunity to discover the field of neurorobotics within the context of the “Human Brain Project”. The course will cover the concepts of virtual neurorobotics ranging from modelling networks of artificial spiking neurons to design of adequate experiments for training and evaluation in a simulation environments.

M 6.187 Module: Practical Course: Visual Computing 1 [M-INFO-101563]

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

Credits	Recurrence	Language	Level	Version
6	Each term	German	4	1

Mandatory			
T-INFO-102996	Practical Course: Visual Computing 1	6 CR	Dachsbacher

M 6.188 Module: Practical Course: Visual Computing 2 [M-INFO-101567]

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

Credits	Recurrence	Language	Level	Version
6	Each term	German	4	1

Mandatory			
T-INFO-103000	Practical Course: Visual Computing 2	6 CR	Dachsbacher

M 6.189 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	Recurrence	Language	Level	Version
5	Each summer term	German	4	2

Mandatory			
T-INFO-103121	Practical Course: Web Applications and Service-Oriented Architectures (II)	5 CR	Abeck

M 6.190 Module: Practical Introduction to Hardware Security [M-INFO-104357]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Language	Level	Version
6	English	4	1

Mandatory			
T-INFO-108920	Practical Introduction to Hardware Security	6 CR	Tahoori

M 6.191 Module: Practical Project Robotics and Automation I (Software) [M-INFO-102224]

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

Credits	Recurrence	Language	Level	Version
6	Each term	German	4	1

Mandatory			
T-INFO-104545	Practical Project Robotics and Automation I (Software)	6 CR	Hein

M 6.192 Module: Practical Project Robotics and Automation II (Hardware) [M-INFO-102230]

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

Credits	Recurrence	Language	Level	Version
6	Each term	German	4	1

Mandatory			
T-INFO-104552	Practical Project Robotics and Automation II (Hardware)	6 CR	Hein

M 6.193 Module: Practical SAT Solving [M-INFO-102825]

Responsible: Prof. Dr. Carsten Sinz
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Language	Level	Version
5	Irregular	German	4	1

Mandatory			
T-INFO-105798	Practical SAT Solving	5 CR	Sinz

M 6.194 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	Recurrence	Language	Level	Version
6	Each term	German	4	1

Mandatory			
T-INFO-108791	Practical Course Engineering Approaches to Software Development	6 CR	Reussner

M 6.195 Module: Principles of Automatic Speech Recognition [M-INFO-100847]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101384	Principles of Automatic Speech Recognition	6 CR	Waibel

M 6.196 Module: Private Business Law [M-INFO-101216]

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

Credits	Language	Level	Version
9	German	4	3

Election block: Recht der Wirtschaftsunternehmen (at least 1 item as well as at least 9 credits)			
T-INFO-101329	Employment Law I	3 CR	Dreier
T-INFO-101330	Employment Law II	3 CR	Dreier
T-INFO-101315	Tax Law I	3 CR	Dreier
T-INFO-101314	Tax Law II	3 CR	Dietrich, Dreier
T-INFO-101316	Law of Contracts	3 CR	Dreier

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.

Prerequisites
None

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 6.197 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	Recurrence	Language	Level	Version
6	Each summer term	German	4	1

Mandatory			
T-INFO-104746	Project Lab: Image Analysis and Fusion	6 CR	Beyerer

M 6.198 Module: Provable Security in Cryptography [M-INFO-100722]

Responsible: Prof. Dr. Dennis Hofheinz
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101259	Provable Security in Cryptography	3 CR	Hofheinz

Prerequisites
None

M 6.199 Module: Public Business Law [M-INFO-101217]

Responsible: Prof. Dr. Matthias Bäcker
Organisation: KIT Department of Informatics
Part of: Law

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	3

Election block: Öffentliches Wirtschaftsrecht (at least 1 item as well as at least 9 credits)			
T-INFO-101309	Telecommunications Law	3 CR	Marsch
T-INFO-101303	Data Protection Law	3 CR	Marsch
T-INFO-101311	Public Media Law	3 CR	Dreier
T-INFO-101312	European and International Law	3 CR	Brühann
T-INFO-101348	Environmental Law	3 CR	Bäcker

Competence Certificate
see course description.

M 6.200 Module: Randomized Algorithms [M-INFO-100794]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101331	Randomized Algorithms	5 CR	Worsch

M 6.201 Module: Rationale Splines [M-INFO-101857]

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

Credits	Recurrence	Language	Level	Version
3	Irregular	German	4	1

Mandatory			
T-INFO-103544	Rationale Splines	3 CR	Prautzsch

M 6.202 Module: Rationale Splines [M-INFO-101853]

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

Credits	Language	Level	Version
5	German	4	1

Mandatory			
T-INFO-103543	Rationale Splines	5 CR	Prautzsch

Prerequisites
one

M 6.203 Module: Real-Time Systems [M-INFO-100803]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Prof. Dr.-Ing. Björn Hein
Prof. Dr.-Ing. Thomas Längle

Organisation: KIT Department of Informatics

Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101340	Real-Time Systems	6 CR	Asfour, Längle

M 6.204 Module: Reconfigurable and Adaptive Systems [M-INFO-100721]

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

Credits	Duration	Language	Level	Version
3	1 term	German	4	1

Mandatory			
T-INFO-101258	Reconfigurable and Adaptive Systems	3 CR	Henkel

M 6.205 Module: Reinforcement Learning and Neural Networks in Robotics [M-INFO-104894]

Responsible: Prof. Dr.-Ing. Torsten Kröger
Dr.-Ing. Pascal Meißner
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Language	Level	Version
3	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 6.206 Module: Reliable Computing I [M-INFO-100850]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	English	4	1

Mandatory			
T-INFO-101387	Reliable Computing I	3 CR	Tahoori

M 6.207 Module: Requirements Engineering [M-INFO-100763]

Responsible: Prof. Dr.-Ing. Anne Koziolek
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	English	4	1

Mandatory			
T-INFO-101300	Requirements Engineering	3 CR	Koziolek

M 6.208 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	Recurrence	Language	Level	Version
10	Each term	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 6.209 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	Recurrence	Language	Level	Version
10	Each term	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 6.210 Module: Robotics - Practical Course [M-INFO-102522]

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

Credits	Recurrence	Language	Level	Version
6	Each summer 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
Should have attended the lectures Robotics I - III, and Mechano-Informatics and Robotics.

M 6.211 Module: Robotics I - Introduction to Robotics [M-INFO-100893]

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

Credits	Recurrence	Language	Level	Version
6	Each winter term	German	4	3

Mandatory			
T-INFO-108014	Robotics I - Introduction to Robotics	6 CR	Asfour

M 6.212 Module: Robotics II: Humanoid Robotics [M-INFO-102756]

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

Credits	Recurrence	Language	Level	Version
3	Each summer term	German/English	4	2

Mandatory			
T-INFO-105723	Robotics II: Humanoid Robotics	3 CR	Asfour

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.

Prerequisites
None

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

M 6.213 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	Recurrence	Duration	Language	Level	Version
3	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 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.

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 6.214 Module: Sales Management [M-WIWI-101487]

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

Credits	Duration	Language	Level	Version
9	1 semester	English	4	8

Election notes
The courses "Business Planning for Founders - EUCOR" and the course "International Selling - EUCOR" must be taken together.

Mandatory			
T-WIWI-102890	Sales Management and Retailing	3 CR	Klarmann
Election block: Ergänzungsangebot (at most 1 item)			
T-WIWI-106137	Country Manager Simulation	1,5 CR	Feurer
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CR	Konhäuser
T-WIWI-110389	Business Planning for Founders - EUCOR	3 CR	Terzidis
T-WIWI-110381	International Selling – EUCOR	3 CR	Casenave , Klarmann
T-WIWI-102891	Price Negotiation and Sales Presentations	1,5 CR	Klarmann, Schröder
Election block: Ergänzungsangebot (at most 2 items)			
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-102883	Pricing	4,5 CR	Feurer

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

Competence Goal
Students

- have an advanced knowledge about sales management (design and structure of sales systems, relationship with sales partners and important customers)
- have a fundamental understanding of price management (in particular consumer behavior of pricing, pricing strategy, price determination)
- are able to handle particularities and challenges in sales management
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- are able to implement their extensive sales and pricing knowledge in a practical context
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the sales department

Prerequisites
The course "Sales Management and Retailing" is compulsory.

Content
The aim of the module is to deepen the sales management knowledge of the students. Theoretical approaches often have a combined view on marketing and sales, whereas in practical surroundings the sales department is completely separated from the marketing tasks. Given this fact, we concentrate on pure sales management topics and address different facets of the sales management.

Annotation
For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu).

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

M 6.215 Module: Secure Multiparty Computation [M-INFO-104119]

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

Credits	Language	Level	Version
3	German	4	1

Mandatory			
T-INFO-108540	Secure Multiparty Computation	3 CR	Müller-Quade

M 6.216 Module: Security [M-INFO-100834]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101371	Security	6 CR	Hofheinz, Müller-Quade

M 6.217 Module: Selected Topics in Cryptography [M-INFO-100836]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101373	Selected Topics in Cryptography	3 CR	Müller-Quade

M 6.218 Module: Semantic Technologies [M-WIWI-101457]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
9	Once	1 semester	German/English	4	2

Election block: Wahlpflichtangebot (at least 2 items)			
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-102874	Semantic Web Technologies	4,5 CR	Sure-Vetter
T-WIWI-103112	Web Science	4,5 CR	Sure-Vetter

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
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.

Prerequisites
None

Content
The module Semantic Technologies covers the basics, methods and applications for intelligent systems in the World Wide Web. Fundamental to this are the scalable provision of knowledge, the provision of data as linked data, and methods for analyzing networks.Formal basics and practical aspects such as knowledge modelling and available tools for representation languages for ontologies are dealt with in detail. Methods for implementing intelligent systems on the World Wide Web will also be clarified and applications such as Web 2.0 or Service Science will be discussed and evaluated.Furthermore, methods for network analysis and the resulting findings are taught. These findings can be used to design recommendation systems and explain social networking phenomena. A variety of procedures exist to identify patterns that, if interpreted valuable, may provide previously unknown insights. This information can be predictive or descriptive.

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

M 6.219 Module: Seminar Information Systems [M-WIWI-104815]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: Seminars

Credits	Language	Level	Version
3	German	1	1

Mandatory			
T-WIWI-109827	Seminar in Information Systems (Master)	3 CR	Studiendekan der KIT-Fakultät für Informatik, Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

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.

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.

Prerequisites
None.

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 6.220 Module: Seminar Module Economic Sciences [M-WIWI-102736]

Responsible: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: Seminars

Credits	Language	Level	Version
3	German	1	1

Election block: Wahlpflichtangebot (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.

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.

Prerequisites
None.

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 6.221 Module: Seminar Module Informatics [M-INFO-102822]

Organisation: KIT Department of Informatics
KIT Department of Economics and Management

Part of: Seminars

Credits	Recurrence	Language	Level	Version
3	Each term	German/English	1	1

Election block: Seminar Informatik (1 item)			
T-INFO-104336	Seminar Informatics A	3 CR	Abeck
T-WIWI-103480	Seminar in Informatics B (Master)	3 CR	Professorenschaft des Fachbereichs Informatik

M 6.222 Module: Seminar Module Law [M-INFO-101218]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each term	1 semester	German	1	1

Mandatory			
T-INFO-101997	Seminar: Legal Studies I	3 CR	Dreier

M 6.223 Module: Service Analytics [M-WIWI-101506]

Responsible: Prof. Dr. Hansjörg Fromm
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German	4	5

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-102822	Industrial Services	4,5 CR	Fromm
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-105778	Service Analytics A	4,5 CR	Fromm
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.

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

Prerequisites
None

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.

Recommendation
The course Service Analytics A [2595501] should be taken.

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.

M 6.224 Module: Service Computing [M-WIWI-102827]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: Informatics

Credits	Language	Level	Version
9	German	4	2

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-102666	Knowledge Discovery	4,5 CR	Sure-Vetter
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-102874	Semantic Web Technologies	4,5 CR	Sure-Vetter
T-WIWI-102670	Practical Seminar Knowledge Discovery	4 CR	Sure-Vetter
T-WIWI-103112	Web Science	4,5 CR	Sure-Vetter

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.

Competence Goal
Students

- demonstrates basic competency in the areas of data and system integration on the web
- learn new Web-based architectures and applications, as well as concepts related to Web 2.0, Cloud Computing and Semantic Web
- know the different machine learning procedures for the supervised as well as the unsupervised learning
- learn methods regarding network theory and network analysis

Prerequisites
None.

Content
Services can be considered from different perspectives. Computer Science considers Services and Web Services traditionally as a piece of software, which fulfills a specific task. By the permanent rise of Cloud Applications, these services become more important. The offered Services and their functionalities have to be described sufficiently in order to be detectable.

In this module the most important network learning methods are introduced and their applicability is discussed with regard to different information sources

Furthermore, network analysis is presented, as well as architectures and descriptions for Services.

Thereby, the practical usability of the presented methods and algorithms in their particular fields of application are compared.

Recommendation
None

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.

M 6.225 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 (Betriebswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	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).

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.

Prerequisites
None

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.

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.

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.

M 6.226 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German	4	3

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-110280	Digital Services: Business Models and Transformation	4,5 CR	Satzger
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt

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.

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.

Prerequisites
None

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.

Recommendation
None

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.

M 6.227 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German	4	2

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-105773	Digital Service Design	4,5 CR	Mädche
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	4,5 CR	Mädche
T-WIWI-102799	Practical Seminar Service Innovation	4,5 CR	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.

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.

Prerequisites
Dependencies between courses:
The course Practical Seminar Service Innovation cannot be applied in combination with the course Practical Seminar Digital Service Design.

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.

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].

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.

M 6.228 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 (Betriebswirtschaftslehre)

Credits	Language	Level	Version
9	German/English	4	5

Mandatory			
T-WIWI-110280	Digital Services: Business Models and Transformation	4,5 CR	Satzger
Election block: Ergänzungsangebot (4,5 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-102822	Industrial Services	4,5 CR	Fromm
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-105778	Service Analytics A	4,5 CR	Fromm
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) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal
The students

- 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.

Prerequisites
The course "Digital Services: Business Models and Transformation" is compulsory and must be examined.

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.

Recommendation
None

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

M 6.229 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	Language	Level	Version
9	German	4	6

Election block: Wahlpflichtangebot (at most 2 items)			
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Nickel
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
Election block: Ergänzungsangebot (at most 2 items)			
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr

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.

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

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.

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.

Recommendation
The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.

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.

M 6.230 Module: Signals and Codes [M-INFO-100823]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101360	Signals and Codes	3 CR	Müller-Quade

M 6.231 Module: Software Architecture and Quality [M-INFO-100844]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101381	Software Architecture and Quality	3 CR	Reussner

M 6.232 Module: Software Development for Modern, Parallel Platforms [M-INFO-100802]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101339	Software Development for Modern, Parallel Platforms	3 CR	Tichy

M 6.233 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	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 semester	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, statistic testing

M 6.234 Module: Software Lab Parallel Numerics [M-INFO-102998]

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

Credits	Recurrence	Language	Level	Version
6	Each term	German/English	4	2

Mandatory			
T-INFO-105988	Software Lab Parallel Numerics	6 CR	Karl

M 6.235 Module: Software-Evolution [M-INFO-100719]

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

Credits	Recurrence	Duration	Level	Version
3	Each winter term	1 term	4	1

Mandatory			
T-INFO-101256	Software-Evolution	3 CR	Reussner

Prerequisites
None

M 6.236 Module: Stochastic Information Processing [M-INFO-100829]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101366	Stochastic Information Processing	6 CR	Hanebeck

M 6.237 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	8

Election block: Wahlpflichtangebot (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
Election block: Ergänzungsangebot (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-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-106552	Simulation of Stochastic Systems	4,5 CR	Grothe, 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.

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.

Prerequisites
At least one of the courses "Advanced Stochastic Optimization" and"Large-scale Optimization" has to be taken.

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.

Recommendation
It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

Annotation
The course "Introduction to Stochastic Optimization" will be offered until the summer semester 2019 as an additional option in the elective offer of the module. Thereafter, the course can only be selected in the supplementary offer.

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.

M 6.238 Module: Subdivision Algorithms [M-INFO-101863]

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

Credits	Language	Level	Version
3	German	4	1

Mandatory			
T-INFO-103551	Subdivision Algorithms	3 CR	Prautzsch

M 6.239 Module: Subdivision Algorithms [M-INFO-101864]

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

Credits	Language	Level	Version
5	German	4	1

Mandatory			
T-INFO-103550	Subdivision Algorithms	5 CR	Prautzsch

Prerequisites
None

M 6.240 Module: Symmetric Encryption [M-INFO-100853]

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

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	German	4	1

Mandatory			
T-INFO-101390	Symmetric Encryption	3 CR	Müller-Quade

M 6.241 Module: Telematics [M-INFO-100801]

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

Credits	Recurrence	Duration	Language	Level	Version
6	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101338	Telematics	6 CR	Zitterbart

M 6.242 Module: Testing Digital Systems I [M-INFO-100851]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
3	Each summer term	1 term	English	4	1

Mandatory			
T-INFO-101388	Testing Digital Systems I	3 CR	Tahoori

M 6.243 Module: Testing Digital Systems II [M-INFO-102962]

Responsible: Prof. Dr. Mehdi Baradaran Tahoori
Organisation: KIT Department of Informatics
Part of: Informatics

Credits	Recurrence	Language	Level	Version
3	Each summer term	German	4	1

Mandatory			
T-INFO-105936	Testing Digital Systems II	3 CR	Tahoori

M 6.244 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 (Volkswirtschaftslehre)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	4	2

Election block: Wahlpflichtangebot (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.

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

Prerequisites
None

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 6.245 Module: Ubiquitous Computing [M-INFO-100789]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German/English	4	1

Mandatory			
T-INFO-101326	Ubiquitous Computing	5 CR	Beigl

M 6.246 Module: Ubiquitous Computing [M-WIWI-101458]

Responsible: N.N.
Prof. Dr. Hartmut Schmeck
Organisation: KIT Department of Economics and Management
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	3

Mandatory			
T-INFO-101326	Ubiquitous Computing	5 CR	Beigl
Election block: Ergänzungsangebot (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.

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

Prerequisites
See German version

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 6.247 Module: Visualization [M-INFO-100738]

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

Credits	Recurrence	Duration	Language	Level	Version
5	Each winter term	1 term	German	4	1

Mandatory			
T-INFO-101275	Visualization	5 CR	Dachsbacher

M 6.248 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	Language	Level	Version
4	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 6.249 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	Recurrence	Duration	Language	Level	Version
4	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 6.250 Module: Web Data Management [M-WIWI-101455]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: Informatics

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	3

Mandatory			
T-WIWI-102874	Semantic Web Technologies	4,5 CR	Sure-Vetter
Election block: Ergänzungsangebot (between 4 and 5 credits)			
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-103112	Web Science	4,5 CR	Sure-Vetter

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.

Prerequisites
The lecture *Semantic Web Technologies*[2511310] is obligatory and has to be absolved.

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
See German version.

7 Courses

T 7.1 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
SS 2019	2545105	Soziale Innovation unter die Lupe genommen	2 SWS	Seminar (S)	Beyer
Exams					
SS 2019	7900017	Soziale Innovationen unter die Lupe genommen		Prüfung (PR)	Weissenberger-Eibl

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.

T 7.2 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	Recurrence	Version
Examination of another type	4	Each summer term	1

Events					
SS 2019	2400094	Practical Course Access Control Systems	2 SWS	Practical course (P)	Grashöfer, Hartenstein, Jacob
Exams					
SS 2019	7500095	Access Control Systems Lab		Prüfung (PR)	Hartenstein

T 7.3 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	Recurrence	Version
Written examination	4	Each term	1

Events					
SS 2019	2400089	Access Control Systems: Foundations and Practice	2 SWS	Lecture (V)	Grundmann, Hartenstein, Neudecker, Jacob
Exams					
SS 2019	7500247	Access Control Systems: Foundations and Practice		Prüfung (PR)	Hartenstein

T 7.4 Course: Accessibility - Assistive Technologies for Visually Impaired Persons [T-INFO-101301]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-100764 - Accessibility - Assistive Technologies for Visually Impaired Persons

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	2400052	Accessibility - Assistive Technologies for Visually Impaired Persons	2 SWS	Lecture (V)	Stiefelhagen, Schwarz
Exams					
SS 2019	7500007	Accessibility - Assistive Technologies for Visually Impaired Persons		Prüfung (PR)	Stiefelhagen
WS 19/20	7500038	Accessibility - Assistive Technologies for Visually Impaired Persons		Prüfung (PR)	Stiefelhagen

Below you will find excerpts from events related to this course:

V Accessibility - Assistive Technologies for Visually Impaired Persons

2400052, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
According to the World Health Organization there are 285 million visually impaired persons worldwide, of which 39 million are blind and 246 million have low vision. The partial of full loss of sight leads to a number of challenges that visually impaired persons have to face. These include difficulties in mobility and navigation in unknown terrain, missing information in social interaction or handling and finding of objects in daily live.
There are already several technical aids available to support blind and visually impaired persons. So digitized texts can be made accessible by sound output or Braille display. There are also various tools which are especially designed for blind persons such as 'speaking' clocks or pocket calculators. However, the most important technical aid by far to improve mobility is the white cane. Although a number of electronic aids to detect obstacles and to support orientation have been developed over the last years they only offer reduced functionality for a relatively high price and are therefore rarely used.

The lecture will give an overview about IT-based assistive technology (AT) for people with visual impairments. It covers the following topics:
• Information about visual impairments and their impact
• Existing assistive technology for various application areas
• AT to access information content
• Designing barrier-free software & websites
• Possibilities and ongoing research in using computer vision methods to develop novel AT for the visually impaired, e.g. to support mobility, and content access among other things.

T 7.5 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	Recurrence	Version
Oral examination	5	Each summer term	1

T 7.6 Course: Advanced Empirical Asset Pricing [T-WIWI-110513]

Responsible: Jun.-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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530569	Advanced Empirical Asset Pricing	2 SWS	Lecture (V)	Thimme
WS 19/20	2530570	Übung zu Advanced Empirical Asset Pricing	1 SWS	Practice (Ü)	Thimme

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered. The examination is offered every semester and can be repeated at any regular examination date.
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 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 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Notes
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.

T 7.7 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2521533	Advanced Game Theory	2 SWS	Lecture (V)	Reiß
WS 19/20	2521534	Übung zu Advanced Game Theory	1 SWS	Practice (Ü)	Reiß
Exams					
SS 2019	7900248	Advanced Game Theory		Prüfung (PR)	Puppe

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

2521533, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
This course offers an advanced and rigorous treatment of game theory.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 7.8 Course: Advanced Information Systems [T-WIWI-110373]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104812 - Information Systems: Engineering and Transformation
M-WIWI-104813 - Information Systems: Internet-based Markets and Services
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2540450	Foundations of Information Systems	2 SWS	Lecture (V)	Weinhardt, Mädche
WS 19/20	2540451		1 SWS	Practice (Ü)	Mädche, Weinhardt

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation).

Recommendation
None

Annotation
The course starts with a short summary of Information Systems I and II. The course is held in English.

Below you will find excerpts from events related to this course:

V Foundations of Information Systems

2540450, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
Information plays a central role in today's society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the 'information lifecycle' that systematizes all phases from information generation to information distribution. The state of the art of economic theory is presented across this information lifecycle within the lectures.
The content of the lecture is deepened in accompanying lecture courses.

Learning Content
Information plays a central role in today’s society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the "information lifecycle" that systematizes all phases from information generation to information distribution. The single phases of that cycle,

- extraction/generation,
- storage,
- transformation,
- evaluation,
- marketing
- and usage of information

are analyzed from the business administration perspective and the microeconomic perspective. The state of the art of economic theory is presented across this information lifecycle within the lectures. The content of the lecture is deepened in accompanying lecture courses.

Workload
The total workload for this course is approximately 150 hours. For further information see German version.

Literature

- Shapiro, C., Varian, H., Information Rules: A Strategic Guide to the Network Economy. Harvard Business School Press 1999.
- Stahlknecht, P., Hasenkamp, U., Einführung in die Wirtschaftsinformatik. Springer Verlag 7. Auflage, 1999.
- Wirth, H., Electronic Business. Gabler Verlag 2001.

T 7.9 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	Recurrence	Version
Examination of another type	4	Irregular	1

Competence Certificate
See German version

Prerequisites
None

Annotation
See German Version

T 7.10 Course: Advanced Lab Informatics (Master) [T-WIWI-110548]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101455 - Web Data Management
M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-101457 - Semantic Technologies
M-WIWI-101477 - Development of Business Information Systems
M-WIWI-102827 - Service Computing

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each term	1

Exams				
WS 19/20	7900038	Linked Data and the Semantic Web	Prüfung (PR)	Sure-Vetter
WS 19/20	7900046	Sicherheit	Prüfung (PR)	Volkamer
WS 19/20	7900047	Praktikum Betriebliche Informationssysteme: Realisierung innovativer Dienste für Studierende	Prüfung (PR)	Oberweis
WS 19/20	7900102	Advanced Lab Information Service Engineering	Prüfung (PR)	Sack
WS 19/20	7900107	Advanced Lab Cognitive Automobile and Robots	Prüfung (PR)	Zöllner
WS 19/20	7900116	Advanced Lab Security, Usability and Society	Prüfung (PR)	Volkamer
WS 19/20	7900187	Real-World Challenges in Data Science und Analytics	Prüfung (PR)	Sure-Vetter

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.

T 7.11 Course: Advanced Lab User Studies in Security [T-WIWI-109271]

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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2019	2512552	Praktikum User Studies in Security and Privacy	3 SWS	Practical course (P)	Volkamer, Gerber, Mayer
Exams					
SS 2019	7900129	Advanced Lab User Studies in Security		Prüfung (PR)	Volkamer

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

T 7.12 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-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2540535	Advanced Machine Learning	2 SWS	Lecture (V)	Nazemi
SS 2019	2540536	Exercise Advanced Machine Learning	1 SWS	Practice (Ü)	Nazemi
Exams					
SS 2019	7900227	Advanced Machine Learning		Prüfung (PR)	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 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
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

Workload
Time of attendance

- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m

Literature

- Alpaydin, E. (2014). Introduction to Machine Learning. Third Edition, MIT Press.
- De Prado, M. L. (2018). Advances in Financial Machine Learning. John Wiley & Sons.
- Goodfellow, I., Bengio, Y., and A. Courville (2017). Deep Learning. MIT Press. (online available)
- Hastie, T., Tibshirani, R., and J. Friedman (2009). Elements of Statistical Learning. Second Edition. Springer. (online available)
- Leskovec, J., Rajaraman, A., Ullman, J. D., (2014). Mining of Massive Datasets. Cambridge University Press. (online available)
- Witten, I. H., Eibe, F., Hall, M. A., Pal, C. J. (2016). Data Mining: Practical Machine Learning Tools and Techniques. Morgan Kaufmann.

T 7.13 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	Recurrence	Version
Oral examination	4,5	Each winter term	2

Events					
WS 19/20	2579907	Advanced Management Accounting	4 SWS	Lecture (V)	Wouters, Riar
Exams					
WS 19/20	79-2579907-00	Advanced Management Accounting		Prüfung (PR)	Wouters

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

2579907, WS 19/20, 4 SWS, Language: English, Open in study portal

Lecture (V)

Notes
see Module Handbook

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).

Learning Content
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.

Annotation
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).

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Literature is mostly made available via ILIAS.

T 7.14 Course: Advanced Management Accounting 2 [T-WIWI-110179]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Recurrence	Version
Oral examination	4,5	Each summer term	1

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.

Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters∂kit.edu).

T 7.15 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2550552	Statistik für Fortgeschrittene	2 SWS	Lecture (V)	Grothe
WS 19/20	2550553	Übung zu Statistik für Fortgeschrittene	2 SWS	Practice (Ü)	Grothe, Kaplan
Exams					
SS 2019	7900096	Advanced Statistics		Prüfung (PR)	Grothe

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4). The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Annotation
New course starting winter term 2015/2016

Below you will find excerpts from events related to this course:

V Statistik für Fortgeschrittene

2550552, WS 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Basic principles
Types of convergence and limit theorems
Multivariate Distributions
Copulas
Simulation techniques, Bootstrap
Statistical Estimation
Statistical Testing
Simulation studies

Literature
Comprehensive lecture notes

T 7.16 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	Recurrence	Version
Written examination	4,5	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 7.17 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
SS 2019	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture (V)	Mitusch, Scheffel
SS 2019	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice (Ü)	Pegorari
Exams					
SS 2019	00227	Advanced Topics in Economic Theory		Prüfung (PR)	Mitusch, Scheffel
SS 2019	7900291	Advanced Topics in Economic Theory		Prüfung (PR)	Mitusch, Scheffel

Competence Certificate
The course T-WIWI-102609 "Advanced Topics in Economic Theory" restarts in summer term 2019.

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 2019, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning Content
The course deals with basic elements of modern economic theory. It is divided into two parts. The first part introduces the microeconomic foundations of general equilibrium á la Debreu ("The Theory of Value", 1959) and Hildenbrand/Kirman ("Equilibrium Analysis",1988). The second part deals with asymmetric information and introduces the basic techniques of contract theory.
The course is largely based on the textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
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 7.18 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	2400051	Algorithm Engineering	2/1 SWS	Lecture (V)	Sanders, Lamm
Exams					
SS 2019	75514	Algorithm Engineering		Prüfung (PR)	Sanders

T 7.19 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	Recurrence	Version
Oral examination	5	Irregular	1

Events					
SS 2019	2400028	Algorithmische Graphentheorie	2+1 SWS	Lecture / Practice (VÜ)	Ueckerdt, Gritzbach
Exams					
SS 2019	7500238	Algorithmic Graph Theory		Prüfung (PR)	Wagner

T 7.20 Course: Algorithmic Methods for Network Analysis [T-INFO-104759]

Responsible: Prof. Dr. Henning Meyerhenke
Organisation: KIT Department of Informatics
Part of: M-INFO-102400 - Algorithmic Methods for Network Analysis

Type	Credits	Recurrence	Version
Oral examination	5	Irregular	1

T 7.21 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	Recurrence	Version
Oral examination	5	Each winter term	1

T 7.22 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	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2019	24638	Algorithmen für Routenplanung (mit Übungen)	3 SWS	Lecture / Practice (VÜ)	Wagner, Buchhold, Zeitz, Zündorf, Sauer
Exams					
SS 2019	7500019	Algorithms for Routing		Prüfung (PR)	Wagner

T 7.23 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	Recurrence	Version
Oral examination	5	Irregular	1

Events					
WS 19/20	24118	Algorithmen zur Visualisierung von Graphen	2+1 SWS	Lecture / Practice (VÜ)	Wagner, Mtsentlintze, Radermacher, Ueckerdt

T 7.24 Course: Algorithms II [T-INFO-102020]

Responsible: Prof. Dr. Hartmut Prautzsch
Prof. Dr. Peter Sanders
Prof. Dr. Dorothea Wagner

Organisation: KIT Department of Informatics

Part of: M-INFO-101173 - Algorithms II

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	24079	Algorithms II	4 SWS	Lecture (V)	Sanders, Lamm, Heuer
Exams					
SS 2019	7500464	Algorithms II		Prüfung (PR)	Sanders

T 7.25 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	24622	Algorithms for Cellular Automata	3 SWS	Lecture (V)	Worsch, Vollmar
Exams					
SS 2019	75400001	Algorithms in Cellular Automata		Prüfung (PR)	Worsch

T 7.26 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2545108	Innovation Processes Live	2 SWS	Seminar (S)	Beyer

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.

T 7.27 Course: Analyzing Big Data - Laboratory Course [T-INFO-103202]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-101663 - Practical Course: Analyzing Big Data

Type	Credits	Recurrence	Version
Examination of another type	4	Each summer term	2

Events					
SS 2019	24874	Analyzing Big Data Laboratory Course	2 SWS	Practical course (P)	Böhm, Steinbuß
Exams					
SS 2019	7500091	Analyzing Big Data - Laboratory Course		Prüfung (PR)	Böhm

T 7.28 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	Recurrence	Version
Examination of another type	4	Each winter term	1

Events					
SS 2019	2400114	Application security lab	4 SWS	Practical course (P)	Hartung, Müller-Quade, Mechler
WS 19/20	2400114	Application security lab	4 SWS	Practical course (P)	Hartung, Müller-Quade, Mechler
Exams					
SS 2019	7500119	Application Security Lab		Prüfung (PR)	Geiselmann, Müller-Quade

T 7.29 Course: Applied Differential Geometry [T-INFO-104546]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: M-INFO-102226 - Applied Differential Geometry

Type	Credits	Recurrence	Version
Oral examination	5	Each term	1

T 7.30 Course: Applied Econometrics [T-WIWI-103125]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Competence Certificate
The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Annotation
The course is not offered regularly.

T 7.31 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-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2595650	Artificial Intelligence in Service Systems	2 SWS	Lecture (V)	Kühl
Exams					
SS 2019	7900065	Artificial Intelligence in Service Systems		Prüfung (PR)	Satzger

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

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Service Systems

2595650, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
Artificial Intelligence and the application of machine learning is becoming more and more popular to solve relevant business challenges. However, it is not only important to be familiar with precise algorithms, but rather a general understanding of the necessary steps with a holistic view—from real-world challenge to successful deployment of an AI. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. 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. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.

T 7.32 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2530555	Asset Pricing	2 SWS	Lecture (V)	Uhrig-Homburg
SS 2019	2530556	Übung zu Asset Pricing	1 SWS	Practice (Ü)	Uhrig-Homburg, Reichenbacher
Exams					
SS 2019	7900110	Asset Pricing		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The success control takes place in form of a written examination (75 min) during the semester break (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.
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 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 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

Learning Content
This lecture deals with the valuation of risky cash flows. A stochastic discount model and a central equation will be introduced, which form the basis of nearly every valuation model in finance. That includes the valuation of stocks, bonds and derivatives. The first part of the lecture will present the theory, the second part covers empirical questions related to this approach.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Basic literature

- Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

Elective literature

- 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 7.33 Course: Asymmetric Encryption Schemes [T-INFO-101260]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-100723 - Asymmetric Encryption Schemes

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	24115	Asymmetric Encryption Schemes	2 SWS	Lecture (V)	Müller-Quade
Exams					
SS 2019	7500180	Asymmetric Encryption Schemes		Prüfung (PR)	Geiselmann, Müller-Quade

Below you will find excerpts from events related to this course:

V Asymmetric Encryption Schemes

24115, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
This course presents the theoretical and practical aspects of Public Key Cryptography.

- The most important primitives of cryptography will be covered, as there are: one-way function, hash function, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (e.g. Diffie-Hellman) with their strengths and weaknesses.
- In addition to public-key systems, the lecture provides knowledge about algorithms to solve number-theoretic problems on which the security of the systems is based. Thus the choice of parameters and the related level of security of a cryptographic system can be estimated.
- Furthermore, an introduction to provable security is provided, which presents some of the key security concepts (e.g. IND-CCA).
- The combination of cryptographic primitives will be treated on currently used protocols.

T 7.34 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2520408	Auktionstheorie	2 SWS	Lecture (V)	Ehrhart
WS 19/20	2520409	Übungen zu Auktionstheorie	1 SWS	Practice (Ü)	Ehrhart
Exams					
SS 2019	7900255	Auction Theory		Prüfung (PR)	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 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
This course deals with the analysis and modeling of auction which are based on game theory. This also includes aspects of applying and designing auctions as well as experiences with auctions. Main topics are:

- Single- and multi-unit auctions
- Selling and procurement auctions
- Electronic auctions (e.g. eBay, C2C, B2B)
- Multi-attributive auctions.

Annotation
We suggest to attend either Game Theory I or Decision Theory beforehand.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

T 7.35 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	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	2400026	Automated Planning and Scheduling	2/1 SWS	Lecture / Practice (VÜ)	Balyo, Schreiber, Sanders

T 7.36 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	Recurrence	Version
Written examination	6	Each winter term	2

Events					
WS 19/20	24169	Automated Visual Inspection and Image Processing	4 SWS	Lecture (V)	Beyerer
Exams					
SS 2019	7500003	Automated Visual Inspection and Image Processing		Prüfung (PR)	Beyerer
WS 19/20	7500008	Automated Visual Inspection and Image Processing		Prüfung (PR)	Beyerer

Below you will find excerpts from events related to this course:

V Automated Visual Inspection and Image Processing

24169, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

Description
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

Learning Content

- 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

T 7.37 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture (V)	Wigger, Gutekunst
Exams					
SS 2019	790unbe	Basics of German Company Tax Law and Tax Planning		Prüfung (PR)	Wigger
WS 19/20	790unbe	Basics of German Company Tax Law and Tax Planning		Prüfung (PR)	Wigger

Competence Certificate
The assessment consists of a written exam (90 min.) according to § 4 paragraph 2 Nr. 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.

T 7.38 Course: Big Data Analytics [T-INFO-101305]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-100768 - Big Data Analytics
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	24114	Big Data Analytics	3 SWS	Lecture (V)	Böhm
Exams					
SS 2019	7500078	Big Data Analytics		Prüfung (PR)	Böhm
SS 2019	7500280	Big Data Analytics		Prüfung (PR)	Böhm
WS 19/20	7500087	Big Data Analytics		Prüfung (PR)	Böhm

T 7.39 Course: Big Data Analytics 2 [T-INFO-105742]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-102773 - Big Data Analytics 2

Type	Credits	Recurrence	Version
Oral examination	3	Irregular	1

Events					
SS 2019	2400042	Big Data Analytics 2	2 SWS	Lecture (V)	Böhm
Exams					
SS 2019	7500092	Big Data Analytics 2		Prüfung (PR)	Böhm
WS 19/20	7500190	Big Data Analytics 2		Prüfung (PR)	Böhm

Prerequisites
none

T 7.40 Course: Biologically Inspired Robot [T-INFO-101351]

Responsible: Prof. Dr.-Ing. Rüdiger Dillmann
Organisation: KIT Department of Informatics
Part of: M-INFO-100814 - Biologically Inspired Robot

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24619	Biologisch Motivierte Robotersysteme	2 SWS	Lecture (V)	Rönnau, Dillmann
Exams					
SS 2019	7500237	Biologically Inspired Robot		Prüfung (PR)	Dillmann

T 7.41 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	2403011	Biometric Systems for Person Identification	2 SWS	Lecture (V)	Sarfraz
Exams					
SS 2019	7500025	Biometric Systems for Person Identification		Prüfung (PR)	Stiefelhagen

Below you will find excerpts from events related to this course:

V Biometric Systems for Person Identification

2403011, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
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 preventio

Learning Content
The student will acquire the basic theoretical and practical understanding of various technologies used in biometrics, the state-of-the-art algorithms used and their analysis. Student will be able to take advance courses in the field of computer vision/pattern recognition on the completion of this course.

Literature
-Tutorials and related scientific papers will be put on the web
-Online material on the topics discussed in the lectures

T 7.42 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
M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530567	Blockchains & Cryptofinance	2 SWS	Lecture (V)	Schuster, Uhrig-Homburg
WS 19/20	2530568	Übung zu Blockchains & Cryptofinance	1 SWS	Practice (Ü)	Müller
Exams					
SS 2019	7900260	Blockchains & Cryptofinance		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations).
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 up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

Annotation
New course starting winter term 2018/2019.

Below you will find excerpts from events related to this course:

V Blockchains & Cryptofinance

2530567, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Workload
Gesamtaufwand bei 4,5 Leistungspunkten: ca. 135.0 Stunden

Präsenzzeit: 30 Stunden

Vor – und Nachbereitung der LV: 45.0 Stunden

Prüfung und Prüfungsvorbereitung: 60.0 Stunden

T 7.43 Course: Business Administration in Information Engineering and Management [T-WIWI-102886]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2019	2540500	Business Administration in Information Engineering and Management	2 SWS	Lecture (V)	Geyer-Schulz
SS 2019	2540501	Übungen zu BWL der Informationsunternehmen	1 SWS	Practice (Ü)	Nazemi
Exams					
SS 2019	7979537	Business Administration in Information Engineering and Management		Prüfung (PR)	Geyer-Schulz

Competence Certificate
The lecture is no longer offered.

Prerequisites
None

Recommendation
Basic knowledge from Operations Research (linear programming) and from decision theory are expected.

Below you will find excerpts from events related to this course:

V Business Administration in Information Engineering and Management

2540500, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
In this lecture, classical Business Administration is applied to businesses in an information- and communicationtechnological environment. The process to extract relevant data for decision making from operational accounting systems receives special attention. In order to do so, topics such as activity-based costing and transaction costs models are addressed. The automization of the decision making process in businesses by data bases is another focus of the module. To solve such issues within a company, relevant methods such as decision theory and game theory are lectured. Finally, complex business relevant questions in a dynamically changing environment are adressed by presenting models and methods from system dynamics.

Workload
The total workload for this course is approximately 150 hours (5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 40h 00m
- Preparation of the examination: 31h 00m

Sum: 150h 00m

Literature

- G. Bamberg und A. G. Coenenberg (2006). Betriebswirtschaftliche Entscheidungslehre. (13. edition), chapter 1 - 8, pages 1 - 270.
- Russell, S. and Norvig, P. (1995). Artificial Intelligence: A Modern Approach The Intelligent Agent Book. Prentice-Hall, Upper Saddle River. chapter 2, pages 31 - 37.
- Porter, M. E. (1998a). Competitive Advantage: Creating and Sustaining Superior Performance. The Free Press, New York, 2 edition. chapter 1, pages 1 - 30
- Porter, M. E. (1998b). Competitive Strategy: Techniques for Analyzing Industries and Competitors. The Free Press, New York, 2 edition. chapters 1+2, pages 1 - 46
- Horngren, C. T., Datar, S. M., and Foster, G. (2003). Cost Accounting: A Managerial Emphasis. Prentice-Hall, Upper Saddle River, 11 edition. chapter 13, pages 446 - 460
- Cooper,W.W., Seiford, L. M., and Tone, K. (2000). Data Envelopment Analysis. Kluwer Academic Publishers, Boston. chapter 2, pages 21- 25
- Copeland, T. and Weston, F. (1988). Financial Theory and Corporate Policy. Addison-Wesley, Reading, 3 edition. pages 18 - 41 and chapter 4.E, pages 92 - 95].
- Myerson, R. B. (1997). Game Theory. Harvard University Press, London, 3 edition. pages 99-105.
- Milgrom, P. and Roberts, J. (1992). Economics, Organization and Management. Prentice Hill [Chapter 2, pp. 25-39].

T 7.44 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

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2019	2540466	Business Data Analytics: Application and Tools	2 SWS	Lecture (V)	Weinhardt, Dann, Staudt
SS 2019	2540467	Excercise Business Data Analytics: Application and Tools	1 SWS	Practice (Ü)	Haubner, Dann, Frankenhauser, Staudt
Exams					
SS 2019	7900183	Business Data Analytics: Application and Tools		Prüfung (PR)	Weinhardt
SS 2019	7900189	Business Data Analytics: Application and Tools		Prüfung (PR)	Weinhardt

Competence Certificate
The assessment is carried out by a written examination (60 minutes) and a written elaboration. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Prerequisites
None

Recommendation
Knowledge of object-oriented programming and statistics is helpful.

Annotation
Course name until winter semester 2018/2019 "Applied Analytics with Open Source Tools" (T-WIWI-108438)

Below you will find excerpts from events related to this course:

V Business Data Analytics: Application and Tools — Lecture (V)

2540466, SS 2019, 2 SWS, Language: German, Open in study portal

Description
The ongoing digitalization and digitization of businesses, industries and societies is generating vast amounts of data. Hence, researchers and businesses are facing increasing pressure to build capabilities to cope with the data and generate value from the contained but yet to be discovered knowledge, insights and information. Researchers and practitioners tackling this task are referred to as data scientists and need skills at the intersection of programming, statistics and development operations. This course provides a hands-on perspective on these fields.

Learning Content
The aim of this course is to introduce practical foundations, concepts, tools and current practice of Analytics from a data scientist's perspective. The lecture is complemented with an Analytics challenge that is based on real-world data from research projects. The students immediately apply their newly acquired knowledge and learn to use a range of open source tools to solve the challenge.

Content:

- Conceptual and theoretical Foundations
- Programming languages common in data science
- Data acquisition, pre-processing
- Basics of data organization and DevOps
- Tool chain selection and automation
- Open source analytics frameworks and data processing infrastructures
- Applied analytics challenge (based on a current research project or a cooperation with an industry partner)

Workload
The total workload for this course is approximately 135 hours.

T 7.45 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540484	Business Data Strategy	2 SWS	Lecture (V)	Weinhardt
WS 19/20	2540485	Übung zu Business Data Strategy	1 SWS	Practice (Ü)	Weinhardt, Knierim

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 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Notes
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.

Learning 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.

Literature

- Fleckenstein & Fellows (2017) – Modern Data Strategy
- Leimeister (2015) – Einführung in die Wirtschaftsinformatik
- Urbach & Ahlemann (2016) – IT-Management im Zeitalter der Digitalisierung
- DAMA International (2009) – The DAMA Guide to the Data Management Body of Knowledge (DAMA-DMBOK)

T 7.46 Course: Business Dynamics [T-WIWI-102762]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540531	Business Dynamics	2 SWS	Lecture (V)	Geyer-Schulz, Glenn
WS 19/20	2540532	Exercise Business Dynamics	1 SWS	Practice (Ü)	Geyer-Schulz, Glenn
Exams					
SS 2019	7900278	Business Dynamics		Prüfung (PR)	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

Below you will find excerpts from events related to this course:

V Business Dynamics

2540531, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Corporate growth, the diffusion of new technologies, business processes, project management, product development, service quality management – all these are examples for application areas of business dynamics. They all are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics such systems can be modelled. Simulations of complex systems allow the analysis, the goal centered design, as well as the optimization of markets, business processes, policies, and organizations.

Annotation
The course is generally held as block course.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
John D. Sterman. Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, 2000.

T 7.47 Course: Business Intelligence Systems [T-WIWI-105777]

Responsible: Prof. Dr. Alexander Mädche
Mario Nadj
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	Recurrence	Version
Examination of another type	4,5	Each winter term	2

Events					
WS 19/20	2540422	Business Intelligence Systems	3 SWS	Lecture (V)	Mädche, Nadj
Exams					
SS 2019	7900149	Business Intelligence Systems		Prüfung (PR)	Mädche
SS 2019	7900270	Business Intelligence Systems		Prüfung (PR)	Mädche

Competence Certificate
Assessment consists of a written exam of 1 hour length and by submitting written papers as part of the exercise. 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

2540422, WS 19/20, 3 SWS, Language: English, Open in study portal

Lecture (V)

Description
In most modern enterprises, Business Intelligence Systems represent a core enabler of managerial 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.

The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of Business Intelligence Systems from a managerial and technical perspective. The lecture is complemented with a Business Intelligence System challenge, where students work with real-world data and enable system-based decision making using commercial Business Intelligence software packages.

Learning Content
· Conceptual Foundations
· Provisioning: ETL Process, Metadata, Data Warehouse & Data Marts and Big Data Technologies
· Consumption: Reporting, Dashboards and its relation to (Big Data) Analytics
· BI Strategy & Governance
· BI Implementation & Post-Implementation Management
· Business Intelligence System Challenge (in cooperation with industry partner)

Literature

Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. “Decision Support and Business Intelligence Systems”. Pearson.

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.

T 7.48 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-101410 - Business & Service Engineering
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104813 - Information Systems: Internet-based Markets and Services

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2019	2540456	Internet Business Models	2 SWS	Lecture (V)	Weinhardt, Peukert, Dann
SS 2019	2540457	Übungen zu Geschäftsmodelle im Internet: Planung und Umsetzung	1 SWS	Practice (Ü)	Peukert, Dann
Exams					
SS 2019	7910454	Business Models in the Internet: Planning and Implementation		Prüfung (PR)	Weinhardt
SS 2019	7979234	Business Models in the Internet: Planning and Implementation		Prüfung (PR)	Weinhardt

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. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Successful participation in the excercises is a prerequisite for admission to the written examination.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Internet Business Models

2540456, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.

Learning Content
The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Will be announced within the course.

T 7.49 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)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2545005	Geschäftsplanung für Gründer (Track 1)	2 SWS	Seminar (S)	Terzidis, Tittel, Ntagiakou
WS 19/20	2545007	Business Planning for Founders (ENTECH)	2 SWS	Seminar (S)	Wohlfeil, Bauman
WS 19/20	2545020	Business Planning for Founders (EUCOR Edition)	2 SWS	Seminar (S)	Terzidis
Exams					
SS 2019	7900054	Business Planning		Prüfung (PR)	Terzidis
WS 19/20	7900023	Business Planning for Founders		Prüfung (PR)	Terzidis

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Geschäftsplanung für Gründer (Track 1)

2545005, SS 2019, 2 SWS, Language: German, Open in study portal

Seminar (S)

Description
This seminar introduces basic concepts of business planning for entrepreneurs to the participants. It focusses on practical concepts andhands-on-methods on how to turn business ideas into solid businesses (e.g. Business Modelling, Market Potential, Planning of Ressorces, and further more) and on the creation of a realistic and viable Business Plan (with or without Venture Capital)

V Business Planning for Founders (EUCOR Edition)

2545020, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Description
This seminar introduces basic concepts of business planning for entrepreneurs to the participants. It focusses on practical concepts andhands-on-methods on how to turn business ideas into solid businesses (e.g. Business Modelling, Market Potential, Planning of Ressorces, and further more) and on the creation of a realistic and viable Business Plan (with or without Venture Capital)

Annotation
Please register on the seminar website.

WARNING: creditability in Seminar Module

The EnTechnon seminars are NOT accepted in the seminar module! The credit is only possible in MODULE ENTREPRENEURSHIP. OneException is the seminar "Entrepreneurship Research".

T 7.50 Course: Business Planning for Founders - EUCOR [T-WIWI-110389]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
WS 19/20	2545020	Business Planning for Founders (EUCOR Edition)	2 SWS	Seminar (S)	Terzidis

Competence Certificate
Alternative exam assessment.

Prerequisites
The course can only be combined with the course "International Selling - EUCOR" to be completed. The course is a combination of 6 ECTS, 3 ECTS per part. The combination can be credited either in the Entrepreneurship module or in the Sales Management module.

Below you will find excerpts from events related to this course:

V Business Planning for Founders (EUCOR Edition)

2545020, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Description
This seminar introduces basic concepts of business planning for entrepreneurs to the participants. It focusses on practical concepts andhands-on-methods on how to turn business ideas into solid businesses (e.g. Business Modelling, Market Potential, Planning of Ressorces, and further more) and on the creation of a realistic and viable Business Plan (with or without Venture Capital)

Annotation
Please register on the seminar website.

WARNING: creditability in Seminar Module

The EnTechnon seminars are NOT accepted in the seminar module! The credit is only possible in MODULE ENTREPRENEURSHIP. OneException is the seminar "Entrepreneurship Research".

T 7.51 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2530299	Business Strategies of Banks	2 SWS	Lecture (V)	Müller
Exams					
SS 2019	7900079	Business Strategies of Banks		Prüfung (PR)	Müller

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Business Strategies of Banks

2530299, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Learning Content
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer

T 7.52 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2545105	Case studies seminar: Innovation management	2 SWS	Seminar (S)	Weissenberger-Eibl
Exams					
WS 19/20	7900237	Case Studies Seminar: Innovation Management		Prüfung (PR)	Weissenberger-Eibl

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 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Notes
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 automotive 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.

Learning 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 automotive 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.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

T 7.53 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2019	2550494	Challenges in Supply Chain Management	3 SWS	Lecture (V)	Mohr
Exams					
SS 2019	7900146	Challenges in Supply Chain Management		Prüfung (PR)	Nickel

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 2019, 3 SWS, Language: English, Open in study portal

Lecture (V)

Learning 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.

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.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
To be defined depending on the topic.

T 7.54 Course: Cognitive Systems [T-INFO-101356]

Responsible: Prof. Dr.-Ing. Rüdiger Dillmann
Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-100819 - Cognitive Systems

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	24572	Kognitive Systeme	4 SWS	Lecture / Practice (VÜ)	Dillmann, Waibel, Stüker, Meißner
Exams					
SS 2019	7500157	Cognitive Systems		Prüfung (PR)	Dillmann, Waibel

T 7.55 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	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2561204	Competition in Networks	2 SWS	Lecture (V)	Mitusch
WS 19/20	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice (Ü)	Wisotzky, Mitusch, Corbo
Exams					
SS 2019	7900274	Competition in Networks		Prüfung (PR)	Mitusch

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
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.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Will be announced in the lecture.

T 7.56 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	Recurrence	Version
Oral examination	5	Irregular	1

T 7.57 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	Recurrence	Version
Oral examination	6	Each term	1

Events					
WS 19/20	2400063	Computational Complexity Theory, with a View Towards Cryptography	4 SWS	Lecture (V)	Hofheinz
Exams					
SS 2019	7500183	Computational Complexity Theory, with a View Towards Cryptography		Prüfung (PR)	Geiselmann, Hofheinz

Below you will find excerpts from events related to this course:

V Computational Complexity Theory, with a View Towards Cryptography

2400063, WS 19/20, 4 SWS, Language: German, Open in study portal — **Lecture (V)**

Description
What is an "efficient" algorithm? Can every algorithmic task be solved efficiently? Or are there inherently hard problems? Computational complexity provides a rigorous, mathematical foundation to reason about problems like these. In this course, we will discuss concepts such as

- machine model, time and space complexity, separations,
- nondeterminism, reductions, completeness,
- the polynomial hierarchy,
- probabilism, one-way functions,
- alternation, interactive proofs, zero-knowledge,

and illustrate them with practical examples. The course provides an outlook to applications of computational complexity theory, with a view towards cryptography.".

T 7.58 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	Recurrence	Version
Oral examination	5	Irregular	1

T 7.59 Course: Computational Risk and Asset Management [T-WIWI-102878]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105032 - Data Science for Finance

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	3

Events					
WS 19/20	2500015	Computational Risk and Asset Management	4 SWS	Lecture (V)	Ulrich

Competence Certificate
The assessment consists of a written exam (90 minutes) according to §4(2) of the examination regulation.

Recommendation
Good knowledge of statistics and first programming experience with Python is recommended.

Below you will find excerpts from events related to this course:

V Computational Risk and Asset Management

2500015, WS 19/20, 4 SWS, Language: English, Open in study portal

Lecture (V)

Description
The aim of this course is to master real-world challenges of computational risk and asset management and provide students with a skill set to incorporate different portfolio objectives into the investment process. It enables students to solve such challenges independently in Python.

Learning Content
The course covers several topics, among them:

Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization

Return Densities: Forecasting with Traditional and Machine Learning Approaches, Monte Carlo Simulation

Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor

Multi-Asset Valuation: DCF Approach, No-Arbitrage and Ito Calculus

Workload
The total workload for this course is approximately 180 hours.

T 7.60 Course: Computer Architecture [T-INFO-101355]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Prof. Dr. Wolfgang Karl

Organisation: KIT Department of Informatics

Part of: M-INFO-100818 - Computer Architecture

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	2424570	Computer structures	3 SWS	Lecture (V)	Karl
Exams					
SS 2019	7500190	Computer Architecture		Prüfung (PR)	Karl

T 7.61 Course: Computer Contract Law [T-INFO-102036]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2411604	Computer Contract Law	2 SWS	Lecture (V)	Bartsch
Exams					
SS 2019	7500066	Computer Contract Law		Prüfung (PR)	Dreier, Matz
WS 19/20	7500065	Computer Contract Law		Prüfung (PR)	Dreier, Matz

Below you will find excerpts from events related to this course:

V Computer Contract Law

2411604, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
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.

Learning Content
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

Elective Literature

tba in the transparencies

T 7.62 Course: Computer Graphics [T-INFO-104313]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-100856 - Computer Graphics

Type	Credits	Recurrence	Version
Completed coursework	0	Each winter term	1

Events					
WS 19/20	24083	Übungen zu Computergrafik	SWS	Lecture / Practice (VÜ)	Zirr, Rapp, Schrade

T 7.63 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	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	24081	Computergrafik	4 SWS	Lecture (V)	Schudeiske, Dachsbacher
Exams					
SS 2019	7500257	Computer Graphics		Prüfung (PR)	Dachsbacher

T 7.64 Course: Computer Vision for Human-Computer Interaction [T-INFO-101347]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-100810 - Computer Vision for Human-Computer Interaction

Type	Credits	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	24180	Computer Vision for Human-Computer Interaction	4 SWS	Lecture (V)	Stiefelhagen, Sarfraz
Exams					
SS 2019	7500060	Computer Vision for Human-Computer Interaction		Prüfung (PR)	Stiefelhagen

Below you will find excerpts from events related to this course:

V Computer Vision for Human-Computer Interaction

24180, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

Description
In this lecture current projects of the field of image processing will be presented which deal with the visual perception of persons re. human-computer interaction.
In respect of the individual topics we will discuss various methods and algorithms, their pros and cons and state of the art:
- Face detection and localisation
- Facial expression
- Assessment of head turns and viewing direction
- Person tracking and localisation
- Articulated body tracking
- Gesture recognition
- Audio-visual speech recognition
- Multi-camera environments
- Tools and libraries

Learning Content
The student acquires a basic understanding of computer vision topics within the context of human-computer interaction and learns how to apply them.

T 7.65 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	2400099	Context Sensitive Systems	1 SWS	Practice (Ü)	Riedel
SS 2019	24658	Context Sensitive Systems	2 SWS	Lecture (V)	Riedel, Beigl
Exams					
SS 2019	7500208_01	Context Sensitive Systems		Prüfung (PR)	Riedel, Beigl
SS 2019	7500208_02	Context Sensitive Systems		Prüfung (PR)	Riedel, Beigl
SS 2019	7500208_190821	Context Sensitive Systems		Prüfung (PR)	Riedel, Beigl
SS 2019	7500208_190822	Context Sensitive Systems		Prüfung (PR)	Beigl, Riedel
SS 2019	7500208_191010	Context Sensitive Systems		Prüfung (PR)	Beigl, Riedel
SS 2019	7500208_191011	Context Sensitive Systems		Prüfung (PR)	Riedel, Beigl

T 7.66 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
SS 2019	2550120	Konvexe Analysis	SWS	Lecture (V)	Stein
Exams					
SS 2019	7900067_SS2019_HK	Convex Analysis		Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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).

Below you will find excerpts from events related to this course:

V Konvexe Analysis

2550120, SS 2019, SWS, Open in study portal **Lecture (V)**

Learning Content
Convex Analysis deals with properties of convex functions and convex sets, in particular with respect to the minimization of convex functions over convex sets. That the involved functions are not necessarily assumed to be differentiable allows a number a applications which are not covered by techniques from smooth optimization, e.g. approximation problems with respect to the Manhattan or maximum norms, classification problems or the theory of statistical estimates. The lecture develops along another, geometrically simple example, where a nonsmooth obstacle set is to be described by a single smooth convex constraint such that minimal and maximal distances to the obstacle can be computed. The lecture is structured as follows:

- Introductory examples and terminology
- Convex subdifferential, Lipschitz continuity and the safety margin
- Normal cones, error bounds and the maximal distance

Literature
Elective literature:

- J. Borwein, A. Lewis, Convex Analysis and Nonlinear Optimization: Theory and Examples (2 ed.), Springer, 2006.
- S. Boyd, L. Vandenberghe, Convex Optimization, Cambridge University Press, 2004.
- O. Güler, Foundations of Optimization, Springer, 2010.
- J.-B. Hiriart-Urruty, C. Lemarechal, Fundamentals of Convex Analysis, Springer, 2001.
- R.T. Rockafellar, Convex Analysis, Princeton University Press, 1970.
- R.T. Rockafellar, R.J.B. Wets, Variational Analysis, Springer, Berlin, 1998.

T 7.67 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	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24121	Copyright	2 SWS	Lecture (V)	Dreier
Exams					
SS 2019	7500064	Copyright		Prüfung (PR)	Dreier, Matz
WS 19/20	7500064	Copyright		Prüfung (PR)	Dreier, Matz

T 7.68 Course: Corporate Compliance [T-INFO-101288]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2400087	Corporate Compliance	2 SWS	Lecture (V)	Herzig
Exams					
SS 2019	7500063	Corporate Compliance		Prüfung (PR)	Dreier, Matz
WS 19/20	7500063	Corporate Compliance		Prüfung (PR)	Dreier, Matz

T 7.69 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	Recurrence	Version
Written examination	4,5	see Annotations	1

Exams				
SS 2019	7900073	Corporate Financial Policy	Prüfung (PR)	Ruckes

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

Annotation
The course will exceptionally be held in the winter semester 2019/2020. Usually, however, the event takes place in the summer semester.

T 7.70 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2530218	Corporate Risk Management	SWS	Lecture (V)	Ruckes, Hoang
SS 2019	2530219	Übung zu Corporate Risk Management	SWS	Practice (Ü)	Silbereis, Ruckes, Hoang
WS 19/20	2530220		SWS	Practice (Ü)	Ruckes, Hoang, Silbereis
Exams					
SS 2019	7900259	Corporate Risk Management		Prüfung (PR)	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
None

Annotation
The course is offered as a block course in the summer term.

Below you will find excerpts from events related to this course:

V Corporate Risk Management

2530218, SS 2019, SWS, Language: English, Open in study portal — **Lecture (V)**

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload
The total workload of this course is approximately 135.0 hours. For further information, see German version.

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach*. Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006.

V

Übung zu Corporate Risk Management

2530219, SS 2019, SWS, Language: English, Open in study portal

Practice (Ü)

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload
The total workload of this course is approximately 135.0 hours. For further information, see German version.

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach*. Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006.

V

2530220, WS 19/20, SWS, Language: English, Open in study portal

Practice (Ü)

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload
The total workload of this course is approximately 135.0 hours. For further information, see German version.

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach*. Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006.

T 7.71 Course: Country Manager Simulation [T-WIWI-106137]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management
M-WIWI-101490 - Marketing Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each winter term	2

Events					
WS 19/20	2572172	Country Manager	1 SWS	Block (B)	Feurer

Competence Certificate
Alternative exam assessment (30 minutes presentation).

Prerequisites
If the course is selected within the module "Sales Management", the following courses may not be started in this module: price negotiations and sales presentations, case studies in sales and pricing.

Annotation
The course language is English. In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter 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 winter term starts.
Please note that only one of the 1.5-ECTS courses can be chosen in this 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.

Below you will find excerpts from events related to this course:

V Country Manager

2572172, WS 19/20, 1 SWS, Language: English, Open in study portal

Block (B)

Learning Content
Understanding Culture
Understanding International Buyer Behavior
Market Entry Decisions
International Marketing and Sales Management (adaptation vs. differentiation)

Annotation

- The course language is English.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter 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 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.

Workload
Total workload for 1.5 ECTS: ca. 45 hours

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T 7.72 Course: Credit Risk [T-WIWI-102645]

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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530565	Credit Risk	3 SWS	Lecture / Practice (VÜ)	Uhrig-Homburg, Mitarbeiter
Exams					
SS 2019	7900113	Credit Risk		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date.
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 up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
Knowledge from the course "Derivatives" is very helpful.

Annotation
See German version.

Below you will find excerpts from events related to this course:

V Credit Risk

2530565, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Description
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

Learning Content
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Lando, D., Credit risk modeling: Theory and Applications, Princeton Univ. Press, (2004).
- Uhrig-Homburg, M., Fremdkapitalkosten, Bonitätsrisiken und optimale Kapitalstruktur, Beiträge zur betriebswirtschaftlichen Forschung 92, Gabler Verlag, (2001).

Elective literature:

- Bluhm, C., Overbeck, L., Wagner, C. , Introduction to Credit Risk Modelling, 2nd Edition, Chapman & Hall, CRC Financial Mathematics Series, (2010).
- Duffie, D., Singleton, K.J., Credit Risk: Pricing, Measurement and Management, Princeton Series of Finance, Prentice Hall, (2003).

T 7.73 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	Recurrence	Version
Examination of another type	4,5	Each winter term	4

Events					
WS 19/20	2511400	Critical Information Infrastructures	2 SWS	Lecture (V)	Sunyaev, Dehling, Lins
WS 19/20	2511401	Exercises to Critical Information Infrastructures	1 SWS	Practice (Ü)	Sunyaev, Dehling, Lins
Exams					
SS 2019	7900061	Critical Information Infrastructures		Prüfung (PR)	Sunyaev
WS 19/20	7900067	Critical Information Infrastructures		Prüfung (PR)	Sunyaev

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.

Prerequisites
None.

Annotation
New lecture from winter semester 2018/2019.

Below you will find excerpts from events related to this course:

V Critical Information Infrastructures

2511400, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Notes
The course critical information infrastructures introduces students to the world of these complex sociotechnical systems that permeate societies on a global scale. Students will learn to handle the complexities involved in the design, development, operation and evaluation of critical information infrastructures. In the beginning of the lecture, critical information infrastructures will be introduced on a general level.

The following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. Students will work (in a group) on a selected case and have to write a seminar paper.

There will be a short introduction to the topics for the course paper on the following topic areas. In addition, it will be possible to propose your own topics as a group in the topic areas:

- **Blockchain**
- **Cloud Computing**
- **Digital Health**
- **Fog Computing**
- **Information Privacy**
- **Certification of critical IT-Services**

In addition to introductions to the topics, an online course is also offered to introduce students to scientific writing. This means to learn how to quote, how a scientific work is structured, and in which form the results of one's research are presented. Since we offer topics in this course that also correspond to the research interests in our research group, there may also be the opportunity to work on the topics in more depth in the course of a final thesis. Students can choose a topic from a variety of topics of the topics presented, and write a course paper in a group of four students.

Learning objectives:

Students know concepts and technologies relevant for the design and reliable operation of critical information infrastructures and can leverage them to develop solutions for real-world challenges.

Notes:

Please note the changed course structure. The course will be held as a block course.

The number of participants is limited. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/3073

Please make sure that your are available at the following dates if you would like to attend the course:

- Introduction: 4 dates on which you have to participate
  - 17.10.2019, 11.30 to 13.00: Foundations of Critical Information Infrastructures. (Geb. 05.20, R1C-02)
  - 24.10.2019, 11.30 to 13.00: Introduction to topics (Geb. 05.20, R1C-02)
  - 31.10.2019: 11.30 - 13.00: Socio-Technical/Socio-Material Information Systems & Design Science Research (Geb. 05.20, R1C-02)
  - 07.11.2019, 11.30 to 13.00: The Critical Information Infrastructures Landscape (Geb. 05.20, R1C-02)
- Intermediate presentations with compulsory attendance: 13.12.2019, 10am to 4pm (Geb. 05.20, R1C-02). Exact times will be announced later.
- Final presentations with compulsory attendance: 07.02.2020, 10am to 4pm (Geb. 05.20, R1C-02). Exact times will be announced later.
- Submission of the course paper: Expected on 02.02.2019. Final date will be announced in the course.

Further information on the course structure will be announced in the first session. Depending on the number of participants the individual sessions can have a shorter duration.

The meetings will take place at the Institute AIFB, KIT Campus South, Kollegiengebäude am Kronenplatz (Geb. 05.20) in Kaiserstr. 89.

The number of participants is limited to 24 students. The registration period is from 31.08.2019 to 29.09.2019. Participation slots are expected to be allocated on 01.10.2019 and must be accepted by the student by 06.10.2019. If the slot is not accepted, the free places will be offered to the students in the waiting list.

If you have any questions regarding this registration, please contact sebastian.lins@kit.edu or dehling@kit.edu.

T 7.74 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	Recurrence	Version
Oral examination	3	Irregular	1

T 7.75 Course: Current Issues in Innovation Management [T-WIWI-102873]

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	Recurrence	Version
Examination of another type	3	Irregular	1

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Annotation
Please note that the seminars we offer vary from semester to semester. Information about the currently offered seminars can be found in the Wiwi-Portal and on the iTM Website.

T 7.76 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	Recurrence	Version
Examination of another type	5	Each winter term	1

Events					
WS 19/20	24175	Curves and Surfaces in CAD II	2+1 SWS	Lecture / Practice (VÜ)	Mir-Mohammad-Sadeghi, Prautzsch

Below you will find excerpts from events related to this course:

V Curves and Surfaces in CAD II

24175, WS 19/20, 2+1 SWS, Language: German/English, Open in study portal

Lecture / Practice (VÜ)

Learning Content
Bèzier-and B-spline techniques, constructive algorithms, underlying geometric structures, as described in the book "Bèzier-and B-spline techniques".
The first part of the course covers curves and tensor product surfaces, the second is on constructions of smooth free form surfaces. Rational, focal and homogenous curves and surfaces are also discussed in both parts.

Workload
Together 180 h.
For both parts 90 h each:
30 h for attending the lectures
30 h for learning
30 h for exam preparations

Literature
Prautzsch, Boehm, Paluszny: Bézier and B-Spline Techniques, Springer 2002.
Farin: Curves and Surfaces for CAGD, Fifth Edition, 2002.

T 7.77 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	Recurrence	Version
Oral examination	5	Irregular	1

Events					
WS 19/20	2400056	Curves and Surfaces in CAD I	2+1 SWS	Lecture / Practice (VÜ)	Prautzsch, Mir-Mohammad-Sadeghi

T 7.78 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	Recurrence	Version
Examination of another type	5	Each term	1

T 7.79 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	24074	Data and Storage Management	2 SWS	Lecture (V)	Neumair

T 7.80 Course: Data Mining and Applications [T-WIWI-103066]

Responsible: Rheza Nakhaeizadeh
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	Recurrence	Version
Oral examination	4,5	Each summer term	2

Events					
SS 2019	2520375	Data Mining and Applications	2/4 SWS	Lecture (V)	Nakhaeizadeh
Exams					
SS 2019	7900102	Data Mining and Applications (Lecture)		Prüfung (PR)	Nakhaeizadeh

Competence Certificate

- Conduction of a larger emprical study in groups
- reporting of milestones
- final presentation (app. 45 minutes)

Prerequisites
None

Below you will find excerpts from events related to this course:

V Data Mining and Applications

2520375, SS 2019, 2/4 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Part one: Data Mining

Why Data Mining?

- What is Data Mining?
- History of Data Mining
- Conferences and Journals on Data Mining
- Potential Applications
- Data Mining Process:
- Business Understanding
- Data Understanding
- Data Preparation
- Modeling
- Evaluation
- Deployment
- Interdisciplinary aspects of Data Mining
- Data Mining tasks
- Data Mining Algorithms (Decision Trees, Association Rules,
- Regression, Clustering, Neural Networks)
- Fuzzy Mining
- OLAP and Data Warehouse
- Data Mining Tools
- Trends in Data Mining

Part two: Examples of application of Data Mining

- Success parameters of Data Mining Projects
- Application in industry
- Application in Commerce

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, R. Uthurusamy, editors, Advances in Knowledge Discovery and Data Mining, AAAI/MIT Press, 1996 (order on-line from Amazon.com or from MIT Press).

- Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
- David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000
- Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.
- Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367
- Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.
- Ian witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070, 2005.

T 7.81 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	Recurrence	Version
Written examination	3	Irregular	1

Exams				
SS 2019	7500235	Data Privacy: From Anonymization to Access Control	Prüfung (PR)	Böhm

T 7.82 Course: Data Protection by Design [T-INFO-108405]

Responsible: PD Dr. Oliver Raabe
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	2400052	Data protection by design	2 SWS	Lecture (V)	Raabe, Werner
Exams					
SS 2019	7500223	Data protection by design		Prüfung (PR)	Raabe
WS 19/20	7500071	Data Protection by Design		Prüfung (PR)	Raabe

T 7.83 Course: Data Protection Law [T-INFO-101303]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	24018	Datenschutzrecht	2 SWS	Lecture (V)	Marsch
Exams					
SS 2019	7500083	Data Protection Law		Prüfung (PR)	Marsch

T 7.84 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511202	Database Systems and XML	2 SWS	Lecture (V)	Oberweis
WS 19/20	2511203	Exercises Database Systems and XML	1 SWS	Practice (Ü)	Oberweis, Fritsch, Schüler
Exams					
SS 2019	7900046	Database Systems and XML		Prüfung (PR)	Oberweis
WS 19/20	7900007	Database Systems and XML		Prüfung (PR)	Oberweis

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 Database Systems and XML

2511202, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Notes
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

T 7.85 Course: Datamanagement in the Cloud [T-INFO-101306]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-100769 - Datamanagement in the Cloud

Type	Credits	Recurrence	Version
Oral examination	5	Irregular	1

Prerequisites
none

T 7.86 Course: Decision Procedures with Applications to Software Verification [T-INFO-108955]

Responsible: Prof. Dr. Carsten Sinz
Organisation: KIT Department of Informatics
Part of: M-INFO-104381 - Decision Procedures with Applications to Software Verification

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	2400073	Decision Procedures with Applications to Software Verification	3 SWS	Lecture / Practice (VÜ)	Sinz, Iser

T 7.87 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	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	2400024	Deep Learning and Neural Networks	4 SWS	Lecture (V)	Waibel, Pham
Exams					
SS 2019	7500044	Deep Learning and Neural Networks		Prüfung (PR)	Waibel

T 7.88 Course: Deep Learning for Computer Vision [T-INFO-109796]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-104099 - Deep Learning for Computer Vision

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	24628	Deep Learning for Computer Vision	2 SWS	Lecture (V)	Stiefelhagen, Sarfraz
Exams					
SS 2019	7500024	Deep Learning for Computer Vision		Prüfung (PR)	Stiefelhagen

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.

Below you will find excerpts from events related to this course:

V Deep Learning for Computer Vision

24628, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
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 lecture is partially given in German and English.

T 7.89 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	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	2400020	Datenbankeinsatz	3 SWS	Lecture (V)	Schäler
Exams					
SS 2019	7500090	Deployment of Database Systems		Prüfung (PR)	Böhm
WS 19/20	7500007	Deployment of Database Systems		Prüfung (PR)	Böhm

T 7.90 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2530550	Derivatives	2 SWS	Lecture (V)	Uhrig-Homburg
SS 2019	2530551	Übungen zu Derivate	1 SWS	Practice (Ü)	Uhrig-Homburg, Eska
Exams					
SS 2019	7900111	Derivatives		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment takes place in the form of a written examination (75 minutes) according to §4(2), 1 SPO. The examination takes place during the semester break. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the excercises. 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 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

Learning Content
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Elective literature:

Cox/Rubinstein (1985): Option Markets, Prentice Hall

T 7.91 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2424106	Design and architectures of embedded systems (ES2)	2 SWS	Lecture (V)	Henkel, Khdr, Samie Ghahfarokhi
Exams					
SS 2019	7500037	VL: Design and architectures of embedded systems (ES2)		Prüfung (PR)	Henkel

Below you will find excerpts from events related to this course:

V Design and architectures of embedded systems (ES2)

2424106, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning Content
Due to the recent advancements in technology, it is now possible to integrate several billion transistors on a single SoC. The trend to add more and more transistors to the SoC continues unabated and leads to multi-fold increase in the SoC's complexity and capabilities. 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.

Workload
90 h

Literature
"Embedded System Design", F. Vahid, John Wiley&Sons, 2002.
"Embedded System Design", P. Marwedel, Kluwer, 2003.
"The Electronic Design Automation Handbook", D. Jansen (Eds.), 2003.
"System Design: A practical guide with SpecC", A. Gerstlauer et al., Kluwer, 2001.
"Computers as Components", W. Wolf, Morgan Kaufmann, 2001.
"Code Optimization for Embedded Systems", R. Leupers et al., Kluwer, 2001.

Further literature will be named during the lecture.

T 7.92 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24648	Design Principles for Interactive Real-Time Systems	2 SWS	Lecture (V)	Peinsipp-Byma, Sauer
Exams					
SS 2019	7500030	Design Príncipes for Interactive Real-Time Systems		Prüfung (PR)	Beyerer, Sauer, Peinsipp-Byma
WS 19/20	7500098	Design Príncipes for Interactive Real-Time Systems		Prüfung (PR)	Beyerer, Sauer, Peinsipp-Byma

T 7.93 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-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2545008	Design Thinking (Track 1)	2 SWS	Seminar (S)	Terzidis, Jochem, Lau
WS 19/20	2545008	Design Thinking (Track 1)	2 SWS	Seminar (S)	Jochem, Terzidis, Lau
Exams					
SS 2019	7900053	Design Thinking (Track 1)		Prüfung (PR)	Terzidis
WS 19/20	7900084	Design Thinking (Track 1)		Prüfung (PR)	Terzidis

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.

T 7.94 Course: Developing Business Models for the Semantic Web [T-WIWI-102851]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Each winter term	1

Competence Certificate
Alternative exam assessments.

Prerequisites
None

Recommendation
As a recommendation to attending the seminar, basic knowledge about semantic technologies and concepts should be available. This may be acquired by attending one of the following lectures – Wissensmanagement, Semantic Web Technologies 1, Semantic Web Technologies 2 or by studying related literature. Furthermore the topic entrepreneurship should be of interest.

T 7.95 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	Recurrence	Version
Examination of another type	4,5	Each winter term	3

Events					
WS 19/20	2511402	Digital Health	2 SWS	Lecture (V)	Sunyaev, Thiebes
Exams					
SS 2019	7900062	Digital Health		Prüfung (PR)	Sunyaev
WS 19/20	7900068	Digital Health		Prüfung (PR)	Sunyaev

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.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Digital Health

2511402, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Lecture (V)

Notes
The course Digital Health offers students a possibility to gain insight into current developments in the digitalization of the health care system. Students will first be introduced to the basics and challenges of the digitalization of the health care system. After the introduction lecture, the course aims to give insights into current topics in the field of digital health and offers students an opportunity to prepare a scientific paper in a group of up to three students.

There will be a short introduction lecture on all topics with regard to the written assignments. It is possible for students to write their paper in one of the following topics. Furthermore, groups of students have the possibility to propose their own topics.

- **Artificial Intelligence**
- **Blockchain**
- **Cloud Computing**
- **Gamification**
- **Genomics**
- **Information Privacy**

In addition to introduction lectures on the topics, an online course is offered to introduce students to scientific writing. This includes learning how to quote, how a scientific paper is structured and in which form the results of one's research are presented. Since we offer topics that also correspond to the research interests of our research associates, there may also be the opportunity to investigate these topics more deeply in a master thesis. Students can give their preferences for the topics offered and are afterwards assigned to groups of up to three students based on their preferences.

Learning objectives:

Students are familiar with the current developments and challenges of digitization in the health care sector, can independently develop corresponding solutions, and discuss their developed solutions in groups.

Workload:

4,5 ECTS = approx. 135 hours.

Comments:

The number of participants is limited. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/3107

Please keep the following dates available if you are planning to attend the course:

- **Introduction:** 3 dates you have to attend
  - **10.2019, 15.45 to 17.15:** Foundations of Digital Health. (Geb. 05.20, R1C-03)
  - **10.2019, 15.45 to 17.15:** Cloud Computing, Genomics, Information Privacy (Geb. 05.20, R1C-03)
  - **11.2019, 15.45 to 17.15:** Blockchain, Artificial Intelligence, Gamification (Geb. 05.20, R1C-03)
- **Intermediate presentation** to be attended: 04.12.2019, 10:00 to 16:00 (Building 05.20, R1A-11). Exact times will be announced soon.
- **Final presentation to be attended:** 02.2020 and 27.02.2020, 09:00 to 19:00 (Building 05.20, R1C-03). Exact times will be announced soon.
- **Submission of the written assignment:** Estimated on 12.02.2019. Final date will be announced in the event.

Further information on the procedure will be announced in the first lecture. Depending on the number of participants, each session may have a shorter duration.

The meetings will take place at the Institute AIFB, KIT-Campus Süd, Kollegiengebäude am Kronenplatz (building 05.20), Kaiserstr. 89.

The number of participants is limited to 30 students. The registration period is from **31.08.2019 to 17.10.2019**. The places are expected to be allocated on **18.10.2019** and must be accepted by the students by **22.10.2019**. If the allocation is not accepted, the free places will be offered to the students in the waiting list.

If you have any questions regarding this registration, please contact scott.thiebes@kit.edu or manuel.schmidt-kraepelin@kit.edu.

T 7.96 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsible: Anja Konhäuser
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each winter term	1

Events					
WS 19/20	2572176	Digital Marketing and Sales in B2B	1 SWS	Others (sonst.)	Konhäuser

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

2572176, WS 19/20, 1 SWS, Language: English, Open in study portal

Others (sonst.)

Learning 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.

Workload
time of presentness = 15 hrs.

private study = 30 hrs.

Literature

-

T 7.97 Course: Digital Service Design [T-WIWI-105773]

Responsible: Prof. Dr. Alexander Mädche
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-104813 - Information Systems: Internet-based Markets and Services

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540420	Digital Service Design	2 SWS	Lecture (V)	Mädche
Exams					
SS 2019	7900190	Digital Service Design		Prüfung (PR)	Mädche

Competence Certificate
Assessment consists of a written exam of 1 hour length and by submitting written papers as part of the exercise Details are announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The course is held in English.

Below you will find excerpts from events related to this course:

V Digital Service Design

2540420, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Description
Designing services is different from designing products. In contrast to products being discrete and tangible objects, services are co-produced by people and only provide value when they are actually used. Digital services represent a specific category of services and specifically leverage and integrate information technology in the service delivery process.

The aim of this course is to introduce key concepts and theoretical foundations of digital service design. Furthermore, a management perspective looking at the entire service lifecycle, covering the organizational and team level as well as state-of-the-art digital service design processes (e.g. agile, lean, continuous delivery) is provided. Finally, an introduction of important digital service design practices and tools supporting user research, conceptualization & prototyping as well as evaluation is given.

The lecture is complemented with a Digital Service Design challenge, where students leverage practices and tools from the lecture to suggest improvements for an existing digital service. The challenge is carried out in cooperation with practice partners (e.g. Commerzbank).

Learning Content

- Definition and key concepts of digital service design and related terms
- Introduction to the business and design perspective of a service design project
- The digital service design process from strategy through planning and prototyping to launching the digital service.
- Practice-oriented capstone project focusing on the design of a real-world digital service

Literature

Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.

Williams, Kevin, Samir Chatterjee, and Matti Rossi. 2008. “Design of Emerging Digital Services: A Taxonomy.” European Journal of Information Systems 17(5): 505–17

Hill, T.P. 1977. “On Goods and Services.” The review of income and wealth 23(4): 315–38.

Werder K, Zobel B, Maedche A (2016) PDISC -- Towards a Method for Software Product DISCovery. In: Maglyas A, Lamprecht A-L (eds) Softw. Bus. 7th Int. Conf. ICSOB 2016, Ljubljana, Slov. June 13-14, 2016, Proc. Springer International Publishing, Cham, pp 47–62

Pichler R (2016) Strategize: Product Strategy and Product Roadmap Practices for the Digital Age. Pichler Consulting

Liu, X., Werder, K., & Maedche, A. (2016). A Taxonomy of Digital Service Design Techniques. In *Proceedings of the 2016 International Conference on Information Systems*

T 7.98 Course: Digital Services: Business Models and Transformation [T-WIWI-110280]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-102754 - Service Economics and Management
M-WIWI-104813 - Information Systems: Internet-based Markets and Services

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2595484	Digital Services: Business Models and Transformation	2 SWS	Lecture (V)	Satzger, Schüritz
WS 19/20	2595485		1 SWS	Practice (Ü)	Enders, Schüritz

Competence Certificate
The assessment of this course is a written examination (60 min.) (following §4(2), 1 SPOs) and by submitting written papers as part of the exercise.

Prerequisites
None

Recommendation
None

Annotation
former name until winter semester 2019/2020: "Business and IT Service Management" (T-WIWI-102881)

Below you will find excerpts from events related to this course:

V Digital Services: Business Models and Transformation

2595484, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Notes
Formerly "Business and IT Service Management"

Learning Content
While the digitalization creates new opportunities for organizations, it also comes with its challenges: formerly proven business models become obsolete and need to be refined, internal processes cannot keep up with the requirements of the market and need to reassessed in any way.

The shift towards a service-based economy enables and requires companies to leverage advances in information technology to create added value for their customers. In particular, the emergence of big data and analytics enables better decision-making. The lecture teaches approaches that enable organizations to adapt their business models to new market requirements and showcases how to plan and execute a successful transformation to the desired organizational setup.

The lecture links academic content with practical examples and excises. Students are asked to actively engage in the discussion and contribute their knowledge. Invited guest speakers from industry and case studies emphasize the practical character of this lecture.

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature

Böhmann, T./ Leimeister, J.M./ Möslein, K. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79

Cardoso et al. (Hrsg.) (2015), Fundamentals on Service Systems

Hartmann/ Zaki/ Feldmann/ Neely (2016), Capturing value from big data - a taxonomy of data-driven business models used by start-up firms, IJPOR, 36 (10), 1382-1406.

Schüritz R./Seebacher S./Satzger G./Schwartz L. (2017), Datatization as the Next Frontier of Servitization; in Proceedings of International Conference on Information Systems 2017

Vargo S. / Lusch R. (2017) Service-dominant logic 2025, in: IJRM 34, 46-67

Weill, P.; Woerner, S.L. (2018): "What's your Digital Business Model? – Six Questions to Help you Build the Next-Generation Enterprise". Boston, Massachusetts: Harvard Business Review Press.

Wirtz, B.(2019): "Digital Business Models – Concepts, Models, and the Alphabet Case Study". Springer.

T 7.99 Course: Digital Signatures [T-INFO-101280]

Responsible: Prof. Dr. Dennis Hofheinz
Organisation: KIT Department of Informatics
Part of: M-INFO-100743 - Digital Signatures

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
SS 2019	24654	Digital Signatures	2 SWS	Lecture (V)	Hofheinz
Exams					
SS 2019	7500182	Digital signatures		Prüfung (PR)	Geiselmann, Müller-Quade, Hofheinz

Below you will find excerpts from events related to this course:

V Digital Signatures

24654, SS 2019, 2 SWS, Open in study portal

Lecture (V)

Learning Content
Digital signatures are a fundamental primitive of modern cryptography. Their practical applications include, for instance, authenticated e-mail or certificate hierarchies on the internet.

This lecture will give an overview of important signature schemes with theoretical or practical relevance. This includes:

- One-time signatures, tree-based signatures, and chameleon hash functions
- RSA-based signatures
- Signatures in bilinear groups

Goal of this lecture is not only to describe these schemes, but also to discuss their security. Therefore we will introduce various security notions for digital signatures, and analyze whether the presented schemes provably meet these notions (under certain hardness assumptions).

Depending on the student's preferences, the remaining time will be used to discuss advanced topics, such as:

- Schnorr signatures
- Programmable hash functions
- Tightness of reductions
- Analysis of hardness assumptions in the generic group model

T 7.100 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2019	2545103	Digitale Transformation und Geschäftsmodelle	2 SWS	Seminar (S)	Koch
Exams					
SS 2019	7900284	Digital Transformation and Business Models		Prüfung (PR)	Weissenberger-Eibl

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.

T 7.101 Course: Digital Transformation of Organizations [T-WIWI-106201]

Responsible: Prof. Dr. Alexander Mädche
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-102808 - Digital Service Systems in Industry
M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104812 - Information Systems: Engineering and Transformation

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2019	2540556	Digital Transformation of Organizations	3 SWS	Lecture (V)	Mädche
Exams					
SS 2019	791000001	Digital Transformation of Organizations		Prüfung (PR)	Mädche

Competence Certificate
The assessment consists of a written exam of 1 hour length and by submitting written papers as part of the exercise. Details will be announced at the beginning of the course.

Prerequisites
None

Annotation
The course will be held in English.

Below you will find excerpts from events related to this course:

V Digital Transformation of Organizations

2540556, SS 2019, 3 SWS, Language: English, Open in study portal

Lecture (V)

Description
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, IT is considered as key enabler of operational excellence ranging from the enrichment of routine working tasks (e.g., enterprise resource planning systems) to e-enabled integration of entire business eco-systems (e.g., e-supply chains). Complementing this primarily company-internal perspective on IT, we have recently have seen a massive growth of digital extensions of existing products and services across all industries. The disruptive potential of IT has already transformed selected key industries, e.g. media or retail, and its impact is continuously growing in all areas of business and society.
Large-scale information systems (IS) in organizations strongly interplay with work practices of individual employees as well as organizational structures shaping and being shaped by individuals' behavior. Thus, successful implementation of IS requires dealing with transformation beyond technology. The ability to implement and use IS in a way supporting its overall value proposition has become a central success determinant. Accordingly, the course “Management of Information Systems” course is designed to provide a comprehensive insight into theoretical foundations, concepts, tools, and current practice of IS. The lecture is complemented with a case study. Students get the opportunity to analyze and propose solutions for a selected real-world IS implementation.

Learning Content

- Definition and key concepts of Information Systems
- Introduction of different types of application systems (organizational process & information-centric systems, customer-centric systems, supplier-centric systems and people-centric systems) and their characteristics
- The digital transformation process: The pre-implementation, implementation and post-implementation phase covering facets such as business/IT alignment, packaged software selection, IS implementation projects, as well as adoption & use of IS
- Practice-oriented case study focusing on real-world IS scenarios

Literature

Daft, R. L. (2009). Organization theory and design. Cengage learning.

Laudon, K. C. and Laudon, J. P. (2014). Management Information Systems: Managing the Digital Firm, 13th Edition, Pearson.

Sambamurthy, V and Zmud, R. Z. (2012). Guiding the Digital Transformation of Organizations. Legerity Digital Press, ISBN 978-0-9857955-0-4.

T 7.102 Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

Responsible: Prof. Dr. Stefan Nickel
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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2550488	Ereignisdiskrete Simulation in Produktion und Logistik	3 SWS	Lecture (V)	Spieckermann
Exams					
SS 2019	7900136	Discrete-Event Simulation in Production and Logistics		Prüfung (PR)	Nickel

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 2019, 3 SWS, Language: German, Open in study portal

Lecture (V)

Learning 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.

Annotation
Basic knowledge as conveyed in the module "Introduction toOperations Research" is assumed.

Besides knowledge of Operations Research students are assumed to be familiar with the following topics:

- Introduction in Statistics
- Programming basics (algorithms and data structures)
- Basic knowledge in production and logistics

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Banks J., Carson II J. S., Nelson B. L., Nicol D. M. (2010) Discrete-event system simulation, 5.Aufl., Pearson, Upper Saddle River.
- Eley, M. (2012): Simulation in der Logistik - Einführung in die Erstellung ereignisdiskreter Modelle unter Verwendung des Werkzeuges "Plant Simulation“, Springer, Berlin und Heidelberg
- Kosturiak, J. und M. Gregor (1995): Simulation von Produktionssystemen. Springer, Wien und New York.
- Law, A. M. (2015): Simulation Modeling and Analysis. 5th Edition, McGraw-Hill, New York usw.
- Liebl, F. (1995): Simulation. 2. Auflage, Oldenbourg, München.
- Noche, B. und S. Wenzel (1991): Marktspiegel Simulationstechnik. In: Produktion und Logistik. TÜV Rheinland, Köln.
- Pidd, M. (2004): Computer Simulation in Management Science. 5th Edition, Wiley, Chichester.
- Robinson S (2004) Simulation: the practice of model development and use. John Wiley & Sons, Chichester
- VDI (2014): Simulation von Logistik-, Materialfluß- und Produktionssystemen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

T 7.103 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	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2400050	Distributed Computing	2 SWS	Lecture (V)	Streit, Krauß, Kühn
Exams					
SS 2019	7500282	Distributed Computing		Prüfung (PR)	Streit

T 7.104 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2560402	Dynamic Macroeconomics	2 SWS	Lecture (V)	Scheffel
WS 19/20	2560403	Übung zu Dynamic Macroeconomics	1 SWS	Practice (Ü)	Krause
Exams					
SS 2019	7900231	Dynamic Macroeconomics		Prüfung (PR)	Scheffel

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Dynamic Macroeconomics

2560402, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Description
The course Dynamic Macroeconomics addresses macroeconomic questions on an advanced level. The main focus of this course is on dynamic programming and its fundamental role in modern macroeconomics. After starting with the necessary mathematical tools, several applications in labor economics, economic growth, and asset pricing are introduced. 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 modern programming language Python.

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature and lecture notes are provided during the course.

T 7.105 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Responsible: PD Dr. Patrick Jochem
Prof. Dr. Russell McKenna
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Recurrence	Version
Written examination	3,5	Each summer term	1

Events					
SS 2019	2581006	Efficient Energy Systems and Electric Mobility	2 SWS	Lecture (V)	Jochem, McKenna
Exams					
SS 2019	7981006	Efficient Energy Systems and Electric Mobility		Prüfung (PR)	Fichtner

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Efficient Energy Systems and Electric Mobility

2581006, SS 2019, 2 SWS, Language: English, Open in study portal **Lecture (V)**

Learning 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.

The energy efficiency part of the lecture provides an introduction to the concept of energy efficiency, the means of affecting it and the relevant framework conditions. Further insights into economy-wide measurements of energy efficiency, and associated difficulties, are given with recourse to several practical examples. The problems associated with market failures in this area are also highlighted, including the Rebound Effect. Finally and by way of an outlook, perspectives for energy efficiency in diverse economic sectors are examined.

The electric mobility part of the lecture examines all relevant issues associated with an increased penetration of electric vehicles including their technology, their impact on the electricity system (power plants and grid), their environmental impact as well as their optimal integration in the future private electricity demand (i.e. smart grids and V2G). Besides technical aspects the user acceptance and behavioral aspects are also discussed.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be anounced in the lecture.

T 7.106 Course: eFinance: Information Systems for Securities Trading [T-WIWI-109941]

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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture (V)	Weinhardt, Notheisen
WS 19/20	2540455	Übungen zu eFinance: Wirtschaftsinformatik für den Wertpapierhandel	1 SWS	Practice (Ü)	Jaquart, Soufi

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.

Prerequisites
see below

Recommendation
None

Below you will find excerpts from events related to this course:

V eFinance: Information Systems for Securities Trading

2540454, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

Learning Content
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

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

Elective literature:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

T 7.107 Course: Embedded Systems for Multimedia and Image Processing [T-INFO-101296]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-100759 - Embedded Systems for Multimedia and Image Processing

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

T 7.108 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 7.109 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 7.110 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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581962	Emissions into the Environment	2 SWS	Lecture (V)	Karl
Exams					
SS 2019	7981962	Emissions into the Environment		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Recommendation
None

Below you will find excerpts from events related to this course:

V Emissions into the Environment

2581962, WS 19/20, 2 SWS, Language: German, Open in study portal **Lecture (V)**

Learning Content
The course will provide an overview of sources of air pollution, waste and municipal waste; methods to monitor and to reduce/ manage pollutant flows; regulatory framework on national and international level.

A Air pollution control

- Indtroduction and definitions
- Sources an dpoluutants
- Regulatory framework
- Emission monitoring
- Air pollution control measures

B Waste management and Recycling

- Introduction and regulatory framework
- Statistics and logistics
- Recycling and disposal
- Waste treatment

C Waste water treatment

- Municipal waste water treatment systems
- Sewage sludge disposal

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
Will be announced in thecourse.

T 7.111 Course: Empirical Software Engineering [T-INFO-101335]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-100798 - Empirical Software Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	24156	Empirische Softwaretechnik	2 SWS	Lecture (V)	Tichy, Hey
Exams					
SS 2019	7500168	Empirical Software Engineering		Prüfung (PR)	Tichy
WS 19/20	7500150	Empirical Software Engineering		Prüfung (PR)	Tichy

T 7.112 Course: Employment Law I [T-INFO-101329]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24167	Employment Law I	2 SWS	Lecture (V)	Hoff
Exams					
SS 2019	7500097	Employment Law I		Prüfung (PR)	Dreier, Matz
WS 19/20	7500040	Employment Law I		Prüfung (PR)	Dreier, Matz

T 7.113 Course: Employment Law II [T-INFO-101330]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
SS 2019	24668	Employment Law II	2 SWS	Lecture (V)	Hoff
Exams					
SS 2019	7500098	Employment Law II		Prüfung (PR)	Dreier, Matz
WS 19/20	7500058	Employment Law II		Prüfung (PR)	Dreier, Matz

T 7.114 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2581003	Energy and Environment	2 SWS	Lecture (V)	Karl
SS 2019	2581004	Übungen zu Energie und Umwelt	1 SWS	Practice (Ü)	Seddig, Keles
Exams					
SS 2019	7981003	Energy and Environment		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy and Environment

2581003, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
The focus of the lecture is put on environmental impacts of fossil fuel conversion and related assessment methods. The list of topics is given below.

- Fundamentals of energy conversion
- Air pollutant formation from fossil fuel combustion
- Control of air pollutant emissions from fossil-fuelled power plants.
- Measures to improve conversion efficiency of fossil fuelled power plants.
- External effects of energy supply (Life Cycle Assessment of selected energy systems)
- Integrated Assessment models supporting the European Thematic Strategy on Air
- Cost-effectiveness analyses and cost-benefit analyses of air pollution control measures
- Monetary evaluation of external effects of energy supply (external costs)

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Thr references for further reading are included in the lecture documents (see ILIAS)

T 7.115 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	Recurrence	Version
Oral examination	5	Each winter term	2

Events					
WS 19/20	2400058	Energy Informatics 1	Lehrveranstaltung mit Übung SWS	Lecture / Practice (VÜ)	Hagenmeyer, Turowski
Exams					
SS 2019	7500079	Energy informatics 1		Prüfung (PR)	Hagenmeyer

T 7.116 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	2400017	Energy Informatics 2	Lehrveranstaltung mit Übung SWS	Lecture / Practice (VÜ)	Hagenmeyer, Turowski, Brown, Duepmeier, Keller, Stucky, Mikut, Kühnapfel, Cakmak, Wagner, Wegner
Exams					
SS 2019	7500156	Energy Informatics 2		Prüfung (PR)	Hagenmeyer
WS 19/20	7500156	Energy Informatics 2		Prüfung (PR)	Hagenmeyer

T 7.117 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2540464	Energy Market Engineering	2 SWS	Lecture (V)	Weinhardt, Staudt
SS 2019	2540465	Übung zu Energy Market Engineering	1 SWS	Practice (Ü)	Staudt, vom Scheidt
Exams					
SS 2019	79852	Energy Market Engineering		Prüfung (PR)	Weinhardt

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 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
This lecture discusses different design options for electricity markets. We will focus on different approaches of nodal and zonal pricing as well as single price mechanisms and capacity markets. After a short recap of German and European market designs, the different design options will be discussed scientifically and with the help of examples. Furthermore, we will evaluate alternative market design options like microgrids. Besides the fundamental functioning of those markets, we will introduce and discuss methodological knowledge to evaluate market design options.

Annotation
The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.
- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

T 7.118 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540494	Energy Networks and Regulation	2 SWS	Lecture (V)	Rogat
WS 19/20	2540495	Übung zu Energy Networks and Regulation	1 SWS	Practice (Ü)	Rogat
Exams					
WS 19/20	7900198	Energy Networks and Regulation		Prüfung (PR)	Weinhardt

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 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
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
- 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.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

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 7.119 Course: Energy Policy [T-WIWI-102607]

Responsible: Prof. Dr. Martin Wietschel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Recurrence	Version
Written examination	3,5	Each summer term	3

Events					
SS 2019	2581959	Energy Policy	2 SWS	Lecture (V)	Wietschel
Exams					
SS 2019	7981959	Energy Policy		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy Policy

2581959, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
The course deals with material and energy policy of policy makers and includes the effects of such policies on the economy as well as the involvement of industrial and other stakeholders in the policy design. At the beginning the neoclassical environment policy is discussed. Afterwards the Sustainable Development concept is presented and strategies how to translate the concept in policy decision follows. In the next part of the course an overview about the different environmental instruments classes, evaluation criteria for these instruments and examples of environmental instruments like taxes or certificates will be discussed. The final part deals with implementation strategies of material and energy policy.

Learning Content
The course deals with material and energy policy of policy makers and includes the effects of such policies on the economy as well as the involvement of industrial and other stakeholders in the policy design. At the beginning the neoclassical environment policy is discussed. Afterwards the Sustainable Development concept is presented and strategies how to translate the concept in policy decision follows. In the next part of the course an overview about the different environmental instruments classes, evaluation criteria for these instruments and examples of environmental instruments like taxes or certificates will be discussed. The final part deals with implementation strategies of material and energy policy.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be anounced in the lecture.

T 7.120 Course: Energy System Modelling [T-INFO-108532]

Responsible: Dr. Thomas William Brown
Organisation: KIT Department of Informatics
Part of: M-INFO-104117 - Energy System Modelling

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2400230	Energy System Modelling	2 SWS		Brown
Exams					
SS 2019	7500093	Energy System Modelling		Prüfung (PR)	Brown

Recommendation
Basic knowledge of network theory and optimisation theory are helpful, but not required. Programming will be in Python.
Basic knowledge of mathematics, differential equations, statistics and programming is assumed.

Below you will find excerpts from events related to this course:

V Energy System Modelling

2400230, SS 2019, 2 SWS, Language: English, Open in study portal

Learning Content
Topics include:

- Time series analysis of wind, solar and energy demand in Europe.
- Complex network theory.
- Power flow in electrical networks.
- Modelling storage, the role of storage versus networks.
- Basics of optimisation, Karush-Kuhn-Tucker conditions.
- Basics of microeconomics.
- Economics of electricity markets.
- Short-run versus long-run efficiency.
- Network optimisation, storage optimisation.
- Programming energy system models.
- Coupling electricity to other energy sectors.
- Role of renewables in electricity markets.

Additional topics may also include:

- Dynamics in power networks.
- Contingency analysis.
- Effects of climate change on energy systems.

T 7.121 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581002	Energy Systems Analysis	2 SWS	Lecture (V)	Ardone, Keles, Dengiz, Yilmaz
Exams					
SS 2019	7981002	Energy Systems Analysis		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam according to Section 4(2), 1 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 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning 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

Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

T 7.122 Course: Energy Trade and Risk Management [T-WIWI-102691]

Responsible: Dr. Clemens Cremer
Dr. Dogan Keles
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2581020	Energy Trade and Risk Management	3 SWS	Lecture (V)	Keles, Cremer
Exams					
SS 2019	7981020	Energy Trade and Risk Management		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 minutes).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Energy Trade and Risk Management

2581020, SS 2019, 3 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content

1. Introduction to Markets, Mechanisms, Interactions
2. Basics of Risk Management
3. Oil Markets
4. Gas Markets
5. Coal Markets
6. Emission Markets
7. Simulation Game
8. Power Markets
9. Risk Management in Utilities

Annotation
The credits have been changed from 3.5 to 4.

Workload
The total workload for this course is approximately 120.0 hours. For further information see German version.

Literature
Elective literature:

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 7.123 Course: Engineering FinTech Solutions [T-WIWI-106193]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105036 - FinTech Innovations

Type	Credits	Recurrence	Version
Examination of another type	9	Each term	4

Events					
WS 19/20	2500020	Engineering FinTech Solutions	6 SWS	Practical course (P)	Ulrich
Exams					
SS 2019	7900125	Engineering FinTech Solutions		Prüfung (PR)	Ulrich
SS 2019	7900287	Engineering FinTech Solutions		Prüfung (PR)	Ulrich

Competence Certificate
The assessment is carried out in form of a written thesis based on the course "Engineering FinTech Solutions".

Prerequisites
In order to take the course "Engineering FinTech Solutions", students must have completed the module "Data Science for Finance".

Below you will find excerpts from events related to this course:

V Engineering FinTech Solutions

2500020, WS 19/20, 6 SWS, Language: English, Open in study portal

Practical course (P)

Description
This project invites students to either pursue their own FinTech innovation project or to contribute to the Chair's ongoing innovation projects.

Learning Content
The course is targeted to students with strong knowledge in the field of computational risk and asset management and strong programming skills. It offers students the opportunity to develop an algorithmic solution and hence ample their programming experience and their understanding of financial economics or asset and risk management.

Workload
The total workload for this course is approximately 270 hours. This consists of regular meetings with members of the research group and time for independent work on the software project.

T 7.124 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-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	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 7.125 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	Recurrence	Version
Written examination	3	Each term	1

Events					
SS 2019	2545001	Entrepreneurship	2 SWS	Lecture (V)	Terzidis, Mitarbeiter
Exams					
SS 2019	7900002	Entrepreneurship		Prüfung (PR)	Terzidis
SS 2019	7900192	Entrepreneurship		Prüfung (PR)	Terzidis

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Entrepreneurship

2545001, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
This lecture, as an obligatory part of the module “Entrepreneurship”, introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of business planning.
Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

Learning Content
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of financial planning.
Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

T 7.126 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)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2019	2545002	Entrepreneurship Research	2 SWS	Seminar (S)	Avila Albez, Terzidis, Tittel
Exams					
SS 2019	7900052	Entrepreneurship Research		Prüfung (PR)	Terzidis

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 2019, 2 SWS, Language: German, Open in study portal

Seminar (S)

Learning Content
Content of the seminar is most recently discussed topics in the field of entrepreneurship. Topics and dates will be communicated online via the seminar portal.

Annotation
The topics are prepared in small groups. The seminar consists of two attendance meetings (kick-off event and final presentation). Between the appointments, independent work is required. The results will be presented at the end of the semester. There is an obligation to attend all seminars.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced during/prior to the seminar as this varies from topic to topic.

T 7.127 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	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2560548	Environmental and Ressource Policy	2 SWS	Lecture / Practice (VÜ)	Walz
Exams					
SS 2019	7900277	Environmental and Resource Policy		Prüfung (PR)	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 2019, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
Elective literature:

Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg
OECD: Environmental Performance Review Germany, Paris

T 7.128 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	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2521547	Umweltökonomik und Nachhaltigkeit (mit Übung)	2 SWS	Lecture / Practice (VÜ)	Walz
Exams					
SS 2019	7900273	Environmental Economics and Sustainability		Prüfung (PR)	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 7.129 Course: Environmental Law [T-INFO-101348]

Responsible: Prof. Dr. Matthias Bäcker
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law
M-WIWI-101468 - Environmental Economics

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24140	Umweltrecht	2 SWS	Lecture (V)	Marsch
Exams					
SS 2019	7500082	Environmental Law		Prüfung (PR)	Marsch

T 7.130 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	24666	Europäisches und Internationales Recht	2 SWS	Lecture (V)	Brühann
Exams					
SS 2019	7500084	European and International Law		Prüfung (PR)	Marsch

T 7.131 Course: European and National Technology Law [T-INFO-109824]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-104810 - European and National Technology Law

Type	Credits	Recurrence	Version
Written examination	9	Each term	1

T 7.132 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

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540489	Experimental Economics	2 SWS	Lecture (V)	Peukert, Dorner
WS 19/20	2540493	Übung zu Experimentelle Wirtschaftsforschung	1 SWS	Practice (Ü)	Greif-Winzrieth, Pietruska
Exams					
SS 2019	7900104	Experimental Economics		Prüfung (PR)	Weinhardt

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

Below you will find excerpts from events related to this course:

V Experimental Economics

2540489, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Experimental Economics have become a separate field in Economics. Nearly all fields of the economic discipline use economic experiments to verify theoretical results. Besides being used for empricial validation, this method is applied in political and strategic consulting. The lecture gives an introduction to experimental methods in economics and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2nd ed., 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

T 7.133 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	Recurrence	Version
Written examination	4,5	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 7.134 Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	4

Exams				
SS 2019	7900233	Facility Location and Strategic Supply Chain Management	Prüfung (PR)	Nickel

Competence Certificate
Due to a research semester of Professor Nickel in WS 19/20, the course "Facility Location and Strategic Supply Chain Management" does NOT take place in WS 19/20. In particular, neither WS 19/20 nor SS 20 will offer an exam for the lecture. The follow-up exam to the lecture in WS 18/19 takes place in SS 19 and is exclusively for students in the second examination.

The assessment consists of a written exam (60 min) according to Section 4 (2), 1 of the examination regulation.

The exam takes place in every semester.

Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

T 7.135 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2530205	Financial Analysis	2 SWS	Lecture (V)	Luedecke
SS 2019	2530206	Übungen zu Financial Analysis	2 SWS	Practice (Ü)	Luedecke
Exams					
SS 2019	7900075	Financial Analysis		Prüfung (PR)	Luedecke

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 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
This lecture reviews the key financial statements according to international financial reporting standards and provides analytical tools to evaluate the income statement, the balance sheet, and the cash flow statement in order to measure a firm's liquidity, operational efficiency, and profitability.

Learning Content
Topics:

- Introduction to Financial Analysis
- Financial Reporting Standards
- Major Financial Statements and Other Information
- Recognition and Measurement Issues
- Analysis of Financial Statements
- Financial Reporting Quality

Literature

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

T 7.136 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

Type	Credits	Recurrence	Version
Written examination	4,5	Irregular	2

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 course takes place each second summer term: 2018/2020....

T 7.137 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530232	Financial Intermediation	2 SWS	Lecture (V)	Ruckes
WS 19/20	2530233	Übung zu Finanzintermediation	1 SWS	Practice (Ü)	Ruckes, Hoang, Benz
Exams					
SS 2019	7900078	Financial Intermediation		Prüfung (PR)	Ruckes

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Competition in the banking sector
- Stability of the financial system
- The macroeconomic role of financial intermediation

Learning Content

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Stability of the financial system
- The macroeconomic role of financial intermediation
- Principles of the prudential regulation of banks

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Elective literature:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6th edition, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2nd edition, MIT Press.

T 7.138 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
WS 19/20	2545109		2 SWS	Seminar (S)	Ntagiakou, Kienzle

Competence Certificate
Alternative exam assessment. The grade consists of the presentation and the written elaboration.

Prerequisites
None

T 7.139 Course: Fixed Income Securities [T-WIWI-102644]

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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530260	Fixed Income Securities	3 SWS	Lecture / Practice (VÜ)	Uhrig-Homburg, Mitarbeiter
Exams					
SS 2019	7900112	Fixed Income Securities		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment takes place in the form of a written examination (75 minutes) according to §4(2), 1 SPO. The examination takes place during the semester break. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the excercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
Knowledge from the course "Derivatives" is very helpful.

Annotation
The oourse is offered as a block course.

Below you will find excerpts from events related to this course:

V Fixed Income Securities

2530260, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Description
The lecture deals with both German and international bond markets, which are an important source of funding for both the corporate and the public sector. After an overview of the most important bond markets, various definitions of return are discussed. Based on that, the concept of the yield curve is presented. The modelling of the dynamics of the term structure of interest rates provides the theoretical foundation for the valuation of interest rate derivatives, which is discussed in the last part of the lecture.

Learning Content
The lecture deals with both German and international bond markets, which are an important source of funding for both the corporate and the public sector. After an overview of the most important bond markets, various definitions of return are discussed. Based on that, the concept of the yield curve is presented. The modelling of the dynamics of the term structure of interest rates provides the theoretical foundation for the valuation of interest rate derivatives, which is discussed in the last part of the lecture.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Bühler, W., Uhrig-Homburg, M., Rendite und Renditestruktur am Rentenmarkt, in Obst/Hintner, Geld-, Bank- und Börsenwesen - Handbuch des Finanzsystems, (2000), S.298-337.
- Sundaresan, S., Fixed Income Markets and Their Derivatives, Academic Press, 3rd Edition, (2009).

Elective literature:

- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition, (2012).

T 7.140 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	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	24086	Formale Systeme	4 SWS	Lecture / Practice (VÜ)	Beckert, Ulbrich
Exams					
SS 2019	7500009	Formal Systems		Prüfung (PR)	Beckert
WS 19/20	7500036	Formal Systems		Prüfung (PR)	Beckert

T 7.141 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	2400093	Formal Systems II: Application	3 SWS	Lecture (V)	Ulbrich, Beckert
Exams					
SS 2019	7500006	Formale Systeme II: Anwendung		Prüfung (PR)	Beckert

T 7.142 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	Recurrence	Version
Oral examination	5	Each summer term	1

T 7.143 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	Recurrence	Version
Oral examination	6	Each summer term	1

Events					
SS 2019	24611	Fuzzy Sets	3 SWS	Lecture (V)	Pfaff
Exams					
SS 2019	7500001	Fuzzy Sets		Prüfung (PR)	Hanebeck
WS 19/20	7500011	Fuzzy Sets		Prüfung (PR)	Hanebeck

Below you will find excerpts from events related to this course:

V Fuzzy Sets

24611, SS 2019, 3 SWS, Language: German, Open in study portal

Lecture (V)

Workload
180 hours

T 7.144 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	Recurrence	Version
Oral examination	3	Irregular	1

Exams				
SS 2019	7500230	Geometric Optimzation	Prüfung (PR)	Prautzsch

T 7.145 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2550134	Globale Optimierung I	2 SWS	Lecture (V)	Stein
SS 2019	2550135	Übungen zu Globale Optimierung I+II	1 SWS	Practice (Ü)	Stein
Exams					
SS 2019	7900061_SS2019_HK	Global Optimization I		Prüfung (PR)	Stein

Competence Certificate
Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO) and possibly of a compulsory prerequisite.

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 Globale Optimierung I

2550134, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods 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.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T 7.146 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	Recurrence	Version
Written examination	9	Each summer term	1

Events					
SS 2019	2550134	Globale Optimierung I	2 SWS	Lecture (V)	Stein
SS 2019	2550136	Globale Optimierung II	2 SWS	Lecture (V)	Stein
Exams					
SS 2019	7900063_SS2019_HK	Global Optimization I and II		Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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 Globale Optimierung I

2550134, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods 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.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- 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

Globale Optimierung II

2550136, SS 2019, 2 SWS, Open in study portal

Lecture (V)

Learning Content

In many optimization problems from economics, engineering and natural sciences, numerical solution methods 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 global solution of convex optimization problems is subject of part I of the lecture.

Part II of 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 aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T 7.147 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2550135	Übungen zu Globale Optimierung I+II	1 SWS	Practice (Ü)	Stein
SS 2019	2550136	Globale Optimierung II	2 SWS	Lecture (V)	Stein
Exams					
SS 2019	7900062_SS2019_HK	Global Optimization II		Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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 Globale Optimierung II

2550136, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods 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 global solution of convex optimization problems is subject of part I of the lecture.

Part II of 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 aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T 7.148 Course: Graph Partitioning and Graph Clustering in Theory and Practice [T-INFO-101295]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics
Part of: M-INFO-100758 - Graph Partitioning and Graph Clustering in Theory and Practice

Type	Credits	Recurrence	Version
Oral examination	5	Each summer term	1

T 7.149 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	Recurrence	Version
Written examination	4,5	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" 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 7.150 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	Recurrence	Version
Examination of another type	3	Irregular	2

T 7.151 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	Recurrence	Version
Written examination	3	Each summer term	1

Exams				
SS 2019	7981001	Heat Economy	Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Recommendation
None

Annotation
See German version.

T 7.152 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	Recurrence	Version
Oral examination	3	Each winter term	1

Exams				
SS 2019	7500216	Heterogeneous Parallel Computing Systems	Prüfung (PR)	Karl

T 7.153 Course: Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy [T-INFO-101262]

Responsible: Prof. Dr.-Ing. Rüdiger Dillmann
Prof. 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	Recurrence	Version
Oral examination	3	Each term	1

Events					
SS 2019	24678	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy	2 SWS	Lecture (V)	Spetzger
WS 19/20	24139	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy	2 SWS	Lecture (V)	Spetzger
Exams					
SS 2019	7500145	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy		Prüfung (PR)	Dillmann

T 7.154 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Exams				
SS 2019	7900084	Human Factors in Security and Privacy	Prüfung (PR)	Volkamer
WS 19/20	7900113	Human Factors in Security and Privacy	Prüfung (PR)	Volkamer

Competence Certificate
The lecture will not be offered in the winter semester 2019/2020.

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.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
Successful participation in the exercises.

Recommendation
The prior attendance of the lecture "Information Security" is strongly recommended.

T 7.155 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	Recurrence	Version
Written examination	6	Each summer term	2

Events					
SS 2019	24659	Human-Computer-Interaction	2 SWS	Lecture (V)	Beigl, Exler
Exams					
SS 2019	7500048	Human-Machine-Interaction		Prüfung (PR)	Beigl
WS 19/20	7500076	Human-Machine-Interaction		Prüfung (PR)	Beigl

T 7.156 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	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	24100	Human-Machine-Interaction in Anthropomatics: Basics	2 SWS	Lecture (V)	Geisler
Exams					
SS 2019	7500005	Human-Machine-Interaction in Anthropomatics: Basics		Prüfung (PR)	Beyerer, Geisler
WS 19/20	7500017	Human-Machine-Interaction in Anthropomatics: Basics		Prüfung (PR)	Beyerer, Geisler

T 7.157 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	Recurrence	Version
Completed coursework	0	Each summer term	1

Events					
SS 2019	2400095	Human-Computer-Interaction	1 SWS	Practice (Ü)	Beigl, Exler
SS 2019	24659	Human-Computer-Interaction	2 SWS	Lecture (V)	Beigl, Exler
Exams					
SS 2019	7500121	Human-Machine-Interaction		Prüfung (PR)	Beigl

T 7.158 Course: Humanoid Robots - Practical Course [T-INFO-105142]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-INFO-102560 - Humanoid Robots - Practical Course

Type	Credits	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	24890	Humanoid Robotics Laboratory	2 SWS	Practical course (P)	Asfour, Pohl, Ottenhaus
Exams					
WS 19/20	7500149	Humanoid Robots - Practical Course		Prüfung (PR)	Asfour

Below you will find excerpts from events related to this course:

V Humanoid Robotics Laboratory

24890, WS 19/20, 2 SWS, Language: German, Open in study portal

Practical course (P)

Learning Content
In this block course, a complex task will be implemented in a small team. The exercise addresses algorithmic questions in the context of humanoid robotics, such as active perception with stereo or depth cameras, grasping and manipulation planning, action representation with DMS, HMMs or splines, reproduction of motions, or active balancing with humanoid robots.

Workload
90 h

T 7.159 Course: Image Data Compression [T-INFO-101292]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Dr. Alexey Pak
Organisation: KIT Department of Informatics
Part of: M-INFO-100755 - Image Data Compression

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2400112	Image Data Compression	2 SWS	Lecture (V)	Beyerer, Pak
Exams					
SS 2019	7500002	Image Data Compression		Prüfung (PR)	Beyerer
WS 19/20	7500013	Image Data Compression		Prüfung (PR)	Beyerer

Below you will find excerpts from events related to this course:

V Image Data Compression

2400112, WS 19/20, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
This module conveys to the students the theoretical and practical aspects of the principal stages in image data acquisition and compression. The discussion progresses from the coding of un-correlated sequential data streams to de-correlation of natural 2D images and to exploitation of temporal correlations in video data coding. Each considered technique is provided with a statistical justification and characterised with basic information-theoretic metrics.
In the end of the class, an outlook is given to non-conventional image-based information coding schemes (watermarking and steganography).

T 7.160 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

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2573003	Incentives in Organizations	2 SWS	Lecture (V)	Nieken
SS 2019	2573004	Übung zu Incentives in Organizations	1 SWS	Practice (Ü)	Nieken, Mitarbeiter
Exams					
SS 2019	7900132	Incentives in Organizations		Prüfung (PR)	Nieken

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.

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.

Annotation
The course is carried out routinely in summer.

Below you will find excerpts from events related to this course:

V Incentives in Organizations

2573003, SS 2019, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Notes
See Module Handbook

T 7.161 Course: Industrial Services [T-WIWI-102822]

Responsible: Prof. Dr. Hansjörg Fromm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2595505	Industrial Services	2 SWS	Lecture (V)	Fromm
WS 19/20	2595506	Übungen zu Industrial Services	1 SWS	Practice (Ü)	Walk
Exams					
SS 2019	7900219	Industrial Services		Prüfung (PR)	Fromm

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Industrial Services

2595505, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Services are becoming ever more important in business. Today, the gross income share of services in Germany exceeds 70%. Following this trend, many companies that previously focused solely on the sale of goods, strive to an extension of their business model: In order to realize new competitive advantages in domestic and international markets, they enrich their material goods with customer-specific services. This transformation to a provider of integrated solutions is called "Servitization" (Neely 2009). For this reason, so-called industrial services to companies of increasing importance. They benefit from the increasingly detailed data collected (on "Big Data"), e.g. concerning user profiles, failure statistics, usage history, accrued expenses, etc. Only these data allow in principle to end products and spare parts are delivered faster, cheaper and more targeted and technicians can be used more efficiently with the correct skills. This requires, however, also suitable methods of optimization, prognosis or predictive modeling. When used properly, such methods can minimize logistics costs, increase availability, prevent potential failures and improve repair planning. This is also enabled by latest "Technology Enabled Services" along with corresponding data transfer and analysis ("Internet of Things", automatic error detection, remote diagnostics, centralized collection of consumption data, etc.). The change from goods manufacturer to a provider of integrated solutions requires new services, transformation of business models as well as intelligent new contract types, which are addressed in the course as well.

More specifically, the lessons of this lecture will include:

- Servitization – The Manufacturer's Transformationto Integrated Solution Provider
- Service Levels – Definitions, Agreements, Measurements and Service Level Engineering
- The "Services Supply Chain"
- Spare Parts Planning – Forecasting, Assortment Planning, Order Quantities and Safety Stocks
- Distribution Network Planning – Network Types, Models, Optimization
- Service Technician Planning
- Condition Monitoring, Predictive Maintenance, Diagnose Systems
- Call Center Services
- Full Service Contracts
- IT-enabled Value-Add Services – Industrial Service Innovation

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (Vol. 3, p. 30). New York: Wiley.

Pintelon, L., & Van Puyvelde, F. (2013). *Asset Management. The Maintenance Perspective*. Acco.

Chopra, S., & Meindl, P. (2007). Supply chain management. Strategy, planning & operation. In *Das summa summarum des management* (pp. 265-275). Gabler.

Koole, G. (2007). Call Center Mathematics: A scientific method for understanding and improving contact centers. *Departement of Mathematics, Vrije Universiteit, Amsterdam*.

Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services. *International journal of service industry management*, *14*(2), 160-172.

T 7.162 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	Recurrence	Version
Oral examination	6	Irregular	1

Events					
WS 19/20	24102	Information Processing in Sensor Networks	3 SWS	Lecture (V)	Noack, Mayer, Hanebeck
Exams					
SS 2019	7500011	Information Processing in Sensor Networks		Prüfung (PR)	Hanebeck, Noack
WS 19/20	7500030	Information Processing in Sensor Networks		Prüfung (PR)	Noack, Hanebeck

T 7.163 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2511606	Information Service Engineering	2 SWS	Lecture (V)	Sack
SS 2019	2511607	Übungen zu Information Service Engineering	1 SWS	Practice (Ü)	Sack
Exams					
SS 2019	7900070	Information Service Engineering		Prüfung (PR)	Sack
WS 19/20	7900071	Information Service Engineering		Prüfung (PR)	Sack

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

Annotation
New course starting summer term 2017.

Below you will find excerpts from events related to this course:

V Information Service Engineering

2511606, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning 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

- Linked Data Engineering

  - Knowledge Representations and Ontologies
  - What's in an URI?
  - Resource Description Framework (RDF)
  - Creating new Models with RDFS
  - Querying RDF(S) with SPARQL
  - More Expressivity with Web Ontology Language (OWL)
  - The Web of Data
  - Vocabularies and Ontologies in the Web of Data
  - Wikipedia, DBpedia, and Wikidata

- Information Retrieval

  - Information Retrieval Models
  - Retrieval Evaluation
  - Web Information Retrieval
  - Document Crawling, Text Processing, and Indexing
  - Query Processing and Result Representation
  - Question Answering

- Knowledge Mining

  - From Data to Knowledge
  - Data Mining
  - Machine Learning Basics for Knowledge Mining
  - Mining Knowledge from Wikipedia
  - Named Entity Resolution

- Exploratory Search and Recommender Systems

  - Semantic Search and Entity Centric Search
  - Collaborative Filtering and Content Based Recommendations
  - From Search to Intelligent Browsing
  - Linked Data Based Exploratory Search
  - Fact Ranking

Annotation
New lecture, since summer semester 2017

Literature

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- S. Hitzler, S. Rudolph, Foundations of Semantic Web Technologies, Chapman / Hall, 2009.
- R. Baeza-Yates, B. Ribeiro-Neto, Modern Information Retrieval, 2nd ed., Addison Wesley, 2010.#

T 7.164 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	2545100	Innovation Management: Concepts, Strategies and Methods	2 SWS	Lecture (V)	Weissenberger-Eibl
Exams					
SS 2019	7900144	Innovation Management: Concepts, Strategies and Methods		Prüfung (PR)	Weissenberger-Eibl
SS 2019	7900145	Innovation Management: Concepts, Strategies and Methods		Prüfung (PR)	Weissenberger-Eibl

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
None

Below you will find excerpts from events related to this course:

V Innovation Management: Concepts, Strategies and Methods

2545100, SS 2019, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Notes
The lecture will be held in German.

Learning 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 particu-larly 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 addi-tion to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of inte-grated knowledge.

Annotation
This course was formerly named "Innovation Management".

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
A detailed bibliography is provided with the lecture notes.

T 7.165 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	Recurrence	Version
Examination of another type	3	Irregular	1

Exams				
WS 19/20	7900141	Innovation Processes Live	Prüfung (PR)	Weissenberger-Eibl

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.

T 7.166 Course: Innovationtheory 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2560236	Innovationtheory and -policy	SWS	Lecture (V)	Ott
SS 2019	2560237	Übung zu Innovationstheorie und -politik	SWS	Practice (Ü)	Ott, Eraydin
Exams					
SS 2019	7900107	Innovationtheory and -Policy		Prüfung (PR)	Ott

Competence Certificate
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. 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.

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 2019, SWS, Language: German, Open in study portal

Lecture (V)

Learning Content

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Excerpt:

- Aghion, P., Howitt, P. (2009), The Economics of Growth, MIT Press, Cambridge MA.
- de la Fuente, A. (2000), Mathematical Methods and Models for Economists. Cambridge University Press, Cambridge, UK.
- Klodt, H. (1995), Grundlagen der Forschungs- und Technologiepolitik. Vahlen, München.
- Linde, R. (2000), Allokation, Wettbewerb, Verteilung - Theorie, UNIBUCH Verlag, Lüneburg.
- Ruttan, V. W. (2001), Technology, Growth, and Development. Oxford University Press, Oxford.
- Scotchmer, S. (2004), Incentives and Innovation, MIT Press.
- Tirole, Jean (1988), The Theory of Industrial Organization, MIT Press, Cambridge MA.

T 7.167 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	24179	Innovative Concepts for Programming Industrial Robots	2 SWS	Lecture (V)	Hein

T 7.168 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2400004	Integrated Network and Systems Management	2 SWS	Lecture (V)	Neumair
Exams					
SS 2019	7500144	Integrated Network and Systems Management		Prüfung (PR)	Neumair

T 7.169 Course: Intelligent CRM Architectures [T-WIWI-103549]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101470 - Data Science: Advanced CRM
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2540525	Intelligent CRM Architectures	2 SWS	Lecture (V)	Geyer-Schulz
WS 19/20	2540526	Übung zu Intelligent CRM Architectures	1 SWS	Practice (Ü)	Nazemi
Exams					
SS 2019	7900280	Intelligent CRM Architectures		Prüfung (PR)	Geyer-Schulz

Competence Certificate
This lecture will be offered for the last time in winter semester 2019/20.

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".

Below you will find excerpts from events related to this course:

V Intelligent CRM Architectures

2540525, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning Content
The lecture is structured in three parts:

In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature

- P. Clements *et al.*, *Documenting Software Architectures. Views and Beyond*. Upper Saddle River: Addison-Wesley, 2011.
- M. Fowler, *Patterns of Enterprise Application Architecture*. Amsterdam: Addison-Wesley Longman, 2002.
- S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 3rd ed. Harlow Essex England: Pearson New International Edition, 2014.
- V. N. Vapnik, *The Nature of Statistical Learning Theory*. New York: Springer, 1995.

T 7.170 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	24679	Interaktive Computergrafik	2 SWS	Lecture (V)	Peters, Dachsbacher
Exams					
SS 2019	7500123	Interactive Computer Graphics		Prüfung (PR)	Dachsbacher

T 7.171 Course: Interactive Information Systems [T-WIWI-108461]

Responsible: Prof. Dr. Alexander Mädche
Dr. Stefan Morana

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

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	3

Events					
SS 2019	2540558	Interactive Systems	3 SWS	Lecture (V)	Mädche, Morana
Exams					
SS 2019	791000002	Interactive Systems		Prüfung (PR)	Mädche

Competence Certificate
The assessment consists of a written exam of 1 hour and by submitting written papers as part of the exercise.

Details will be announced at the beginning of the course.

Prerequisites
None

Annotation
This course replaces T-WIWI-106342 "Interactive Systems" starting summer term 2018.

The course is held in english.

Below you will find excerpts from events related to this course:

V Interactive Systems

2540558, SS 2019, 3 SWS, Language: English, Open in study portal

Lecture (V)

Description
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. The aim of this course is to introduce the foundations, theoretical grounding, key concepts and principles as well as current practice of interactive systems. The contents of the course abstract from the technical implementation details. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

Notes
The lecture is complemented with a capstone project assignment, where students analyze and review existing interactive systems and suggest areas of improvement / extensions.

Learning Content
· Basics

· Theoretical foundations

· Key concepts and design principles for specific interactive systems classes

· Capstone project

Literature

The lecture bases to a large extend on

· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.

Additional literature will be provided in the lecture.

T 7.172 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	2530570	International Finance	2 SWS	Lecture (V)	Walter, Uhrig-Homburg
Exams					
SS 2019	7900097	International Finance		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Annotation
See German version.

Below you will find excerpts from events related to this course:

V International Finance

2530570, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry outour analysis fromtwo distinctperspectives:First the point of view of an international investor second that, of an international corporation.Several alternativesto the management of foreignexchangerisks are shown. Due to the importance of foreign exchangerisks, the first part of the course deals withcurrency markets. Furthermore current exchange rate theories are discussed.

Learning Content
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor second that, of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore current exchange rate theories are discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:

- Eiteman, D. et al., Multinational Business Finance, 13. edition, 2012.
- Solnik, B. and D. McLeavey, Global Investments, 6. edition, 2008.

T 7.173 Course: International Management in Engineering and Production [T-WIWI-102882]

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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581956	International Management in Engineering and Production	2 SWS	Lecture (V)	Sasse
Exams					
SS 2019	7981956	International Management in Engineering and Production		Prüfung (PR)	Schultmann

Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V International Management in Engineering and Production

2581956, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning 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

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
Will be announced in the course.

T 7.174 Course: International Selling – EUCOR [T-WIWI-110381]

Responsible: Erice Casenave
Prof. Dr. Martin Klarmann

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101487 - Sales Management
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

Events					
WS 19/20	2572179	International Selling – EUCOR	2 SWS	Block (B)	Klarmann

Competence Certificate
Non exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation (presentation). The grade is based on the presentation and the subsequent discussion.

Prerequisites
The courses "Business Planning for Founders - EUCOR" and the course "International Selling - EUCOR" must be taken together.

Annotation

An application is required to participate in this course. 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.
Please note that the courses "Business Planning for Founders - EUCOR" (3 ECTS) and "International Selling - EUCOR" (3 ECTS) can only be taken together (6 ECTS in total). In combination with the mandatory course "Sales Management and Retailing" (3 ECTS) the module is completed.

Below you will find excerpts from events related to this course:

V International Selling – EUCOR

2572179, WS 19/20, 2 SWS, Language: English, Open in study portal

Block (B)

Notes
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 developed in the LV "Business Planning for Founders - EUCOR".

Annotation

- 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.
- Please note that the courses "Business Planning for Founders - EUCOR" (3 ECTS) and "International Selling - EUCOR" (3 ECTS) can only be taken together (6 ECTS in total). In combination with the mandatory course "Sales Management and Retailing" (3 ECTS) the module is completed.

Workload
Total workload for 3 ECTS: about 90 hours

T 7.175 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	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	24354	Internet Law	2 SWS	Lecture (V)	Dreier
Exams					
SS 2019	7500057	Internet Law		Prüfung (PR)	Dreier, Matz
WS 19/20	7500060	Internet Law		Prüfung (PR)	Dreier, Matz

T 7.176 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	24104	Internet of Everything	2 SWS	Lecture (V)	Friebe, Jung, Zitterbart
Exams					
SS 2019	7500071	Internet of Everything		Prüfung (PR)	Zitterbart
WS 19/20	7500009	Internet of Everything		Prüfung (PR)	Zitterbart

T 7.177 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2400055	Introduction to Bioinformatics for Computer Scientists	2 SWS	Lecture (V)	Stamatakis
Exams					
WS 19/20	7500057	Introduction to Bioinformatics for Computer Scientists		Prüfung (PR)	Stamatakis

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 7.178 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2550470	Einführung in die Stochastische Optimierung	2 SWS	Lecture (V)	Rebennack
SS 2019	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice (Ü)	Rebennack, Assistenten
Exams					
SS 2019	7900198	Introduction to Stochastic Optimization		Prüfung (PR)	Rebennack

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 7.179 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24684	Introduction to Video Analysis	2 SWS	Lecture (V)	Arens
Exams					
SS 2019	7500031	Introduction to Video Analysis		Prüfung (PR)	Beyerer, Arens
WS 19/20	7500099	Introduction to Video Analysis		Prüfung (PR)	Beyerer, Arens

T 7.180 Course: IT- Security Law [T-INFO-109910]

Responsible: PD Dr. Oliver Raabe
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

T 7.181 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	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	24149	IT-Security Management for Networked Systems	3 SWS	Lecture / Practice (VÜ)	Hartenstein, Grashöfer, Neudecker
Exams					
SS 2019	7500599	IT-Security Management for Networked Systems		Prüfung (PR)	Hartenstein

T 7.182 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	Recurrence	Version
Examination of another type	6	Irregular	1

Events					
SS 2019	2545021	Joint Entrepreneurship School	SWS	Seminar (S)	Terzidis, Ntagiakou
Exams					
SS 2019	7900228	Joint Entrepreneurship School 2019		Prüfung (PR)	Terzidis

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.

T 7.183 Course: Knowledge Discovery [T-WIWI-102666]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-102827 - Service Computing

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511302	Knowledge Discovery	2 SWS	Lecture (V)	Sure-Vetter, Färber
WS 19/20	2511303	Exercises to Knowledge Discovery	1 SWS	Practice (Ü)	Sure-Vetter, Färber, Weller
Exams					
SS 2019	7900039	Knowledge Discovery		Prüfung (PR)	Sure-Vetter
WS 19/20	7900013	Knowledge Discovery		Prüfung (PR)	Sure-Vetter

Competence Certificate
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation.
Students can be awarded a bonus on their final grade if they successfully complete special assignments.

Prerequisites
None

Below you will find excerpts from events related to this course:

V **Knowledge Discovery** — **Lecture (V)**
2511302, WS 19/20, 2 SWS, Language: English, Open in study portal

Notes
The lecture provides an overview of machine learning and data mining techniques for knowledge discovery from large data sets. These techniques are examined in respect of algorithms, applicability to different data representations and application in the real world.

Knowledge discovery is a well-established field with a large community investigating methods for the discovery of patterns and regularities in large data sets, including relational databases and unstructured text.

A variety of methods are available to assist in extracting patterns that, if interpreted, provide valuable, possibly previously unknown, insights. This information can be predictive or descriptive in nature.

This lecture provides an overview of this field. The lecture imparts specific techniques and methods, challenges and current and future research workin this field.

Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empircial evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others feauturevector-based learning, text mining and social network analysis.

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

V

Exercises to Knowledge Discovery

2511303, WS 19/20, 1 SWS, Language: English, Open in study portal

Practice (Ü)

Notes
The exercises are related to the lecture Knowledge Discovery.

Multiple exercises are held that capture the topics, held in the lecture Knowledge Discovery, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empircial evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others feauturevector-based learning, text mining and social network analysis.

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.

T 7.184 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	Recurrence	Version
Examination of another type	6	Each summer term	1

Exams				
SS 2019	7500288	Lab Course Heterogeneous Computing	Prüfung (PR)	Karl

T 7.185 Course: Lab Course: Natural Language Processing and Software Engineering [T-INFO-106239]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-103138 - Lab Course: Natural Language Processing and Software Engineering

Type	Credits	Recurrence	Version
Examination of another type	5	Each winter term	1

Events					
WS 19/20	2400082	Lab Course: Natural Language Processing and Software Engineering	4 SWS	Practical course (P)	Weigelt, Hey
Exams					
WS 19/20	7500003	Natural Language Processing and Software Engineering		Prüfung (PR)	Tichy

Below you will find excerpts from events related to this course:

V Lab Course: Natural Language Processing and Software Engineering

2400082, WS 19/20, 4 SWS, Language: German, Open in study portal

Practical course (P)

Annotation
We recommend to attend the course "Sprachverarbeitung in der Softwaretechnik".

Workload
150h

Literature
Needed literature will be given in the lab.

T 7.186 Course: Lab: Designing Embedded Application-Specific Processors [T-INFO-103115]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-101631 - Lab: Designing Embedded Application-Specific Processors

Type	Credits	Recurrence	Version
Examination of another type	4	Each winter term	1

Events					
SS 2019	2424302	Customized Embedded Processor Design	4 SWS	Practical course (P)	Hussain, Amrouch, Bauer, Henkel
WS 19/20	2424302	Designing embedded processors with an application-specific instruction set	4 SWS	Practical course (P)	Hussain, Amrouch, Bauer, Henkel
Exams					
SS 2019	7500203	Lab: Customized Embedded Prozessor Design		Prüfung (PR)	Henkel

Below you will find excerpts from events related to this course:

V Customized Embedded Processor Design

2424302, SS 2019, 4 SWS, Language: German/English, Open in study portal

Practical course (P)

Description
Internet of Things (IoT) covers an ever-increasing range of ap plications. Smart sensors and embedded devices with networking capabilities connect to the Internet to provide advanced control and mon itoring services in healthcare, smart home, smart city and many other domains.

The design of embedded processors, especially for IoT, has experienced significant progress since past few years. This development has been characterized by the increasing demand for application-specif ic solutions for IoT in order to fulfil the diverse and contradictory requirements of low power consumption, high performance, low cost and most important ly an efficient time-to-market deployment of those processors.

Application Specific Instruction Set Processors (ASIP) are customized processors, having a specific instruction set targeting a specif ic application to achieve an optimal solution for the above requirements. This customization can be addressed at different architectural levels by defining customized instructions, including/excluding predefined hardware blocks or setting processor‘s parameters.

The focus of this lab is to get hands-on expertise of state-of-the-art ASIP Tool-Suite and practice optimized processor design for IoT. We will select an IoT application from healthcare domain (e.g. heart rate mo nitoring), profile them, design ASIP targeting power/area/speed eff iciency, and then use our infrastructure to benchmark the designed ASIP to com pare cost & benefit in terms of performance, power, area, etc.

The ASIP design flow includes analysing and profiling the targeted application, defining an ASIP accordingly, creating the speci al instruction, embedding required hardware blocks or configuring differ ent architectural parameters. The synthesizable hardware description and complet e compiler tool chain are generated automatically, and then t he customized processor is implement ed on an FPGA platform. This processor can be benchmarked for performance, area, and power constraints using ModelSim and Xilinx tools.

For this lab, the lab script and all exercises are available in English language.

Learning Content
The student will be supervised to learn how to adapt and customize a processor. This is done using state-of-the-art tool chains that can generate the required hardware description of the processor based on the optimization and customization that the student wants to do such as targeting performance and/or power goals. In addition, synthesis and implementation of the generated processor will be also done at the end using an FPGA platform.

V

Designing embedded processors with an application-specific instruction set

2424302, WS 19/20, 4 SWS, Language: German/English, Open in study portal

Practical course (P)

Description

The design of embedded processors has experienced significant progress since past few years. This development has been characterized by the increasing demand for application-specific solutions in order to fulfil the diverse and contradictory requirements of low power consumption, high performance, low cost and most importantly an efficient time-to-market deployment of those processors.

Application Specific Instruction Set Processors (ASIP) are customized processors, having a specific instruction set targeting a specific application to achieve an optimal solution for the above requirements. This customization can be addressed at different architectural levels by defining customized instructions, including/excluding predefined hardware blocks or setting processor‘s parameters.

The focus of this lab is to get hands-on expertise of state-of-the-art ASIP Tool-Suite. The ASIP design flow typically starts with analyzing and profiling the targeted application, after which an ASIP is defined by specifying its instruction set, embedding required hardware blocks or by configuring different architectural parameters. A synthesizable hardware description and complete compiler tool chain is generated automatically, which is then used to implement and verify the customized processor on an FPGA platform. This processor can be benchmarked for performance, area, and power constraints using ModelSim and Xilinx tools. Additionally, it can also be refined if the requirements are not fulfilled.

For this lab, the lab script and all exercises are available in English language.

Learning Content

The student will be supervised to learn how to adapt and customize a processor. This is done using state-of-the-art tool chains that can generate the required hardware description of the processor based on the optimization and customization that the student wants to do such as targeting performance and/or power goals. In addition, synthesis and implementation of the generated processor will be also done at the end using an FPGA platform.

Workload

attendance time in the lab: 36h; preparation/postprocessing: 24h

T 7.187 Course: Lab: Designing Embedded Systems [T-INFO-107689]

Responsible: Prof. Dr.-Ing. Jörg Henkel
Organisation: KIT Department of Informatics
Part of: M-INFO-103808 - Lab: Designing Embedded Systems

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	1

Events					
SS 2019	2424303	Design of embedded systems	4 SWS	Practical course (P)	Salamin, Bauer, Henkel
WS 19/20	2424303	Design of embedded systems	4 SWS	Practical course (P)	Salamin, Bauer, Henkel
Exams					
SS 2019	7500174	Lab: Designing embedded systems		Prüfung (PR)	Henkel

Below you will find excerpts from events related to this course:

V Design of embedded systems

2424303, SS 2019, 4 SWS, Language: German/English, Open in study portal

Practical course (P)

Description
Embedded Systems are systems that are composed of hardware and software parts that are developed for a special task within a bigger system.

Examples for such systems are smart phones, digital cameras, robot controls, set-top boxes etc. The application areas of such systems are growing rapidly. As these systems are not only composed of application software, this lab exercises the combined development of hardware and software, as it is typical for embedded systems. A Fischertechnik robot and a hardware development board are used as target system.

The schedule of the lab is as follows:

At first, the abstract behavior of the system is described. The task is to have the robot follow a small black line on a bright background by using photoresistors. This specification is transformed into a software for a microcontroller. The microcontroller is available as a hardware description. To connect it to periphery (motors and photoresistors), additional parts have to be written in a hardware-description language. This shows the usage of typical development- and design tools for simulation and synthesis. After combining the hardware and the software parts, the robot is tested against the initial specification.

T 7.188 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	Recurrence	Version
Examination of another type	6	Irregular	1

T 7.189 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	Recurrence	Version
Examination of another type	5	Irregular	1

Events					
SS 2019	2400037	Graph Visualization in Practice	2 SWS	Practical course (P)	Wagner, Mtsentlintze, Radermacher
Exams					
SS 2019	7500136	Lab: Graph Visualization in Practice		Prüfung (PR)	Wagner

T 7.190 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	Recurrence	Version
Examination of another type	4	Each term	1

Events					
SS 2019	2424304	Internet of Things (IoT)	4 SWS	Practical course (P)	Samie Ghahfarokhi, Salamin, Henkel
WS 19/20	2424304	Internet of Things (IoT)	4 SWS	Practical course (P)	Samie Ghahfarokhi, Salamin, Henkel
Exams					
SS 2019	7500187	Lab: Internet of Things (IoT)		Prüfung (PR)	Henkel

T 7.191 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2424811	Low Power Design and Embedded Systems	2 SWS	Practical course (P)	Castro-Godínez, Henkel
WS 19/20	2424120	Low Power Design and Embedded Systems	2 SWS	Practical course (P)	Castro-Godínez, Henkel
Exams					
SS 2019	7500158	Lab: Low Power Design and Embedded Systems		Prüfung (PR)	Henkel

Below you will find excerpts from events related to this course:

V Low Power Design and Embedded Systems

2424811, SS 2019, 2 SWS, Language: English, Open in study portal

Practical course (P)

Description
Nowadays, power consumption is on of the most important criterion 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 the power consumption, due it is a limiting factor. In fact, the power consumption has brought out many changes in the last decade: the fact that today we have multi-core chips instead of single core chips, is a direct result of the increase of power consumption. The power consumption is not only a matter of hardware, but also the software and the operating system decisively determine it. Therefore, this internship is indispensable for all who deal with on-chip systems at hardware and software level.

The second part of the lab consists of a Hardware/Software Co-design exploration using a High-Level Synthesis (HLS) Tool called “LegUp”. This tool is capable to take a C code implementation and to produce three types of implementations: a complete hardware (RTL) implementation, a 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. Considering these possibilities, the participants of the Lab will perform an exploration and analysis of the implementations in terms of required execution cycles, maximum frequency, area (FPGA resources), and power consumption. Altera Quartus tools are used to synthesize the implementations and obtain metrics, while Modelsim tool is used to perform simulations.

V Low Power Design and Embedded Systems

2424120, WS 19/20, 2 SWS, Language: English, Open in study portal

Practical course (P)

Annotation
Note: The lab is given as a full week block.

T 7.192 Course: Laboratory Course Algorithm Engineering [T-INFO-104374]

Responsible: Prof. Dr. Peter Sanders
Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: M-INFO-102072 - Laboratory Course Algorithm Engineering

Type	Credits	Recurrence	Version
Examination of another type	6	Irregular	1

Events					
WS 19/20	24305	Practical Course in Algorithm Design	4 SWS	Practical course (P)	Wagner, Buchhold, Zündorf, Zeitz, Sauer

Below you will find excerpts from events related to this course:

V Practical Course in Algorithm Design

24305, WS 19/20, 4 SWS, Language: German, Open in study portal

Practical course (P)

Workload
150 h

T 7.193 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	24881	Laboratory: Cryptanalysis	4 SWS	Practical course (P)	Müller-Quade, Geiselmann, Kaidel, Agrikola
Exams					
SS 2019	7500110	Laboratory in Cryptography		Prüfung (PR)	Geiselmann, Müller-Quade
SS 2019	7500111	Laboratory in Cryptanalysis		Prüfung (PR)	Geiselmann, Müller-Quade

T 7.194 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	24301	Laboratory Cryptography and Security	4 SWS	Practical course (P)	Müller-Quade, Geiselmann, Agrikola
Exams					
SS 2019	7500110	Laboratory in Cryptography		Prüfung (PR)	Geiselmann, Müller-Quade

Below you will find excerpts from events related to this course:

V Laboratory Cryptography and Security

24301, WS 19/20, 4 SWS, Open in study portal **Practical course (P)**

Learning Content
The Praktikum covers different areas of computer security and cryptography. The topics are presented theoretically and are implemented afterwards. Covered topics are:

- Historical encryption
- Kerberos protocol
- EC-card PINs
- Block ciphers
- Efficient long number arithmetic
- ElGamal encryption / signature

T 7.195 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	Recurrence	Version
Examination of another type	4	Each winter term	1

Events					
WS 19/20	2512100	Security	4 SWS	Practical course (P)	Baumgart, Volkamer, Mayer, Zarei

Below you will find excerpts from events related to this course:

V Security

2512100, WS 19/20, 4 SWS, Language: German, Open in study portal

Practical course (P)

Notes

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 https://ilias.studium.kit.edu/goto_produktiv_crs_998421.html

T 7.196 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2550475	Large-Scale Optimization	2 SWS	Lecture (V)	Rebennack
SS 2019	2550476	Übung zu Large-Scale Optimization	1 SWS	Practice (Ü)	Rebennack, Assistenten
Exams					
SS 2019	7900197	Large-scale Optimization		Prüfung (PR)	Rebennack

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 7.197 Course: Law of Contracts [T-INFO-101316]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law
M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
SS 2019	24671	Law of Contracts	2 SWS	Lecture (V)	Hoff
Exams					
SS 2019	7500055	Law of Contracts		Prüfung (PR)	Dreier, Matz
WS 19/20	7500059	Law of Contracts		Prüfung (PR)	Dreier, Matz

T 7.198 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581998	Liberalised Power Markets	2 SWS	Lecture (V)	Fichtner
Exams					
SS 2019	7900253	Liberalised Power Markets		Prüfung (PR)	Fichtner

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

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Liberalised Power Markets

2581998, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
1. The European liberalisation process
1.1 The concept of a competitive market
1.2 The regulated market
1.3 Deregulation in Europe
2. Pricing and investments in a liberalised power market
2.1 Merit order
2.2 Prices and investments
2.3 Market flaws and market failure
2.4 Regulation in liberalised markets
2.5 Additional regulation mechanisms
3. The power market and the corresponding submarkets
3.1 List of submarkets
3.2 Types of submarkets
3.3 Market rules
4. Risk management
4.1 Uncertainties in a liberalised market
4.2 Investment decisions under uncertainty
4.3 Estimating future electricity prices
4.4 Portfolio management
5. Market power
5.1 Defining market power
5.2 Indicators of market power
5.3 Reducing market power
6. Market structures in the value chain of the power sector

Annotation
The course "Basics of Liberalised Energy Markets" [2581998] will be reduced to 3 credits in winter term 2015/2016 and the tutorial [2581999] is no longer offered.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Elective literature:

Power System Economics; Steven Stoft, IEEE Press/Wiley-Interscience Press, 0-471-15040-1

T 7.199 Course: Life Cycle Assessment [T-WIWI-110512]

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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581995	Life Cycle Assessment	2 SWS	Lecture (V)	Schultmann, Maier

Competence Certificate
The examination takes place in the form of a written examination (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None.

Recommendation
None

Below you will find excerpts from events related to this course:

V Life Cycle Assessment

2581995, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
Our society has reached a historically unique material prosperity. At the same time, environmental burdens and resource consumption are continuously reaching new peaks - not only regarding greenhouse gas emissions and oil production rates. It is obvious that the material and energy intensity of products and services has to decrease if we want to keep our current level of material prosperity on the long run. Enormous efficiency gains, as they have been reached e.g. for labour productivity, however, require that environmental burdens and resource consumption per unit of product are in the first place known, transparent and can thus be optimised. This data and its calculation are increasingly requested and sooner or later will have to become as essential for management as e.g. unit labour costs.

Life cycle assessment is a methodology in sustainability assessment that provides this information and deduces optimisation potentials and decision support for companies, politics, consumers etc. To this end, material and energy flows are compiled along the whole life cycle of a product from extraction of raw materials, via production and use of a product until its disposal. Subsequently, environmental impacts of these flows are analysed.

This lecture describes structure and individual steps of life cycle assessments in detail. Furthermore, it explains its application in decision support. In interactive phases, participants recapitulate the theoretical basis by own calculations. As an outlook, further instruments in sustainability assessment are introduced that analyse other sustainability aspects.

Workload
Total effort required will account for approximately 105h (3.5 credits).

Literature
will be announced in the course

T 7.200 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	Recurrence	Version
Oral examination	6	Each summer term	1

Events					
SS 2019	24613	Localization of Mobile Agents	3 SWS	Lecture (V)	Noack, Li
Exams					
SS 2019	7500004	Localization of Mobile Agents		Prüfung (PR)	Hanebeck, Noack
WS 19/20	7500020	Localization of Mobile Agents		Prüfung (PR)	Noack, Hanebeck

Below you will find excerpts from events related to this course:

V Localization of Mobile Agents

24613, SS 2019, 3 SWS, Language: German, Open in study portal

Lecture (V)

Learning 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.

Workload
The amount of work required is ca.180 hours.

T 7.201 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	2424672	Low Power Design	2 SWS	Lecture (V)	Henkel, Amrouch
Exams					
SS 2019	7500200	VL: Low Power Design		Prüfung (PR)	Henkel

Below you will find excerpts from events related to this course:

V Low Power Design

2424672, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description

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.

T 7.202 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511500	Machine Learning 1 - Fundamental Methods	2 SWS	Lecture (V)	Zöllner
WS 19/20	2511501	Exercises to Machine Learning 1 - Fundamental Methods	1 SWS	Practice (Ü)	Zöllner
Exams					
SS 2019	7900154	Machine Learning 1 - Basic Methods		Prüfung (PR)	Zöllner
WS 19/20	7900076	Machine Learning 1 - Basic Methods		Prüfung (PR)	Zöllner

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 Machine Learning 1 - Fundamental Methods

2511500, WS 19/20, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Notes
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.

T 7.203 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2511502	Machine Learning 2 - Advanced methods	2 SWS	Lecture (V)	Zöllner
SS 2019	2511503	Exercises for Machine Learning 2 - Advanced Methods	1 SWS	Practice (Ü)	Zöllner
Exams					
SS 2019	7900080	Machine Learning 2 – Advanced Methods		Prüfung (PR)	Zöllner
WS 19/20	7900050	Machine Learning 2 – Advanced Methods		Prüfung (PR)	Zöllner

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 Machine Learning 2 - Advanced methods

2511502, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
The field of machine decision-making and inference procedures, taking into account uncertainties and incomplete knowledge, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The focus of this lecture is on the embedding and application of machine-learning methods in decision and inference systems starting with methods of dimension reduction, feature selection/evaluation via semi-supervised learning to methods of probabilistic inference (e.g. Dempster Shafer information fusion, dynamic and object-oriented Bayesian networks, POMDP, etc).

The lecture introduces the basic principles and structures and explains algorithms developed so far. The structure and operation of the procedures and methods are presented and explained using a number of application scenarios, in particular from the field of technical (semi-)autonomous systems.

Notes
The first exercise will take place on 08.05.2019.

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 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.).

Literature
The slides are available as a PDF

Related Literature

- 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

Further (specific) literature on individual topics will be given in the lecture.

V **Exercises for Machine Learning 2 - Advanced Methods** **Practice (Ü)**
2511503, SS 2019, 1 SWS, Open in study portal

Notes
The first exercise will take place on 08.05.2019.

T 7.204 Course: Machine Translation [T-INFO-101385]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-100848 - Machine Translation

Type	Credits	Recurrence	Version
Oral examination	6	Each summer term	1

Events					
SS 2019	24639	Maschinelle Übersetzung	4 SWS	Lecture (V)	Waibel, Herrmann, Pham
Exams					
SS 2019	7500043	Machine Translation		Prüfung (PR)	Waibel
WS 19/20	7500186	Machine Translation		Prüfung (PR)	Stüker, Waibel

T 7.205 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2579900	Management Accounting 1	2 SWS	Lecture (V)	Wouters
SS 2019	2579901	Übung zu Management Accounting 1	2 SWS	Practice (Ü)	Riar
Exams					
SS 2019	79-2579900-00	Management Accounting 1		Prüfung (PR)	Wouters
WS 19/20	79-2579900-00	Management Accounting 1		Prüfung (PR)	Wouters

Competence Certificate
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester.

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 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Notes
see Module Handbook

Learning 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.

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

Übung zu Management Accounting 1

2579901, SS 2019, 2 SWS, Language: English, Open in study portal

Practice (Ü)

Notes
see Module Handbook

T 7.206 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2579903	Management Accounting 2	2 SWS	Lecture (V)	Wouters
WS 19/20	2579904		2 SWS	Practice (Ü)	Ebinger
WS 19/20	2579905		2 SWS	Practice (Ü)	Ebinger
Exams					
SS 2019	79-2579902-00	Management Accounting 2		Prüfung (PR)	Wouters
WS 19/20	79-2579903-00	Management Accounting 2		Prüfung (PR)	Wouters

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester.

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

2579903, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Notes
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 and customer value propositions.

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.

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Learning 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 and customer value propositions.

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.

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 2579904, WS 19/20, 2 SWS, Language: English, Open in study portal **Practice (Ü)**

Notes
see ILIAS

V 2579905, WS 19/20, 2 SWS, Language: English, Open in study portal **Practice (Ü)**

Notes
see ILIAS

T 7.207 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	Recurrence	Version
Written examination	4,5	Each summer term	3

Events					
SS 2019	2511214	Management of IT-Projects	2 SWS	Lecture (V)	Schätzle
SS 2019	2511215	Übungen zu Management von Informatik-Projekten	1 SWS	Practice (Ü)	Schätzle
Exams					
SS 2019	7900045	Management of IT-Projects		Prüfung (PR)	Oberweis
WS 19/20	7900014	Management of IT-Projects		Prüfung (PR)	Oberweis

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.

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.

The exact details will be announced in the lecture.

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 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning 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.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam &1h

Total: 150h

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.

Further literature is given in each lecture individually.

T 7.208 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2019	2545003	Managing New Technologies	2 SWS	Lecture (V)	Reiß
Exams					
SS 2019	7900257	Managing New Technologies		Prüfung (PR)	Terzidis

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 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
The course provides an overview of the international development of a selected number of key technologies such as biotechnology, nanotechnology, neurotechnologies, converging technologies. Methods for monitoring new technologies including foresight approaches will be presented and the economic and social impacts of new technologies will be discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature

- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

T 7.209 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2540460	Market Engineering: Information in Institutions	2 SWS	Lecture (V)	Weinhardt, Straub
SS 2019	2540461	Übungen zu Market Engineering: Information in Institutions	1 SWS	Practice (Ü)	Weinhardt
Exams					
SS 2019	7910804	Market Engineering: Information in Institutions		Prüfung (PR)	Weinhardt
SS 2019	7979235	Market Engineering: Information in Institutions		Prüfung (PR)	Weinhardt

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 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

Learning Content
The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.
- Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
- Smith, V. "Theory, Experiments and Economics", The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

T 7.210 Course: Market Research [T-WIWI-107720]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management
M-WIWI-101490 - Marketing Management
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101647 - Data Science: Evidence-based Marketing

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2571150	Market Research	2 SWS	Lecture (V)	Klarmann
SS 2019	2571151	Market Research Tutorial	1 SWS	Practice (Ü)	Honold
Exams					
SS 2019	7900015	Market Research		Prüfung (PR)	Klarmann
SS 2019	7900203	Market Research		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

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

2571150, SS 2019, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning 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

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Workload
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

Literature
Homburg, Christian (2016), Marketingmanagement, 6th. ed., Wiesbaden.

T 7.211 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	Recurrence	Version
Written examination	4,5	Each winter term	4

Events					
WS 19/20	2572170	Marketing Analytics	2 SWS	Lecture (V)	Klarmann
WS 19/20	2572171		1 SWS	Practice (Ü)	Halbauer
Exams					
WS 19/20	7900082	Marketing Analytics		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation)

Prerequisites
The prerequisite for taking the course is the successful completion of the course Market Research [2571150].

Recommendation
It is strongly recommended to complete the course Market Research prior to taking the Marketing Analytics course.

Annotation
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 & Sales Research Group.

Below you will find excerpts from events related to this course:

V Marketing Analytics

2572170, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning 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.

Annotation
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 & Sales Research Group.

Workload
Total workload for 4.5 ECTS: ca. 135 hours

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.

T 7.212 Course: Marketing Strategy Business Game [T-WIWI-102835]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management
M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each summer term	1

Events					
SS 2019	2571183	Marketing Strategy Business Game	1 SWS	Block (B)	Klarmann, Assistenten
Exams					
SS 2019	7900022	Marketing Strategy Business Game		Prüfung (PR)	Klarmann

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.

Below you will find excerpts from events related to this course:

V Marketing Strategy Business Game

2571183, SS 2019, 1 SWS, Language: German, Open in study portal

Block (B)

Learning Content
Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups' companies.

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 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.

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T 7.213 Course: Master Thesis [T-WIWI-103142]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104833 - Module Master Thesis

Type	Credits	Version
Final Thesis	30	1

Exams				
SS 2019	8179-10001	My Thesis		Oberweis
SS 2019	8179-10002	My Thesis		Oberweis
SS 2019	8179-10003	Conceptual Design and Evaluation of Modular Handling and Assembly Systems for Stacking Fuel Cells for Use in Automotive Production		Fleischer
SS 2019	8179-10004	Analyzing Power Plant Behavior and Identifying Strategies with Generative Adversarial Neural Networks		Weinhardt
SS 2019	8179-10008	Development and Simulation of Business Models for the Circular Economy in a Global Context		Lanza
SS 2019	8179-10009	Analysis of Manufacturing Processes and Identification of Potential Issues in PEMFC Assembly for Automotive Mass Production with Focus on Technology Transfer from Other Industries		Fleischer
SS 2019	8179-10010	Trajektorienplanung in kooperativen Multi-Agent-Szenarien durch Deep Reinforcement Learning		Zöllner
SS 2019	8179-10011	Dynamic Pricing in Parahotellerie - an adaption using the example of CASAMUNDO		Heller, Schienle
SS 2019	8179-10012	Development and Implementation of Computer-Controlled Players for Use in Software-Based Wargaming Simulations		Lindstädt
SS 2019	8179-10013	a		
SS 2019	8179-10014	a		
SS 2019	8179-10015	Kopplung von Strom- und Gasinfrastruktur auf Verteilnetzebene zur Vermeidung von Einspeisemanagement		Weinhardt
SS 2019	8179-10016	Development of a Generic Process Model for the Integration of BPM and IoT		Oberweis
SS 2019	8179-10017	Reinforcement Learning in der Produktion - Eine Analyse der Entscheidungen, des Agentenverhaltens und des Einflusses von Demonstrationsdaten		Lanza
SS 2019	8179-10018	The Impact of Sustainability on Trading Behavior - A Retail Investor Perspective		Weinhardt
SS 2019	8179-10019	Development of a tool for linearizing economies-of-scale at the example of a techno-economic analysis of a lignocellulose biorefinery		
WS 19/20	8179-10020	Development of an instrument for the analysis, evaluation and avoidance of transport relevant CO2 emissions using the example of an automotive supplier		Schultmann

SS 2019	8179-10021	Measurement of Option Liquidity		Uhrig-Homburg
SS 2019	8179-10022	Business Models in Artificial Intelligence: Deduction of an Exemplary Business Model Based on an Analysis of Markets, Companies, and Experts		Lindstädt
SS 2019	8179-10025	Early Customer Integration in der Serviceentwicklung		Weinhardt
WS 19/20	8179-10027	A Techno-Economic Assessment of Compressed Biomethane Gas Production for Natural Gas Vehicles in Thailand		Schultmann
SS 2019	8179-10028	Investigation of the Deployment Potential of the Augmented Reality Solution MiRA on the NH90 Assembly Line and Development of an Implementation Roadmap		Fleischer
WS 19/20	8179-10029	Creation of a Model for Planning the Migration of Production Sites towards Autonomous Plants within a Global Production Network for a Middle-Class Automotive Supplier		Lanza
SS 2019	8179-10030	Development of a Simulation Model and Execution of a Simulation Study to Derive Recommendations for the Example of the Matrix Production of the Schaufensterfabrik II at SEW Eurodrive GmbH		Lanza
SS 2019	8179-10031	Fusion of mobility surveys supported by matching methods		Vortisch
SS 2019	8179-10032	Development of a Modular Planning Model for the Support of Production Ramp Ups in Global Value-Added Networks		Lanza
SS 2019	8179-10033	Development of a Generic Change Management Model to Guide and Accompany Industry 4.0-Initiatives within Companies		Lanza
SS 2019	8179-10034	Development of a Concept for Scalable Automation of Assembly Systems		Lanza
SS 2019	8179-10035	Conception and Implementation of an Integrative Graphical Process and Data-Modeling System for Production and Logistics Planning		Lanza
SS 2019	8179-10036	Development of a Method for Designing Business Performance Management within Global Production Networks Using the Example of a Medium-Sized Automotive Supplier		Lanza
SS 2019	8179-10037	Machine Learning-Driven Engineering: Application of AI in the Process and Product Development		Lanza
SS 2019	8179-10038	Semantic Segmentation of Worn Machine Inserts with Deep Learning		Satzger
SS 2019	8179-10039	Archetypes of Analytics-Based Services		Satzger
SS 2019	8179-10040	AI-based Recommendation of Design Steps Based on the CAD Model Tree		Lanza
SS 2019	8179-10041	Machine Learning in Production: Development of an Application for Human Activity Recognition on the Shop Floor		Lanza
SS 2019	8179-10042	Development of a Decentralized Technology Approach to Improve Order and Quality Management in Automotive Value Networks Using Distributed Ledger Technology		Lanza
SS 2019	8179-10043	Digitization in Industrial Assembly by Means of an Assistance System		Lanza

SS 2019	8179-10044	Development of a Planning Model for Assessing the Feasibility of the Integration of New Vehicle Models into Existing Product Lines		Lanza
SS 2019	8179-10045	Semi-Automated Selection of an Optimal Industry 4.0 Retrofit for Machine Tools		Fleischer
SS 2019	8179-10047	Predicting Taxi Trips with Deep Spatial-Temporal Neural Networks		Nickel
SS 2019	8179-10048	Impact of the Minimum Connection Time on the supply chain and connectivity: case study of Lufthansa Cargo AG		Nickel
SS 2019	8179-10049	Optimierungsprozess der Fabrikumstrukturierungsplanung des Groblayouts von KMU im Sondermaschinenbau		Lanza
SS 2019	8179-10050	: Procedural and methodical support of customer-oriented requirements management in the Early Phase of PGE – Product Generation Engineering		Albers
SS 2019	8179-10051	Product portfolio-spanning definition of functional product concepts in the Early Phase of the PGE – Product Generation Engineering by the example of the concept development at Dr. Ing. h.c. F. Porsche AG		Albers
SS 2019	8179-10052	Design and Evaluation of an ePrescription System Based on Distributed Ledger Technology		Sunyaev
SS 2019	8179-10053	Development of a cost model of a scalable modular supporting structure for bridge cranes		
SS 2019	8179-10054	Entwicklung einer Methode zur Erstellung eines Conversational Agents, der eine gesunde Ernährung unterstützt		Mädche
SS 2019	8179-10055	Conceptual design of a traceability model within a global production network of era-contact GmbH		Albers
SS 2019	8179-10056	Weighted Network analysis of the European airport network		Wigger
SS 2019	8179-10059	Job Shop Selection and Scheduling in Production Networks - An Optimization Approach		Furmans
SS 2019	8179-10060	Jobs-to-be-done method-based business opportunity design for an existing product program		Terzidis
SS 2019	8179-10061	166/5000 Cloud-based software functions to support the completion of jobs via a cloud manufacturing platform (using the example of Heidelberger Druckmaschinen AG)		Terzidis
WS 19/20	8179-10062	Probabilistic Forecasting and the Integration of Wind Power into the Swedish Electrical Grid		Mikut
SS 2019	8179-10063	Optimization and innovation of mobility systems using the example of Auckland's public transportation		Jochem
SS 2019	8179-10065	Information Sharing in Digital Ecosystems		Satzger
SS 2019	8179-10066	Optimization and Innovation of Mobility Systems using the Example of Aucklands's Public Transportation		Jochem
WS 19/20	8179-10067	folgt		Schmeck
SS 2019	8179-10068	Advanced Topics in Transfer Machine Learning: Transferability Analysis in Distributed and Automated Machine Learning Systems		Fromm

SS 2019	8179-10069	Bewertung haptischer Warnungen als Eskalationsstufe in der Übernahmeaufforderung des hochautomatisierten Fahrens bei der Daimler AG		Satzger
SS 2019	8179-10070	Laufzeitsicherheitsnachweise für Industrie 4.0 Materialflussanwendungen - Konzeptstudien mit System-Theoretischer Prozessanalyse		Furmans
SS 2019	8179-10071	Analysis of the Connectivity Structure in Knowledge Graphs		Sure-Vetter
WS 19/20	8179-10072	Improvement of Metaheuristik for logistics optimization		Mittwollen, Thomas
WS 19/20	8179-10073	Simulative investigation of different control strategies for shuttle systems		Furmans
SS 2019	8179-10074	Applying Nudges in Change Management – a Study about Choice Architectures as a Support for Organizational Change Processes		Weinhardt
SS 2019	8179-10075	Überwindung des Kaltstartproblems in der KI-Technologie - ein umfragebasierter Ansatz am Beispiel von tragbarem Schlaf-Tracker AURA		Klarmann
WS 19/20	8179-10076	Logistische Simulation für die Prozessplanung: Untersuchung des Wartungsprozesses im Fusionskraftwerk		Furmans
WS 19/20	8179-10077	Development of a Model to Map Maintenance Processes by Means of Logistic Simulation		Furmans
SS 2019	8179-10078	Transfer learning for sales forecasting in retail		Satzger, Fromm
SS 2019	8600-10000	Usage profiles of free-floating carsharing in Karlsruhe		Vortisch
SS 2019	8600-10001	Agility scenarios of agile cooperation and derivation of an Agility Roadmap 2025 using Daimler AG as an example		Albers
SS 2019	8610-10003	Nachweis der DSGVO-Konformität: Entwurf einer automatisierten Lösung zur Erstellung des Verarbeitungsverzeichnisses		Sunyaev
SS 2019	8610-10004	Probabilistic Forecasting of Individual Electrical Load Using GRU Considering Weather Effects		Weinhardt
SS 2019	8610-10006	Evaluation and Implementation of Methods for Process Recognition With Artificial Neural Networks in Videos		Stork
SS 2019	8610-10007	Evaluation eines Konversationsagenten als instruktives Assistenzsystem für industrielle und häusliche Wartungsarbeit		Beigl
SS 2019	8610-10008	A Distributed Platform Approach to Cooperative Perception Based on Cellular-V2X Communication		Sax
SS 2019	8610-10009	Analyse von Bodenfeuchte-Zeitreihen mithilfe von neuronalen Netzen (Deep Learning)		Beigl
SS 2019	8610-10010	Value Propositions of Startups in the Context of Fundraisung: Overstatements due to Vision Communications		Klarmann
SS 2019	8610-10011	Designing a Self-Learning Decision Support System for Viticulture Campaigns		Satzger
WS 19/20	8610-10012	Meta-Learning zur Erkennung von Anomalien in Energiezeitreihen		Hagenmeyer
SS 2019	8610-10013	Planning and Optimization of MRO-Services in the Aircraft Industry		
SS 2019	8610-10014	Evaluation of Expert Estimates of the Cost of IT-Projects		Geyer-Schulz

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 7.214 Course: Mechanisms and Applications of Workflow Systems [T-INFO-101257]

Responsible: Jutta Mülle
Organisation: KIT Department of Informatics
Part of: M-INFO-100720 - Mechanisms and Applications of Workflow Systems

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	24111	Konzepte und Anwendungen von Workflowsystemen	3 SWS	Lecture (V)	Mülle
Exams					
SS 2019	7500094	Mechanisms and Applications of Workflow Systems		Prüfung (PR)	Mülle
WS 19/20	7500089	Mechanisms and Applications of Workflow Systems		Prüfung (PR)	Böhm, Mülle

T 7.215 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	24681	Medical Robotics	2 SWS	Lecture (V)	Mathis-Ullrich
Exams					
SS 2019	7500129	Medical Robotics		Prüfung (PR)	Mathis-Ullrich

T 7.216 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	Recurrence	Version
Oral examination	3	Each term	1

Events					
SS 2019	2400026	Praktikum Unterteilungsalgorithmen	2 SWS	Practical course (P)	Prautzsch, Xu

T 7.217 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	Recurrence	Version
Examination of another type	1,5	Each summer term	2

Events					
SS 2019	2560240	Methods in Economic Dynamics	SWS	Lecture (V)	Ott, Bälz
Exams					
SS 2019	7900108	Methods in Economic Dynamics		Prüfung (PR)	Ott

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 2019, SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
The workshop offers the possibility to deepen the understanding about different aspects of theoretical modelling of innovation-based growth and induced economic effects. 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 discussed.

Annotation
The course has been added summer 2015.

Workload
The total workload for this course is approximately 45 hours.

Lecture: 15h
Preparation of lecture/exam: 30h

T 7.218 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar (S)	Koch
Exams					
WS 19/20	7900143	Methods in Innovation Management		Prüfung (PR)	Weissenberger-Eibl

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 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Notes
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.

T 7.219 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
WS 19/20	2550138	Mixted Integer Programming I	SWS	Lecture (V)	Stein
WS 19/20	2550139	Exercises Mixted Integer Programming I	SWS	Practice (Ü)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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 Mixted Integer Programming I

2550138, WS 19/20, SWS, Open in study portal **Lecture (V)**

Learning Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, or the time minimal covering of a distance with a vehicle equipped with a gear shift. While optimal points can be defined straightforwardly, for their numerical identification an interplay of ideas from discrete and continuous optimization is necessary.

The lecture treats methods for the numerical solution of linear optimization problems which depend on continuous as well as discrete variables. It is structured as follows:

- Existence results and concepts of linear as well as convex optimization
- LP relaxation and error bounds for rounding
- Gomory's cutting plane method
- Benders decomposition

Part II of the lecture treats nonlinear mixed integer programs.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 7.220 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	Recurrence	Version
Written examination	4,5	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 examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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).

T 7.221 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	24643	Mobile Communications	2 SWS	Lecture (V)	Jung, Waldhorst
Exams					
SS 2019	7500073	Mobile Communication		Prüfung (PR)	Waldhorst, Zitterbart
WS 19/20	7500015	Mobile Communication		Prüfung (PR)	Waldhorst, Zitterbart

T 7.222 Course: Mobile Robots – Practical Course [T-INFO-105951]

Responsible: Prof. Dr.-Ing. Rüdiger Dillmann
Organisation: KIT Department of Informatics
Part of: M-INFO-102977 - Mobile Robots – Practical Course

Type	Credits	Recurrence	Version
Examination of another type	6	Each winter term	1

T 7.223 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	24657	Model-Driven Software Engineering	2 SWS	Lecture (V)	Burger
Exams					
SS 2019	7500016	Model Driven Software Development		Prüfung (PR)	Burger, Reussner
WS 19/20	7500086	Model Driven Software Development		Prüfung (PR)	Reussner

T 7.224 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2540470	Modeling and Analyzing Consumer Behavior with R	2 SWS	Lecture (V)	Dorner, Knierim
SS 2019	2540471	Übung zu Modeling and Analyzing Consumer Behaviour with R	1 SWS	Practice (Ü)	Knierim, Greif-Winzrieth
Exams					
SS 2019	7901391	Modeling and Analyzing Consumer Behavior with R		Prüfung (PR)	Weinhardt
SS 2019	79791391	Modeling and Analyzing Consumer Behavior with R		Prüfung (PR)	Weinhardt

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
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 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Students learn the fundamental methods, algorithms and concepts for analysing consumer data. The students deepen their knowledge in working on a case study and computer exercises, especially in the areas of e-commerce and behavioural economics. In addition, students learn to write applications in R and to organize and execute larger data mining and general data analytics projects. Furthermore, students learn methods for evaluating and visualizing data.

The event will focus on the following topics:

1. basic programming concepts in R
2. data mining with R using established process models such as CRISP-DM
3. text mining and analysis of online data with R
4. working on a case study from the area of Consumer and User Analytics
5. data visualization and evaluation with R

Annotation
The course has been added summer term 2015.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

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 7.225 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	Recurrence	Version
Examination of another type	4,5	Each winter term	2

Events					
WS 19/20	2550490	Modellieren und OR-Software: Fortgeschrittene Themen	3 SWS	Practical course (P)	Pomes, Zander, Bakker

Competence Certificate
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the software laboratory and the following term.

Prerequisites
None.

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 19/20, 3 SWS, Language: German, Open in study portal

Practical course (P)

Learning 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.

Annotation
The lecture is for Master students who have already attended the introduction or have achieved comparable knowledge e.g. in a Bachelor thesis.
Interested students are requested to send an e-mail to Anika Pomes (anika.pomes@kit.edu) from now until 29.09.2019, including the Bachelor's and the current Master's grade transcripts. If the introduction has not been checked, please let us know how the necessary knowledge has been obtained.

For further information see the webpage of the course.

The lecture is offered in every winter term. The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 7.226 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	24606	Modelle der Parallelverarbeitung	3 SWS	Lecture (V)	Worsch, Vollmar
Exams					
SS 2019	75400003	Models of Parallel Processing		Prüfung (PR)	Worsch

T 7.227 Course: Multicore Computers and Computer Clusters [T-INFO-101325]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-100788 - Multicore Computers and Computer Clusters

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	24112	Multikern-Rechner und Rechnerbündel	2 SWS	Lecture (V)	Tichy

T 7.228 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	Recurrence	Version
Examination of another type	6	Each winter term	1

T 7.229 Course: Multi-Dimensional Signal Processing and Image Exploitation with Graphic Cards and Other Manycore-Processors [T-INFO-106278]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Dr. Thomas Perschke

Organisation: KIT Department of Informatics

Part of: M-INFO-103154 - Multi-dimensional Signal Processing and Image Exploitation with Graphic Cards and Other Manycore-Processors

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2400021	Multi-dimensional signal processing and image exploitation with graphic cards and other manycore-processors	2 SWS	Lecture (V)	Perschke
Exams					
WS 19/20	750002400021	Multi-dimensional signal processing and image exploitation with graphic cards and other manycore-processors		Prüfung (PR)	Beyerer

Prerequisites
none.

T 7.230 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).

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.

T 7.231 Course: Natural Language Processing and Dialog Modeling [T-INFO-101473]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-100899 - Natural Language Processing and Dialog Modeling

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2400007	Natural Language Processing and dialog modeling	2 SWS	Lecture (V)	Waibel, Herrmann, Pham
Exams					
SS 2019	7500045	Natural Language Processing and Dialog Modeling		Prüfung (PR)	Waibel

Below you will find excerpts from events related to this course:

V Natural Language Processing and dialog modeling

2400007, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
In order that we can communicate with a computer successfully, it has to be able to interpret sentences like “I don't understand what you mean by this!”. For that it has to know what “to not understand” means and what “by this” refers to.
This lecture gives an overview of different subject areas and applied methods in Natural Language Processing (NLP) and dialog modeling.Concerning NLP, the covered topics will vary in complexity such as Part-of-Speech Tagging, Sentiment Analysis, Word Sense Disambiguation (WSD) and Question Answering (QA).
At the same time, various techniques will be presented with which the corresponding components can be realized. Among those are Conditional Random Fields (CRFs) and Maximum Entropy Models (MaxEnt).
Furthermore, topics and methods of NLP will be emphasized which are especially relevant for realizing spoken dialog systems. In Dialog Modeling different areas like Social Dialog, Goal-Oriented Dialog, Multimodal Dialog and Error Handling will be addressed. These involve additional techniques like Partially Observable Markov Decision Processes (POMDPs).

T 7.232 Course: Natural Language Processing and Software Engineering [T-INFO-101272]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-100735 - Natural Language Processing and Software Engineering

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	24187	Sprachverarbeitung in der Softwaretechnik	2 SWS	Lecture (V)	Tichy, Weigelt
Exams					
SS 2019	7500185	Natural Language Processing and Software Engineering		Prüfung (PR)	Tichy
WS 19/20	7543231	Natural Language Processing and Software Engineering		Prüfung (PR)	Tichy

T 7.233 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	24601	Netzsicherheit: Architekturen und Protokolle	2 SWS	Lecture (V)	Baumgart, Bless, Heseding, Zitterbart
Exams					
SS 2019	7500072	Network Security: Architectures and Protocols		Prüfung (PR)	Zitterbart
WS 19/20	7500014	Network Security: Architectures and Protocols		Prüfung (PR)	Zitterbart

T 7.234 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	24674	Next Generation Internet	2 SWS	Lecture (V)	Bless
Exams					
SS 2019	7500074	Next Generation Internet		Prüfung (PR)	Bless, Zitterbart
WS 19/20	7500016	Next Generation Internet		Prüfung (PR)	Bless, Zitterbart

T 7.235 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
WS 19/20	2521300		2 SWS	Lecture (V)	Schienle
WS 19/20	2521301		2 SWS	Practice (Ü)	Schienle, Görgen

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

T 7.236 Course: Nonlinear Model Predictive Control - Theory and Applications [T-INFO-107492]

Responsible: Dr. Timm Faulwasser
Organisation: KIT Department of Informatics
Part of: M-INFO-103705 - Nonlinear Model Predictive Control - Theory and Applications

Type	Credits	Recurrence	Version
Oral examination	5	Each summer term	2

Events					
SS 2019	2400100	Nonlinear Model Predictive Control - Theory and Applications	4 SWS	Lecture / Practice (VÜ)	Faulwasser, Mühlpfordt
Exams					
SS 2019	7500258	Nonlinear Model Predictive Control - Theory and Applications		Prüfung (PR)	Faulwasser

T 7.237 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	Recurrence	Version
Written examination	4,5	Each winter term	4

Events					
WS 19/20	2550111	Nonlinear Optimization I	2 SWS	Lecture (V)	Stein
WS 19/20	2550112	Exercises Nonlinear Optimization I + II	SWS	Practice (Ü)	Stein
Exams					
SS 2019	7900064_SS2019_NK	Nonlinear Optimization I		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Learning 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, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.238 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	Recurrence	Version
Written examination	9	Each winter term	6

Events					
WS 19/20	2550111	Nonlinear Optimization I	2 SWS	Lecture (V)	Stein
WS 19/20	2550112	Exercises Nonlinear Optimization I + II	SWS	Practice (Ü)	Stein
WS 19/20	2550113	Nonlinear Optimization II	2 SWS	Lecture (V)	Stein
Exams					
SS 2019	7900066_SS2019_NK	Nonlinear Optimization I and II		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Learning 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, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

V

Nonlinear Optimization II

2550113, WS 19/20, 2 SWS, Open in study portal

Lecture (V)

Learning 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, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of 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 for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.239 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	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2550112	Exercises Nonlinear Optimization I + II	SWS	Practice (Ü)	Stein
WS 19/20	2550113	Nonlinear Optimization II	2 SWS	Lecture (V)	Stein
Exams					
SS 2019	7900065_SS2019_NK	Nonlinear Optimization II		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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 OptimizationI* [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 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Learning 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, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of 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 for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.240 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	Recurrence	Version
Written examination	4,5	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" 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 7.241 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	Recurrence	Version
Written examination	4,5	Irregular	2

Events					
SS 2019	2550480	Operations Research in Supply Chain Management	2 SWS	Lecture (V)	Nickel
SS 2019	2550481	Übungen zu OR in Supply Chain Management	1 SWS	Practice (Ü)	Dunke
Exams					
SS 2019	7900128	Operations Research in Supply Chain Management		Prüfung (PR)	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 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.

Below you will find excerpts from events related to this course:

V Operations Research in Supply Chain Management

2550480, SS 2019, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning Content
Supply Chain Management constitutes a general tool for logistics process planning in supply networks. To an increasing degree quantitative decision support is provided by methods and models from Operations Research. The lecture "OR in Supply Chain Management" conveys concepts and approaches for solving practical problems and presents an insight to current research topics. The lecture's focus is set on modeling and solution methods for applications originating in different domains of a supply chain. The emphasis is put on mathematical methods like mixed integer programming, valid inequalities or column generation, and the derivation of optimal solution strategies.

In form and content, the lecture addresses all levels of Supply Chain Management: After a short introduction, the tactical and operational level will be discussed with regard to inventory models, scheduling as well as cutting and packing. The strategic level will be discussed in terms of layout planning. Another main focus of the lecture is the application of methods from online optimization. This optimization discipline has gained more and more importance in the optimization of supply chains over the several past years due to an increasing amount of dynamic data flows.

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.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Simchi-Levi, D.; Chen, X.; Bramel, J.: The Logic of Logistics: Theory, Algorithms, and Applications for Logistics and Supply Chain Management, 2nd edition, Springer, 2005
- Simchi-Levi, D.; Kaminsky, P.; Simchi-Levi, E.: Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, McGraw-Hill, 2000
- Silver, E. A.; Pyke, D. F.; Peterson, R.: Inventory Management and Production Planning and Scheduling, 3rd edition, Wiley, 1998
- Blazewicz, J.: Handbook on Scheduling - From Theory to Applications, Springer, 2007
- Pinedo, M. L.: Scheduling - Theory, Algorithms, and Systems (3rd edition), Springer, 2008
- Dyckhoff, H.; Finke, U.: Cutting and Packing in Production and Distribution - A Typology and Bibliography, Physica-Verlag, 1992
- Borodin, A.; El-Yaniv, R.: Online Computation and Competitive Analysis, Cambridge University Press, 2005
- Francis, R. L.; McGinnis, L. F.; White, A.: Facility Layout and Location: An Analytical Approach, 2nd edition, Prentice-Hall, 1992

T 7.242 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2424143	Optimisation and synthesis of embedded systems (ES1)	2 SWS	Lecture (V)	Bauer, Henkel
Exams					
SS 2019	7500038	VL: Optimization and synthesis of embedded systems (ES1)		Prüfung (PR)	Henkel

T 7.243 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2550140	Optimization Models and Application	2 SWS	Lecture (V)	Sudermann-Merx

Competence Certificate
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.

T 7.244 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2550464	Optimierungsansätze unter Unsicherheit	SWS	Lecture (V)	Rebennack
WS 19/20	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	SWS	Practice (Ü)	Rebennack, Füllner
WS 19/20	2550466		2 SWS	Practice (Ü)	Rebennack, Füllner
Exams					
SS 2019	7900202	Optimization under Uncertainty		Prüfung (PR)	Rebennack

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 7.245 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2520320	Paneldaten	2 SWS	Lecture (V)	Heller
SS 2019	2520321	Übungen zu Paneldaten	2 SWS	Practice (Ü)	Heller
Exams					
SS 2019	7900115	Panel Data		Prüfung (PR)	Heller

Prerequisites
None

T 7.246 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	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	2400053	Parallel Algorithms	2/1 SWS	Lecture (V)	Sanders, Hespe, Schreiber
Exams					
SS 2019	75489	Parallel Algorithms		Prüfung (PR)	Sanders

T 7.247 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	24617	Parallel computer systems and parallel programming	2 SWS	Lecture (V)	Streit, Häfner
Exams					
SS 2019	7500141	Parallel computer systems and parallel programming		Prüfung (PR)	Streit

T 7.248 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	Recurrence	Version
Written examination	4,5	Irregular	1

Exams				
SS 2019	7900068_SS2019_NK	Parametric Optimization	Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.
The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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 7.249 Course: Patent Law [T-INFO-101310]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2019	24656	Patent Law	2 SWS	Lecture (V)	Koch
Exams					
SS 2019	7500062	Patent Law		Prüfung (PR)	Dreier, Matz
WS 19/20	7500001	Patent Law		Prüfung (PR)	Dreier, Matz

T 7.250 Course: Pattern Recognition [T-INFO-101362]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: M-INFO-100825 - Pattern Recognition

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	24675	Pattern Recognition	2 SWS	Lecture (V)	Beyerer
Exams					
SS 2019	7500032	Pattern Recognition		Prüfung (PR)	Beyerer
WS 19/20	7500111	Pattern Recognition		Prüfung (PR)	Beyerer

Below you will find excerpts from events related to this course:

V Pattern Recognition

24675, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
Features:

- types of features
- exploration of the feature space
- transformation of the features
- distance measures within the feature space
- normalization of features
- selection and construction of features
- reduction of the dimension of the feature space

Classifiers:

- Bayesian decision theory
- parameter estimation
- parameter free methods
- linear classifiers
- support vector machine
- template matching, matched filter
- classification with rejection
- classification with regard to nominal features

General principles:

- Vapnik-Chervonenkis theory
- evaluation of classifiers
- boosting

Learning Content
Features:

- types of features
- exploration of the feature space
- transformation of the features
- distance measures within the feature space
- normalization of features
- selection and construction of features
- reduction of the dimension of the feature space

Classifiers:

- Bayesian decision theory
- parameter estimation
- parameter free methods
- linear classifiers
- support vector machine
- template matching, matched filter
- classification with rejection
- classification with regard to nominal features

General principles:

- Vapnik-Chervonenkis theory
- evaluation of classifiers
- boosting

T 7.251 Course: Personalization and Services [T-WIWI-102848]

Responsible: Dr.-Ing. Andreas Sonnenbichler
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540533	Personalization & Services	2 SWS	Lecture (V)	Sonnenbichler, Geyer-Schulz
WS 19/20	2540534	Exercise Personalization & Services	1 SWS	Practice (Ü)	Sonnenbichler, Geyer-Schulz
Exams					
SS 2019	7900283	Personalization and Services		Prüfung (PR)	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

Below you will find excerpts from events related to this course:

V Personalization & Services

2540533, WS 19/20, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Learning Content

- Personalization of Services and Applications
- User Modeling
- User Profiles
- Authentification
- Authorization
- Applications in e-Commerce and for internet-based Services
- Personalized Web Search
- Privacy

Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
The course follows latest scientific papers. References to these papers are listed at the end of each course unit.

T 7.252 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	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	24682	Fotorealistische Bildsynthese	2 SWS	Lecture (V)	Schudeiske
Exams					
SS 2019	7500124	Photorealistic Rendering		Prüfung (PR)	Dachsbacher

T 7.253 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	Recurrence	Version
Written examination	5,5	Each winter term	1

Events					
WS 19/20	2581952	Planning and Management of Industrial Plants	2 SWS	Lecture (V)	Glöser-Chahoud, Schultmann
WS 19/20	2581953	Übungen Anlagenwirtschaft	2 SWS	Practice (Ü)	Rosenberg, Schultmann
Exams					
SS 2019	7981952	Planning and Management of Industrial Plants		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of a written exam (90 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
None

Below you will find excerpts from events related to this course:

V Planning and Management of Industrial Plants

2581952, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning 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.

Workload
Total effort required will account for approximately 165h (5.5 credits).

Literature
will be announced in the course

T 7.254 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2520357	Portfolio and Asset Liability Management	2 SWS	Lecture (V)	Safarian
SS 2019	2520358	Übungen zu Portfolio and Asset Liability Management	2 SWS	Practice (Ü)	Safarian
Exams					
SS 2019	7900116	Portfolio and Asset Liability Management		Prüfung (PR)	Safarian

Competence Certificate
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Portfolio and Asset Liability Management

2520357, SS 2019, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Description
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

Learning 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
The total workload for this course is approximately 150 hours. For further information see German version.

Literature
To be announced in lecture.

Elective literature:

To be announced in lecture.

T 7.255 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	Recurrence	Version
Examination of another type	6	Each winter term	1

Events					
WS 19/20	24316	Praxis der Telematik	4 SWS	Practical course (P)	Bauer, Hock, Zitterbart

T 7.256 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	24298	Praktikum Automatische Spracherkennung	2 SWS	Practical course (P)	Waibel, Stüker, Müller

T 7.257 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2400092	Circuit Design with Intel Galileo	4 SWS	Practical course (P)	Tahoori
WS 19/20	2400116	Circuit Design with Intel Galileo	4 SWS	Practical course (P)	Tahoori
Exams					
SS 2019	7500103	Practical Course Circuit Design with Intel Galileo		Prüfung (PR)	Tahoori
WS 19/20	7500148	Practical Course Circuit Design with Intel Galileo		Prüfung (PR)	Tahoori

Below you will find excerpts from events related to this course:

V Circuit Design with Intel Galileo

2400092, SS 2019, 4 SWS, Language: English, Open in study portal

Practical course (P)

Learning Content
Students will learn to design and test their own digital circuits.

Workload
4 SWS / 3 ECTS

V Circuit Design with Intel Galileo

2400116, WS 19/20, 4 SWS, Language: English, Open in study portal

Practical course (P)

Workload
4 SWS / 3 ECTS

T 7.258 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	Recurrence	Version
Examination of another type	3	Each summer term	2

Events					
SS 2019	24893	Practical Course Computer Vision for Human-Computer Interaction	2 SWS	Practical course (P)	Stiefelhagen, Zündorf, Roitberg
Exams					
SS 2019	7500080	Practical Course Computer Vision for Human-Computer Interaction		Prüfung (PR)	Stiefelhagen
WS 19/20	7500136	Practical Course Computer Vision for Human-Computer Interaction		Prüfung (PR)	Stiefelhagen

T 7.259 Course: Practical Course Computer Vision for Human-Computer Interaction incl. Scientific Report [T-INFO-110325]

Responsible: Prof. Dr.-Ing. Rainer Stiefelhagen
Organisation: KIT Department of Informatics
Part of: M-INFO-105105 - Practical Course Computer Vision for Human-Computer Interaction incl. Scientific Report

Type	Credits	Recurrence	Version
Examination of another type	6	Each summer term	2

Events					
SS 2019	2400123	Practical Course Computer Vision for Human-Computer Interaction incl. Scientific Report	2 SWS	Practical course (P)	Stiefelhagen, Zündorf, Roitberg
Exams					
SS 2019	7500279	Practical Course Computer Vision for Human-Computer Interaction incl. Scientific Report		Prüfung (PR)	Stiefelhagen

T 7.260 Course: Practical Course Data Management and Data Analysis [T-INFO-106066]

Responsible: Prof. Dr. Achim Streit
Organisation: KIT Department of Informatics
Part of: M-INFO-103050 - Practical Course Data Management and Data Analysis

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	1

Events					
SS 2019	2400068	Data management and data analysis	2 SWS	Practical course (P)	Streit, Schlitter, Petzold, Sundermann
WS 19/20	2400043	Data management and data analysis	2 SWS	Practical course (P)	Streit, Schlitter, Petzold, Sundermann

T 7.261 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	Recurrence	Version
Examination of another type	4	Irregular	1

T 7.262 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	24318	Digital Design & Test Automation Flow	4 SWS	Practical course (P)	Tahoori
Exams					
SS 2019	7500089	Practical Course Digital Design & Test Automation Flow		Prüfung (PR)	Tahoori
WS 19/20	7500084	Practical Course Digital Design & Test Automation Flow		Prüfung (PR)	Tahoori

Below you will find excerpts from events related to this course:

V Digital Design & Test Automation Flow

24318, WS 19/20, 4 SWS, Open in study portal

Practical course (P)

Workload
4 SWS / 3 ECTS

T 7.263 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	Recurrence	Version
Examination of another type	6	Each term	1

Events					
WS 19/20	2400093	Practical Course Engineering Approaches to Software Development	4 SWS	Practical course (P)	Reussner
Exams					
SS 2019	7500184	Practical Course Engineering Approaches to Software Development		Prüfung (PR)	Burger, Reussner
WS 19/20	7500234	Practical Course Engineering Approaches to Software Development		Prüfung (PR)	Reussner

T 7.264 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2400106	FPGA Programming	4 SWS	Practical course (P)	Tahoori
WS 19/20	2400106	FPGA Programming	4 SWS	Practical course (P)	Tahoori
Exams					
SS 2019	7500087	Practical Course FPGA Programming		Prüfung (PR)	Tahoori
WS 19/20	7500083	Practical Course FPGA Programming		Prüfung (PR)	Tahoori

Below you will find excerpts from events related to this course:

V FPGA Programming

2400106, SS 2019, 4 SWS, Language: English, Open in study portal

Practical course (P)

Workload
4 SWS / 3 ECTS

V FPGA Programming

2400106, WS 19/20, 4 SWS, Open in study portal

Practical course (P)

Workload
4 SWS / 3 ECTS

T 7.265 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	Recurrence	Version
Examination of another type	6	Each winter term	1

Events					
SS 2019	2400091	Practical Course Model-Driven Software Development	4 SWS	Practical course (P)	Burger
Exams					
SS 2019	7500017	Practical Course Model-Driven Software Development		Prüfung (PR)	Reussner

T 7.266 Course: Practical Course Natural Language Dialog Systems [T-INFO-104780]

Responsible: Prof. Dr. Alexander Waibel
Organisation: KIT Department of Informatics
Part of: M-INFO-102414 - Natural Language Dialog Systems

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

T 7.267 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	Recurrence	Version
Examination of another type	4	Each winter term	1

Events					
WS 19/20	2400086	Protocol Engineering	4 SWS	Practical course (P)	Bauer, Zitterbart
Exams					
WS 19/20	7500002	Practical Course Protocol Engineering		Prüfung (PR)	Zitterbart

T 7.268 Course: Practical Course Research Project: Hands-on Anthropomatics [T-INFO-105278]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-INFO-102568 - Practical Course Research Project: Hands-on Anthropomatics

Type	Credits	Recurrence	Version
Examination of another type	8	Each summer term	1

Events					
SS 2019	24871	Research Project: Hands-on Anthropomatics	4 SWS	Practical course (P)	Hanebeck, Basarur
WS 19/20	24281	Laboratory Research Project: Hands-on Anthropomatics	4 SWS	Practical course (P)	Hanebeck, Basarur
Exams					
SS 2019	7500050	Laboratory: Research Project "Hands-on Anthropomatics"		Prüfung (PR)	Hanebeck, Noack
WS 19/20	7500103	Laboratory: Research Project "Hands-on Anthropomatics"		Prüfung (PR)	Hanebeck

T 7.269 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	Recurrence	Version
Examination of another type	6	Each summer term	1

Events					
SS 2019	24899	Projektpraktikum: Software Defined Networking	4 SWS	Practical course (P)	Bauer, Zitterbart
Exams					
SS 2019	7500167	Practical Course: Software Defined Networking		Prüfung (PR)	Zitterbart

T 7.270 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	Recurrence	Version
Completed coursework	4	Irregular	1

Exams				
SS 2019	7500096	Practical Course Analysis of Complex Data Sets	Prüfung (PR)	Böhm

T 7.271 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	Recurrence	Version
Completed coursework	4	Each winter term	2

Events					
WS 19/20	24286	Datenbankpraktikum	2 SWS	Practical course (P)	Schäler, Böhm
Exams					
WS 19/20	7500130	Practical Course Database Systems		Prüfung (PR)	Böhm

T 7.272 Course: Practical Course: Developing Safe & Secure Software for Microcontrollers in Interconnected Energy Systems [T-INFO-106554]

Responsible: Prof. Dr. Veit Hagenmeyer
Organisation: KIT Department of Informatics
Part of: M-INFO-103291 - Practical Course: Developing Safe & Secure Software for Microcontrollers in Interconnected Energy Systems

Type	Credits	Recurrence	Version
Completed coursework (written)	4	Each summer term	1

Events					
SS 2019	2400087	Developing Safe & Secure Software for Microcontrollers in interconnected energy systems	4 SWS	Practical course (P)	Scherer, Elbez, Reibelt, Keller, Hagenmeyer
Exams					
SS 2019	7500208	Practical Course: Developing Safe & Secure Software for Microcontrollers in interconnected energy systems		Prüfung (PR)	Hagenmeyer

T 7.273 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	Recurrence	Version
Examination of another type	6	Each winter term	1

Events					
WS 19/20	2400059	Praktikum	SWS	Practical course (P)	Prautzsch, Xu
Exams					
SS 2019	7500191	Practical Course Discrete Freeform Surfaces		Prüfung (PR)	Prautzsch

T 7.274 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	24911	Praktikum General-Purpose Computation on Graphics Processing Units	2 SWS	Practical course (P)	Zeidan, Herveau, Dachsbacher
Exams					
SS 2019	7500134	Practical Course: General-Purpose Computation on Graphics Processing Units		Prüfung (PR)	Dachsbacher

T 7.275 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
SS 2019	2400107	Praktikum Geometrisches Modellieren	2 SWS	Practical course (P)	Prautzsch, Xu
WS 19/20	2400024	Praktikum	SWS	Practical course (P)	Xu, Prautzsch
Exams					
SS 2019	7500212	Practical course: Geometric Modeling		Prüfung (PR)	Prautzsch

T 7.276 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	Recurrence	Version
Examination of another type	6	Irregular	1

T 7.277 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	Recurrence	Version
Completed coursework	4	Irregular	1

T 7.278 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Exams				
WS 19/20	7500109	Practical Course: Neural Network Exercises	Prüfung (PR)	Waibel

T 7.279 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	Recurrence	Version
Examination of another type	3	Irregular	1

T 7.280 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	Recurrence	Version
Examination of another type	6	Each summer term	1

Events					
SS 2019	24895	Practical Course: Smart Data Analytics	4 SWS	Practical course (P)	Beigl, Riedel, Ravivanpong, Pescara
Exams					
SS 2019	7500088	Practical Course: Smart Data Analytics		Prüfung (PR)	Beigl, Riedel

T 7.281 Course: Practical Course: Virtual Neurorobotics in the Human Brain Project [T-INFO-106417]

Responsible: Prof. Dr.-Ing. Rüdiger Dillmann
Organisation: KIT Department of Informatics
Part of: M-INFO-103227 - Practical Course: Virtual Neurorobotics in the Human Brain Project

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Recommendation
Previous visit of the lectures *Machine Learning* or *Cognitive* Systems is helpful but not mandatory.

T 7.282 Course: Practical Course: Visual Computing 1 [T-INFO-102996]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-101563 - Practical Course: Visual Computing 1

Type	Credits	Recurrence	Version
Examination of another type	6	Each term	1

Events					
SS 2019	24912	Praktikum Grafik-Programmierung und Anwendungen	4 SWS	Practical course (P)	Zeidan, Herveau, Dachsbacher
Exams					
SS 2019	7500135	Practical Course: Graphics Programming and Applications		Prüfung (PR)	Dachsbacher

T 7.283 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	Recurrence	Version
Examination of another type	6	Each term	1

Events					
SS 2019	24909	Praktikum GPU-Computing	4 SWS	Practical course (P)	Zeidan, Herveau, Dachsbacher
Exams					
SS 2019	7500125	Practical Course GPU-Computing		Prüfung (PR)	Dachsbacher

T 7.284 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	Recurrence	Version
Examination of another type	5	Each summer term	2

Events					
SS 2019	24873	Practical Course: Web Applications and Service-Oriented Architectures (II)	2 SWS	Practical course (P)	Abeck, Schneider
Exams					
SS 2019	7500139	Practical Course: Web Applications and Service-Oriented Architectures (II)		Prüfung (PR)	Abeck

T 7.285 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	Recurrence	Version
Examination of another type	6	Each winter term	1

Events					
SS 2019	2400009	Practical Introduction in Hardware Security	4 SWS	Lecture / Practice (VÜ)	Tahoori
WS 19/20	2400033	Practical Introduction in Hardware Security	4 SWS	Lecture / Practice (VÜ)	Tahoori
Exams					
SS 2019	7500224	Practical Introduction to Hardware Security		Prüfung (PR)	Tahoori
WS 19/20	7500226	Practical Introduction to Hardware Security		Prüfung (PR)	Tahoori

Below you will find excerpts from events related to this course:

V Practical Introduction in Hardware Security

2400009, SS 2019, 4 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)

Description
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.

Notes
4 SWS / 6 ECTS = 180h

Learning Content
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)

Workload
Each slot will be 1.5h + 1.5h, and will be done at CDNC lab once per week. In the first 1.5h either the lecture is presented, the lab assignment is explained or the students present assignment results, depending the schedule of that week. The second 1.5h will be used by the students to continue on implementing the assignment.

V Practical Introduction in Hardware Security

2400033, WS 19/20, 4 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)

Description
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.

Notes
4 SWS / 6 ECTS = 180h

Learning Content
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)

Workload
Each slot will be 1.5h + 1.5h, and will be done at CDNC lab once per week. In the first 1.5h either the lecture is presented, the lab assignment is explained or the students present assignment results, depending the schedule of that week. The second 1.5h will be used by the students to continue on implementing the assignment.

T 7.286 Course: Practical Project Robotics and Automation I (Software) [T-INFO-104545]

Responsible: Prof. Dr.-Ing. Björn Hein
Organisation: KIT Department of Informatics
Part of: M-INFO-102224 - Practical Project Robotics and Automation I (Software)

Type	Credits	Recurrence	Version
Examination of another type	6	Each term	1

Events					
WS 19/20	24282	Robotics and Automation I (Software)	4 SWS	Practical course (P)	Hein, Längle
Exams					
SS 2019	750003	Project practical Robotics and Automation I (Software)		Prüfung (PR)	Kröger, Hein

T 7.287 Course: Practical Project Robotics and Automation II (Hardware) [T-INFO-104552]

Responsible: Prof. Dr.-Ing. Björn Hein
Organisation: KIT Department of Informatics
Part of: M-INFO-102230 - Practical Project Robotics and Automation II (Hardware)

Type	Credits	Recurrence	Version
Examination of another type	6	Each term	1

Events					
WS 19/20	24290	Robotics and Automation II (Hardware)	4 SWS	Practical course (P)	Hein, Längle
Exams					
SS 2019	750004	Practical Course		Prüfung (PR)	Kröger, Hein

T 7.288 Course: Practical SAT Solving [T-INFO-105798]

Responsible: Prof. Dr. Carsten Sinz
Organisation: KIT Department of Informatics
Part of: M-INFO-102825 - Practical SAT Solving

Type	Credits	Recurrence	Version
Oral examination	5	Irregular	1

Events					
SS 2019	2400085	Practical SAT Solving	3 SWS	Lecture / Practice (VÜ)	Sinz, Balyo
Exams					
SS 2019	7500039	Practical SAT Solving		Prüfung (PR)	Sinz

T 7.289 Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Recurrence	Version
Examination of another type	4,5	Irregular	1

Events					
SS 2019	2540554	Practical Seminar: Information Systems & Service Design	3 SWS	Lecture (V)	Mädche
WS 19/20	2540554	Practical Seminar: Information Systems & Service Design	3 SWS	Seminar (S)	Mädche

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

2540554, SS 2019, 3 SWS, Open in study portal — **Lecture (V)**

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of **Future Corporate Management.** The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

V

Practical Seminar: Information Systems & Service Design

2540554, WS 19/20, 3 SWS, Language: English, Open in study portal

Seminar (S)

Description

Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of **Future Corporate Management.** The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

T 7.290 Course: Practical Seminar Knowledge Discovery [T-WIWI-102670]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102827 - Service Computing

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	1

Competence Certificate
The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis, a presentation and a project. The final mark is based on the examination of the written seminar thesis and the project but can be upgraded or downgraded according to the quality of the presentation.

Prerequisites
None

Recommendation
Knowledge of algorithms in the area of knowledge discovery is assumed. Therefore it is recommended to attend the course [2511302] Knowledge Discovery beforehand.

T 7.291 Course: Practical Seminar Service Innovation [T-WIWI-102799]

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	Recurrence	Version
Examination of another type	4,5	Irregular	1

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 7.292 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	Recurrence	Version
Examination of another type	4,5	Each term	1

Exams				
SS 2019	7900211	Practical Seminar: Advanced Analytics	Prüfung (PR)	Weinhardt

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 7.293 Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

Responsible: Prof. Dr. Alexander Mädche
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	Recurrence	Version
Examination of another type	4,5	Each term	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 7.294 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	Recurrence	Version
Examination of another type	4,5	Each term	2

Events					
SS 2019	2550498	Practical seminar: Health Care Management	5 SWS		Nickel, Reuter-Oppermann
Exams					
SS 2019	7900014	Practical Seminar: Health Care Management (with Case Studies)		Prüfung (PR)	Nickel

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.

Below you will find excerpts from events related to this course:

V Practical seminar: Health Care Management

2550498, SS 2019, 5 SWS, Language: German, Open in study portal

Learning Content
Processes in a hospital are often grown historically ("We have always done it this way"), so that there has not been the need to analyze processes until reforms of the health system have put increasing pressure on hospitals. Consequently, nowadays hospitals look for possibilities to improve their processes. The students are confronted with case studies and are asked to develop a solution. Therefore they have to collect and analyze relevant data , processes and structures. When developing the solution the students have to bear in mind that besides the economic efficiency also the quality of care and patient satisfaction (e.g. measured in waiting time) may not be neglected in the health care sector.

Annotation
The lecture is offered every term.

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

Workload
The total workload for this course is approximately135 hours. For further information see German version.

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 7.295 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	Recurrence	Version
Examination of another type	4,5	Each term	2

Events					
SS 2019	2540554	Practical Seminar: Information Systems & Service Design	3 SWS	Lecture (V)	Mädche
Exams					
SS 2019	7900261	Information Systems and Design (ISSD) Seminar		Prüfung (PR)	Mädche
SS 2019	7900262	Practical Seminar: Information Systems and Service Design / Seminarpraktikum: Information Systems und Service Design		Prüfung (PR)	Mädche
SS 2019	7900265	Interactive Analytics Seminar		Prüfung (PR)	Mädche

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

2540554, SS 2019, 3 SWS, Open in study portal — **Lecture (V)**

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of **Future Corporate Management.** The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

T 7.296 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
WS 19/20	2520402	Predictive Mechanism and Market Design	2 SWS	Lecture (V)	Reiß
WS 19/20	2520403		SWS	Practice (Ü)	Reiß

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 7.297 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	Recurrence	Version
Written examination	4,5	Each summer term	1

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.

T 7.298 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-101487 - Sales Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each winter term	3

Events					
WS 19/20	2572198	Price Negotiation and Sales Presentations	1 SWS	Block (B)	Klarmann, Schröder

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
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 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 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 19/20, 1 SWS, Language: German, Open in study portal **Block (B)**

Learning 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.

Annotation

- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter 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 winter term starts.
- Please note that only one of the following courses can be chosen in the Sales Management Module: Country Manager Simulation, Case Studies in Sales and Pricing or Preisverhandlungen und Verkaufspräsentationen.
- 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.

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
None

T 7.299 Course: Pricing [T-WIWI-102883]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management
M-WIWI-101490 - Marketing Management
M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2572157	Pricing	2 SWS	Lecture (V)	Klarmann
WS 19/20	2572169	Übung zu Pricing	1 SWS	Practice (Ü)	Moosbrugger
Exams					
SS 2019	7900081	Pricing		Prüfung (PR)	Feurer
WS 19/20	7900138	Pricing		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Pricing

2572157, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 7.300 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	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	24145	Grundlagen der Automatischen Spracherkennung	4 SWS	Lecture (V)	Waibel, Stüker
Exams					
SS 2019	7500042	Principles of Automatic Speech Recognition		Prüfung (PR)	Waibel, Stüker
WS 19/20	7500082	Principles of Automatic Speech Recognition		Prüfung (PR)	Waibel, Stüker

Below you will find excerpts from events related to this course:

V Grundlagen der Automatischen Spracherkennung

24145, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

Description
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.

T 7.301 Course: Product and Innovation Management [T-WIWI-109864]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101514 - Innovation Economics

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	2571154	Product and Innovation Management	2 SWS	Lecture (V)	Klarmann
Exams					
SS 2019	7900024	Product- and Innovation Management		Prüfung (PR)	Klarmann
SS 2019	7900204	Product and Innovation Management		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

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 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning 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.

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Workload
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

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T 7.302 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	Recurrence	Version
Written examination	5,5	Each summer term	1

Events					
SS 2019	2581954	Production and Logistics Management	2 SWS	Lecture (V)	Schultmann
SS 2019	2581955	Übung zu Produktions- und Logistikmanagement	2 SWS	Practice (Ü)	Rudi, Zimmer
Exams					
SS 2019	7981954	Production and Logistics Management		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of a written exam (90 minutes) (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Production and Logistics Management

2581954, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
This course covers central tasks and challenges of an operative production and logistics management. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Methods to solve these tasks will be explored with respect to manufacturing program planning, material and time. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in PPS. Finally, commercially available PPS-, ERP- and Advanced Planning Systems will be presented and discussed.

Learning Content
This course covers central tasks and challenges of operational production and logistics management. Systems analytically, central planning tasks are discussed. Exemplary solution approaches for these tasks are presented. Further practical approaches are explained. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in Supply Chain Management.

Workload
Total effort required will account for approximately 165h (5.5 credits).

Literature
will be announced in the course

T 7.303 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	Recurrence	Version
Examination of another type	4,5	Each winter term	2

Events					
WS 19/20	2512501	Project lab Cognitive automobiles and robots	3 SWS	Practical course (P)	Zöllner
Exams					
WS 19/20	7900107	Advanced Lab Cognitive Automobile and Robots		Prüfung (PR)	Zöllner

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 Cognitive automobiles and robots

2512501, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

Notes
Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- The students master the analysis and solution of corresponding problems in the team.
- The students can evaluate, document and present their concepts and results.

Workload:

The workload of 4.5 credits consists of time of attendance at the test site for the practical implementation of the chosen solution, as well as the time for literature research and planning / specification of the planned solution. In addition, a short report and a presentation of the work carried out will be prepared.

T 7.304 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2019	2512500	Projektpraktikum Maschinelles Lernen	3 SWS	Practical course (P)	Zöllner
Exams					
SS 2019	7900086	Project Lab Machine Learning		Prüfung (PR)	Zöllner

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

T 7.305 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	Recurrence	Version
Examination of another type	6	Each winter term	1

Events					
WS 19/20	24299	Project Lab: Image Analysis and Fusion	4 SWS	Practical course (P)	Beyerer
Exams					
WS 19/20	7500101	Project Lab: Image Analysis and Fusion		Prüfung (PR)	Beyerer

Below you will find excerpts from events related to this course:

V Project Lab: Image Analysis and Fusion

24299, WS 19/20, 4 SWS, Open in study portal **Practical course (P)**

Learning Content
The practical course is closely connected to the lectures of the Vision and Fusion Laboratory (Lehrstuhl für Interaktive Echtzeitsysteme): Automated Visual Inspection and Image Processing, Pattern Recognition, Introduction to Information Fusion and Probabilistische Planung.
The projects change every year. The corresponding application fields are among others:

- deflectometry – reconstruction of specular surfaces
- camera array for multivariate scene reconstruction
- image processing for driver assistance systems
- distributed vehicle cooperation
- localization and map generation for mobile robots
- systems theory of security for danger analysis
- local approaches for information fusion
- multimodal man-machine interaction

During the first meeting that will take place in the beginning of the semester an overview of the currently offered projects will be given. An introductory workshop "Introduction to project management" will give some hints for further proceeding.

In the course of the project the participants will create a project plan based on which they will individually complete the assigned work packages.
In the course of the semester, three presentations have to be held:

- Presentation of the project plan
- Intermediate state presentation
- Presentation of results

The results have to be documented.

Two weeks before the intermediate presentation, a second workshop, "Introduction to an effective presentation" will take place. The attendance of the both workshops as well as all the presentations is mandatory.

T 7.306 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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581963	Project Management	2 SWS	Lecture (V)	Schultmann, Volk, Wiens, Schumacher, Rosenberg, Wehrle
WS 19/20	2581964	Übung zu Project Management	1 SWS	Practice (Ü)	Volk, Wiens, Schumacher, Rosenberg, Wehrle
Exams					
SS 2019	7981963	Project Management		Prüfung (PR)	Schultmann

Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Project Management

2581963, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning 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

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course

T 7.307 Course: Provable Security in Cryptography [T-INFO-101259]

Responsible: Prof. Dr. Dennis Hofheinz
Organisation: KIT Department of Informatics
Part of: M-INFO-100722 - Provable Security in Cryptography

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
SS 2019	24166	Provable Security in Cryptography	2 SWS	Lecture (V)	Hofheinz
Exams					
SS 2019	7500109	Provable Security in Cryptography		Prüfung (PR)	Geiselmann, Hofheinz, Müller-Quade

Below you will find excerpts from events related to this course:

V Provable Security in Cryptography

24166, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
When is an encryption scheme secure? What type of security is guaranteed by a digital signature scheme? How can secure cryptographic systems be constructed? These and more questions are the topic of this lecture. We put particular emphasis on concrete examples: we will present several cryptographic schemes (such as encryption schemes) and analyze their security properties. In this, the notion of a security proof will play a central role. We endeavour to find mathematical proofs that a given system achieves certain desirable properties under well-defined complexity-theoretic assumptions.

T 7.308 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561127	Public Management	3 SWS	Lecture / Practice (VÜ)	Wigger
Exams					
SS 2019	790puma	Public Management		Prüfung (PR)	Wigger
WS 19/20	790puma	Public Management		Prüfung (PR)	Wigger

Competence Certificate
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V Public Management

2561127, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Learning Content
The lecture "Public Management" deals with the economic theory of public sector administration. It is divided into four parts. The first section gives an overview of the legal framework of governmental administration in the Federal Republic of Germany and introduces the classical theory of administration as developed by Weber. Part two studies concepts of public decision-making, which have a significant impact on the operation of public sector administrations and where one focus is on consistency problems of collective decision-making. The third chapter deals with efficiency problems arising in conventionally organized public administrations and companies. X-inefficiency, information and control problems, the isolated consideration of income-spending-relations as well as rent-seeking problems will be considered. In section four the concept of New Public Management, which is a new approach to public sector administration that is mainly based in contract theory, is introduced. Its foundations in institutional economics are developed, with a focus on the specific incentive structures in self-administered administrations. Finally, the achievements of New Public Management approaches are discussed.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Elective literature:

- Damkowski, W. and C. Precht (1995): Public Management; Kohlhammer
- Richter, R. and E.G. Furubotn (2003): Neue Institutionenökonomik; 3rd edition; Mohr
- Schedler, K. and I. Proeller (2003): New Public Management; 2nd edition; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2nd edition; Springer

T 7.309 Course: Public Media Law [T-INFO-101311]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	24082	Public Media Law	2 SWS	Lecture (V)	Kirchberg
Exams					
SS 2019	7500058	Public Media Law		Prüfung (PR)	Dreier, Matz
WS 19/20	7500062	Public Media Law		Prüfung (PR)	Dreier, Matz

T 7.310 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2560120	Public Revenues	2 SWS	Lecture (V)	Wigger
SS 2019	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice (Ü)	Wigger
Exams					
SS 2019	790oeff	Public Revenues		Prüfung (PR)	Wigger
WS 19/20	790oeff	Public Revenues		Prüfung (PR)	Wigger

Competence Certificate
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

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 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
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 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.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Elective literature:

- Homburg, S.(2000): *Allgemeine Steuerlehre*, Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4th ed., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* and *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2nd ed., Springer

T 7.311 Course: Python for Computational Risk and Asset Management [T-WIWI-110213]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105032 - Data Science for Finance

Type	Credits	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2500016	Python for Computational Risk and Asset Management	2 SWS	Practical course (P)	Ulrich

Competence Certificate
The assessment is carried out in form of twelve weekly Python programming tasks and offered each winter term. The grade of this course is determined by the points achieved in the programming tasks.

Prerequisites
None.

Recommendation
Good knowledge of statistics and first programming experience with Python is recommended.

Below you will find excerpts from events related to this course:

V Python for Computational Risk and Asset Management

2500016, WS 19/20, 2 SWS, Language: English, Open in study portal

Practical course (P)

Description
The aim of this course is to provide students with strong knowledge in Python to independently solve real-world data problems related to automated robo investment advisory.

Learning Content
The course covers several topics from a programming perspective, among them:

Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization

Return Densities: Forecasting with Traditional and Machine Learning Approaches, Monte Carlo Simulation

Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor

Multi-Asset Valuation: DCF Approach, No-Arbitrage and Ito Calculus

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

T 7.312 Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

Responsible: Dr. Dogan Keles
Patrick Plötz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581007	Quantitative Methods in Energy Economics	2 SWS	Lecture (V)	Plötz, Keles
WS 19/20	2581008	Übung zu Quantitative Methods in Energy Economics	1 SWS	Practice (Ü)	Plötz
Exams					
SS 2019	7981007	Quantitative Methods in Energy Economics		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (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
None

Below you will find excerpts from events related to this course:

V Quantitative Methods in Energy Economics

2581007, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning 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.

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

T 7.313 Course: Randomized Algorithms [T-INFO-101331]

Responsible: Thomas Worsch
Organisation: KIT Department of Informatics
Part of: M-INFO-100794 - Randomized Algorithms

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	24171	Randomized Algorithms	3 SWS	Lecture / Practice (VÜ)	Worsch
Exams					
SS 2019	75400002	Randomized Algorithms		Prüfung (PR)	Worsch

T 7.314 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	Recurrence	Version
Oral examination	3	Irregular	2

T 7.315 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	Recurrence	Version
Oral examination	5	Irregular	1

T 7.316 Course: Real-Time Systems [T-INFO-101340]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Prof. Dr.-Ing. Thomas Längle

Organisation: KIT Department of Informatics

Part of: M-INFO-100803 - Real-Time Systems

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	24576	Real-Time Systems	4 SWS	Lecture / Practice (VÜ)	Längle, Ledermann
Exams					
SS 2019	750002	Real-Time Systems		Prüfung (PR)	Längle

T 7.317 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-101470 - Data Science: Advanced CRM
M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2540506	Recommender Systems	2 SWS	Lecture (V)	Geyer-Schulz
SS 2019	2540507	Exercise Recommender Systems	1 SWS	Practice (Ü)	Schweizer
Exams					
SS 2019	7900138	Recommender Systems		Prüfung (PR)	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

Below you will find excerpts from events related to this course:

V Recommender Systems

2540506, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature

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Christopher Avery, Paul Resnick, and Richard Zweckhauser. The market for evaluations. American Economic Review, 89(3):564 – 584, 1999.

Ibrahim Cingil, Asuman Dogac, and Ayca Azgin. A Broader Approach to Personalization. Communications of the ACM, 43(8):136 – 141, Aug 2000.

Richard O. Duda, Peter E. Hart, and David G. Stork. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.

Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. A customer purchase incidence model applied to recommender services. In R. Kohavi et al., editor, Proceedings of the WebKDD 2001 – Mining log data across all customer touchpoints, volume 2356 of Lecture Notes in Artificial Intelligence LNAI, pages 25–47, Berlin, 2002. ACM, Springer-Verlag.

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Paul Resnick, Neophytos Iacovou, Peter Bergstrom, and John Riedl. Grouplens: An open architecture for collaborative filtering of netnews. In Proceedings of the conference on Computer supported cooperative work, pages 175 – 186. ACM Press, 1994.

Elective literature:

Antoinette Alexander. The return of hardware: A necessary evil? Accounting Technology, 15(8):46 – 49, Sep 1999.

Christopher Avery and Richard Zeckhauser. Recommender systems for evaluating computer messages. Communications of the ACM, 40(3):88 – 89, Mar 1997.

Steven Bellman, Gerald Lohse, and Eric Johnson. Predictors of Online Buying Behavior. Communications of the ACM, 42(12):32 – 38, Dec 1999.

Thomas J. Blischok. Every transaction tells a story. Chain Store Age Executive with Shopping Center Age, 71(3):50–56, Mar 1995.

Hans Hermann Bock. Automatische Klassifikation. Vandenhoeck und Ruprecht, Göttingen, 1974.

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Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. myvu: a next generation recommender system based on observed consumer behavior and interactive evolutionary algorithms. In W. Gaul, O. Opitz, and M. Schader, editors, Data Analysis – Scientific Modeling and Practical Applications, volume 18 of Studies in Classification, Data Analysis and Knowledge Organization, pages 447 – 457, Heidelberg, Germany, 2000. Springer.

Andreas Geyer-Schulz, Michael Hahsler, and Maximillian Jahn. Educational and scientific recommender systems: Designing the information channels of the virtual university. International Journal of Engineering Education, 17(2):153 – 163, 2001.

Mark-Edward Grey. Recommendersysteme auf Basis linearer Regression, 2004.

John A. Hartigan. Clustering Algorithms. John Wiley and Sons, New York, 1975.

Kevin Kelly. New Rules for the New Economy: 10 Radical Strategies for a Connected World. Viking, 1998.

Taek-Hun Kim, Young-Suk Ryu, Seok-In Park, and Sung-Bong Yang. An improved recommendation algorithm in collaborative filtering. In K. Bauknecht, A. Min Tjoa, and G. Quirchmayr, editors, E-Commerce and Web Technologies, Third International Conference, Aix-en-Provence, France, volume 2455 of Lecture Notes in Computer Science, pages 254–261, Berlin, Sep 2002. Springer-Verlag.

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Paul Resnick and Hal R. Varian. Recommender Systems. Communications of the ACM, 40(3):56 – 58, Mar 1997.

Badrul M. Sarwar, Joseph A. Konstan, Al Borchers, Jon Herlocker, Brad Miller, and John Riedl. Using filtering agents to improve prediction quality in the grouplens research collaborative filtering system. In Proceedings of ACM Conference on Computer-Supported Cooperative Work, Social Filtering, Social Influences, pages 345 – 354, New York, 1998. ACM Press.

J. Ben Schafer, Joseph Konstan, and Jon Riedl. Recommender Systems in E-commerce. In Proceedings of the 1st ACM conference on Electronic commerce, pages 158 – 166, Denver, Colorado, USA, Nov 1999. ACM.

Upendra Shardanand and Patti Maes. Social information filtering: Algorithms for automating "word of mouth". In Proceedings of ACM SIGCHI, volume 1 of Papers: Using the Information of Others, pages 210 – 217. ACM, 1995.

T 7.318 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	2424662	Rekonfigurierbare und Adaptive Systeme	2 SWS	Lecture (V)	Bauer, Henkel
Exams					
SS 2019	7500201	VL: Reconfigurable and Adaptive Systems		Prüfung (PR)	Henkel

T 7.319 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	Recurrence	Version
Oral examination	4,5	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 7.320 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	Recurrence	Version
Oral examination	3	Each summer term	1

T 7.321 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	24071	Reliable Computing I	2 SWS	Lecture (V)	Tahoori
Exams					
SS 2019	7500027	Reliable Computing I		Prüfung (PR)	Tahoori
WS 19/20	7500167	Reliable Computing I		Prüfung (PR)	Tahoori

Below you will find excerpts from events related to this course:

V Reliable Computing I

24071, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
The objective of this course is to become familiar with general and state of the art techniques used in design and analysis of fault-tolerant digital systems. The students will study and investigate existing fault-tolerant systems. Both Hardware and software methods will be studied and new research topics will be investigated.

This course overviews reliable (fault-tolerant) computing and the design and evaluation of dependable systems, and provides a base for research in reliable systems. Models and methods are used in the analysis and design of fault-tolerant and highly reliable computer systems will be taught in this course. Topics include faults and their manifestations, fault/error modeling, reliability, availability and maintainability analysis, system evaluation, performance-reliability trade-offs, system level fault diagnosis, hardware and software redundancy techniques, and fault-tolerant system design methods.

Workload
2 SWS / 3 ECTS

T 7.322 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2019	2400050	Requirements Engineering	2 SWS	Lecture (V)	Koziolek
Exams					
SS 2019	7500059	Requirements Engineering		Prüfung (PR)	Koziolek
SS 2019	7500295	Requirements Engineering Second Exam VL 2400050		Prüfung (PR)	Koziolek

Recommendation
Das Modul Softwaretechnik II wird empfohlen.

Below you will find excerpts from events related to this course:

V Requirements Engineering

2400050, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
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.

Notes
General remarks: The lecture is held in English and all lecture material is in English. The lecture will be recorded and the recordings will be made available on the Ilias platform.

Workload
Two SWS (1.5 hours) of lecture per week in 15 weeks plus ca. 15 hours preparation for the exam = 90h

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 7.323 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	Recurrence	Version
Examination of another type	3	Each term	1

Exams				
SS 2019	7500114	Team Project (Project, 1st Semester) - Oral Exam	Prüfung (PR)	Beckert, Beigl, Reussner

T 7.324 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	Recurrence	Version
Examination of another type	3	Each term	1

Exams				
SS 2019	7500130	Team Project (Project, 1st Semester) - Presentation	Prüfung (PR)	Beckert, Beigl, Reussner
WS 19/20	7500080	Research Project (Project, 1st Semester) - Presentation	Prüfung (PR)	Beckert, Beigl, Reussner

T 7.325 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	Recurrence	Version
Examination of another type	4	Each term	1

Exams				
SS 2019	7500131	Team Project (Project, 1st Semester) - Project Proposal	Prüfung (PR)	Beckert, Beigl, Reussner
WS 19/20	7500081	Research Project (Project, 1st Semester) - Written Exam	Prüfung (PR)	Beckert, Beigl, Reussner

T 7.326 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2400053	Praxis der Forschung (Projekt, 2. Semester)	SWS		Beckert, Beigl, Reussner, Kirsten
WS 19/20	2400070	Praxis der Forschung (Projekt, 2. Semester)	SWS		Beckert, Beigl, Reussner, Kirsten, Budde
Exams					
SS 2019	7500126	Team Project (Project, 2nd Semester) - Oral Exam		Prüfung (PR)	Beckert, Beigl, Reussner
WS 19/20	7500171	Research Project (Project, 2nd Semester) - Oral Exam		Prüfung (PR)	Beckert, Beigl, Reussner

T 7.327 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2400053	Praxis der Forschung (Projekt, 2. Semester)	SWS		Beckert, Beigl, Reussner, Kirsten
WS 19/20	2400070	Praxis der Forschung (Projekt, 2. Semester)	SWS		Beckert, Beigl, Reussner, Kirsten, Budde
Exams					
SS 2019	7500132	Team Project (Project, 2nd Semester) - Presentation		Prüfung (PR)	Beckert, Beigl, Reussner
WS 19/20	7500077	Research Project (Project, 2nd Semester) - Presentation		Prüfung (PR)	Beckert, Beigl, Reussner

T 7.328 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	Recurrence	Version
Examination of another type	4	Each term	1

Events					
SS 2019	2400053	Praxis der Forschung (Projekt, 2. Semester)	SWS		Beckert, Beigl, Reussner, Kirsten
WS 19/20	2400070	Praxis der Forschung (Projekt, 2. Semester)	SWS		Beckert, Beigl, Reussner, Kirsten, Budde
Exams					
SS 2019	7500133	Team Project (Project, 2nd Semester) - Scientific Report		Prüfung (PR)	Beckert, Beigl, Reussner
WS 19/20	7500078	Research Project (Project, 2nd Semester) - Written Exam		Prüfung (PR)	Beckert, Beigl, Reussner

T 7.329 Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

Responsible: Dr. Marcus Wiens
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581992	Risk Management in Industrial Supply Networks	2 SWS	Lecture (V)	Wiens
WS 19/20	2581993	Übung zu Risk Management in Industrial Supply Networks	1 SWS	Practice (Ü)	Klein, Wiens
Exams					
SS 2019	7981992	Risk Management in Industrial Supply Networks		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Risk Management in Industrial Supply Networks

2581992, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content

- supply chain management: introduction, aims and trends
- industrial risk management
- definition und characterization of risks: sourcing and procurement, demand, production and infrastructure
- identification of risks
- risk controlling
- risk assessment and decision support tools
- risk prevention and mitigation strategies
- robust design of supply chain networks
- supplier selection
- capacity management
- business continuity management

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course

T 7.330 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2019	2545102	Roadmapping	2 SWS	Seminar (S)	Koch
Exams					
SS 2019	7900055	Roadmapping		Prüfung (PR)	Weissenberger-Eibl

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 2019, 2 SWS, Language: German, Open in study portal

Seminar (S)

Learning Content
Roadmapping is a method used to support innovation decisions in the early phase of innovation management. The roadmapping process addresses the procedure of constructing roadmaps which can then be assessed. Roadmapping provides structured and graphical visualizations of preferably future-oriented topics which have innovation potentials. The benefits of the roadmapping method lie in the structured bundling of both technology- and market-driven individual topics and the joint setting of priorities and processes to achieve predetermined corporate targets. As a rule, roadmaps represent a consensus reached by the people involved in their compilation. For this reason, roadmaps are suited to the designation and initial prioritization of emerging technologies and corresponding development projects.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

T 7.331 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	Recurrence	Version
Examination of another type	6	Each summer term	2

Events					
SS 2019	24870	Robotics - Practical Course	4 SWS	Practical course (P)	Asfour, Beil, Patzer, Grotz
Exams					
SS 2019	7500261	Robotics - Practical Course		Prüfung (PR)	Asfour

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 2019, 4 SWS, Language: German, Open in study portal

Practical course (P)

Learning Content
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.

Workload
180 h

T 7.332 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	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	2424152	Robotics I - Introduction to Robotics	3/1 SWS	Lecture (V)	Asfour, Paus
Exams					
SS 2019	7500218	Robotik I - Einführung in die Robotik		Prüfung (PR)	Asfour
WS 19/20	7500106	Robotics I - Introduction to Robotics		Prüfung (PR)	Asfour

T 7.333 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	Recurrence	Version
Written examination	3	Each summer term	3

Events					
SS 2019	2400074	Robotics II: Humanoid Robotics	2 SWS	Lecture (V)	Asfour, Wächter
Exams					
SS 2019	7500086	Robotics II: Humanoid Robotics		Prüfung (PR)	Asfour
WS 19/20	7500211	Robotics II: Humanoid Robotics		Prüfung (PR)	Asfour

Below you will find excerpts from events related to this course:

V Robotics II: Humanoid Robotics

2400074, SS 2019, 2 SWS, Language: German/English, Open in study portal

Lecture (V)

Learning 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

Workload
90 h

T 7.334 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2019	2400067	Robotics III - Sensors and Perception in Robotics	2 SWS	Lecture (V)	Asfour, Grotz
Exams					
SS 2019	7500242	Robotics III - Sensors and Perception in Robotics		Prüfung (PR)	Asfour

Below you will find excerpts from events related to this course:

V Robotics III - Sensors and Perception in Robotics

2400067, SS 2019, 2 SWS, Language: German/English, Open in study portal

Lecture (V)

Learning 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.

Workload
90h

T 7.335 Course: Sales Management and Retailing [T-WIWI-102890]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2572156	Sales Management and Retailing	2 SWS	Lecture (V)	Klarmann
Exams					
SS 2019	7900196	Sales Management and Retailing		Prüfung (PR)	Klarmann
WS 19/20	7900080	Sales Management and Retailing		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

Annotation
The lecture is compulsory for the module Sales Management. It is taught in English.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

Below you will find excerpts from events related to this course:

V Sales Management and Retailing

2572156, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Learning Content
The aim of the course "Sales Management and Retailing" is on the one hand to give insights into the challenging realization of a successful sales management and on the other hand to discuss peculiarities of retailing contexts. The contents are below others:

- Customer relationship management (word-of-mouth-analysis, key account management, loyalty programs, complain management etc.)
- Retail marketing (trends, point of sale design etc.)
- Retailer-producer relationships

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

This course is held in English.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T 7.336 Course: Secure Multiparty Computation [T-INFO-108540]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-104119 - Secure Multiparty Computation

Type	Credits	Recurrence	Version
Oral examination	3	Each term	1

T 7.337 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	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	24941	Security	3 SWS	Lecture (V)	Müller-Quade
Exams					
SS 2019	7500263	Security		Prüfung (PR)	Müller-Quade
SS 2019	7500292	Security		Prüfung (PR)	Müller-Quade

T 7.338 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2019	2513401	Selected Issues in Critical Information Infrastructures	SWS	Seminar (S)	Sunyaev, Lins
Exams					
SS 2019	7900114	Selected Issues in Critical Information Infrastructures		Prüfung (PR)	Sunyaev

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 7.339 Course: Selected Legal Isues 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2019	24821	Selected legal issues of Internet law	2 SWS	Colloquium (KOL)	Dreier
Exams					
SS 2019	7500226	Selected legal issues of Internet law		Prüfung (PR)	Dreier

T 7.340 Course: Selected Topics in Cryptography [T-INFO-101373]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-100836 - Selected Topics in Cryptography

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24623	Selected topics in Cryptography	2 SWS	Lecture (V)	Müller-Quade, Klooß, Mechler
Exams					
SS 2019	7500222	Selected Topics in Cryptography		Prüfung (PR)	Geiselmann, Müller-Quade, Hofheinz

Below you will find excerpts from events related to this course:

V Selected topics in Cryptography

24623, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content

- Basic security protocols such as fair coin toss over the phone, Byzantine Agreement, Dutch Flower Auctions, Zero Knowledge
- Threat models and security definitions
- Modular design and protocol composition
- Security definitions of simulatability
- Universal Composability
- Deniability as an additional safety feature
- Electronic Voting

T 7.341 Course: Semantic Web Technologies [T-WIWI-102874]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101455 - Web Data Management
M-WIWI-101457 - Semantic Technologies
M-WIWI-102827 - Service Computing

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2511310	Semantic Web Technologies	2 SWS	Lecture (V)	Sure-Vetter, Acosta Deibe, Käfer
SS 2019	2511311	Exercises to Semantic Web Technologies	1 SWS	Practice (Ü)	Sure-Vetter, Acosta Deibe, Käfer
Exams					
SS 2019	7900028	Semantic Web Technologies		Prüfung (PR)	Sure-Vetter
WS 19/20	7900022	Semantic Web Technologies		Prüfung (PR)	Sure-Vetter

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 2019, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Description
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.

Learning Content
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

Workload

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- 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.

Additional Literature

- 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

2511311, SS 2019, 1 SWS, Language: English, Open in study portal

Practice (Ü)

Description
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.

Learning Content
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

Workload
The total workload for the lecture Semantic Web Technologiesis given out on the description of the lecture.

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.

Additional Literature

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

T 7.342 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2400121	Interactive Analytics Seminar	2 SWS		Beigl, Mädche, Pescara, Toreini
SS 2019	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2019	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2019	2530372	Automated Financial Advisory	2 SWS	Seminar (S)	Ulrich
SS 2019	2530374	Applied Risk and Asset Management	2 SWS	Seminar (S)	Ulrich
SS 2019	2530580	Seminar in Finance (Master, Prof. Uhrig-Homburg)	2 SWS	Seminar (S)	Uhrig-Homburg, Hofmann, Reichenbacher, Eska
SS 2019	2540510	Masterseminar Big Data Mining in Finance	2 SWS	Seminar (S)	Geyer-Schulz
SS 2019	2540559	Digital Service Design Seminar	3 SWS	Seminar (S)	Mädche
SS 2019	2550493	Hospital Management	2 SWS	Block (B)	Hansis
SS 2019	2577915	Strategische Unternehmensführung	2 SWS	Seminar (S)	Klopfer
SS 2019	2579904	Seminar Management Accounting	2 SWS	Seminar (S)	Hammann, Disch
SS 2019	2579905	Special Topics in Management Accounting	2 SWS	Seminar (S)	Mickovic, Riar
SS 2019	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar (S)	Schultmann
WS 19/20	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2500029	Seminar in Data Science for Finance	2 SWS	Seminar (S)	Ulrich
WS 19/20	2530293		2 SWS	Seminar (S)	Ruckes, Hoang, Benz, Strych, Luedecke, Silbereis, Stengel, Schubert
WS 19/20	2540473	Data Science in Service Management	2 SWS	Seminar (S)	Haubner, Frankenhauser, Gröschel
WS 19/20	2540475	Electronic Markets & User behavior	2 SWS	Seminar (S)	Dorner, Knierim, Dann, Jaquart
WS 19/20	2540477	Digital Experience and Participation	2 SWS	Seminar (S)	Straub, Peukert, Hoffmann, Kloker, Pusmaz, Willrich, Kloepper, Fegert, Greif-Winzrieth
WS 19/20	2540478	Smart Grids and Energy Markets	2 SWS	Seminar (S)	Dinther, Staudt, Richter, Huber, vom Scheidt, Golla

WS 19/20	2540510	Masterseminar in Data Science and Machine Learning	2 SWS	Seminar (S)	Geyer-Schulz, Schweigert, Schweizer, Nazemi
WS 19/20	2540557	Literature Review Seminar: Information Systems and Service Design	3 SWS	Seminar (S)	Mädche
WS 19/20	2540559	Digital Service Design Seminar	3 SWS	Seminar (S)	Mädche
WS 19/20	2572181		2 SWS	Seminar (S)	Klarmann
WS 19/20	2573010	Seminar: Human Resources and Organizations (Bachelor)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2573011	Seminar: Human Resource Management (Bachelor)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2577915	Strategische Unternehmensführung	2 SWS	Seminar (S)	Klopfer
WS 19/20	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar (S)	Riar
WS 19/20	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar (S)	Glöser-Chahoud, Schultmann
WS 19/20	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar (S)	Volk, Schultmann
WS 19/20	2581978	Seminar in Production and Operations Management III	2 SWS	Seminar (S)	Wiens, Schultmann
WS 19/20	2581980		2 SWS	Seminar (S)	Keles, Fett, Yilmaz
WS 19/20	2581981		2 SWS	Seminar (S)	Ardone, Ruppert, Sandmeier, Slednev
WS 19/20	2581990		2 SWS	Seminar (S)	Schultmann, Schumacher
Exams					
SS 2019	00019	Seminar Digital Service Innovation		Prüfung (PR)	Satzger
SS 2019	7500148	Proseminar: Practical Seminar: Interactive Analytics		Prüfung (PR)	Beigl, Mädche
SS 2019	7900008	Hospital Management		Prüfung (PR)	Nickel
SS 2019	7900017	Soziale Innovationen unter die Lupe genommen		Prüfung (PR)	Weissenberger-Eibl
SS 2019	7900019	Master Seminar in Information Engineering and Management		Prüfung (PR)	Geyer-Schulz
SS 2019	7900052	Entrepreneurship Research		Prüfung (PR)	Terzidis
SS 2019	7900055	Roadmapping		Prüfung (PR)	Weissenberger-Eibl
SS 2019	7900093	Seminar in Business Administration A		Prüfung (PR)	Weinhardt
SS 2019	7900126	Seminar Strategic Management		Prüfung (PR)	Lindstädt
SS 2019	7900127	Seminar in Finance (Master)		Prüfung (PR)	Uhrig-Homburg
SS 2019	7900180	Seminar in Business Administration		Prüfung (PR)	Weinhardt
SS 2019	7900214	Seminar Business Data Analytics (Master)		Prüfung (PR)	Weinhardt
SS 2019	7900242	Applied Risk and Asset Management		Prüfung (PR)	Ulrich
SS 2019	7900244	Digital Service Design Seminar		Prüfung (PR)	Mädche
SS 2019	7900256	Seminar Electronic Markets & User Behavior		Prüfung (PR)	Weinhardt
SS 2019	7900261	Information Systems and Design (ISSD) Seminar		Prüfung (PR)	Mädche
SS 2019	7900262	Practical Seminar: Information Systems and Service Design / Seminarpraktikum: Information Systems und Service Design		Prüfung (PR)	Mädche
SS 2019	7900265	Interactive Analytics Seminar		Prüfung (PR)	Mädche
SS 2019	7900284	Digital Transformation and Business Models		Prüfung (PR)	Weissenberger-Eibl
SS 2019	79-2579904-02	Seminar Management Accounting (Master)		Prüfung (PR)	Wouters
SS 2019	79-2579905-02	Seminar Special Topics in Management Accounting (Master)		Prüfung (PR)	Wouters

SS 2019	7981976	Seminar in Production and Operations Management I	Prüfung (PR)	Schultmann
SS 2019	7981978	Seminar in Production and Operations Management III	Prüfung (PR)	Schultmann
SS 2019	7981979	Seminar Energy Economics I	Prüfung (PR)	Fichtner
SS 2019	7981981	Seminar Energy Economics III	Prüfung (PR)	Fichtner
WS 19/20	7900017	Seminar Smart Grid and Energy Markets	Prüfung (PR)	Weinhardt
WS 19/20	7900141	Innovation Processes Live	Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900143	Methods in Innovation Management	Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900159	Seminar in Marketing and Sales	Prüfung (PR)	Klarmann
WS 19/20	7900163	Seminar Human Resource Management (Master)	Prüfung (PR)	Nieken
WS 19/20	7900164	Seminar Human Resources and Organizations (Master)	Prüfung (PR)	Nieken
WS 19/20	7900165	Seminar Digital Experience and Participation	Prüfung (PR)	Weinhardt
WS 19/20	7900237	Case Studies Seminar: Innovation Management	Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900239	Technologies for Innovation Management	Prüfung (PR)	Weissenberger-Eibl
WS 19/20	79-2579919-02	Seminar Management Accounting - Special Topics (Master)	Prüfung (PR)	Wouters

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 Human Resource Management (Master)** **Seminar (S)**
2500006, SS 2019, 2 SWS, Open in study portal

Notes
See Module Handbook

V **Seminar Human Resources and Organizations (Master)** **Seminar (S)**
2500007, SS 2019, 2 SWS, Open in study portal

Notes
See Module Handbook

V Automated Financial Advisory

2530372, SS 2019, 2 SWS, Language: English, Open in study portal

Seminar (S)

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

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

Literature
Literature will be distributed during the first lecture.

V Seminar in Finance (Master, Prof. Uhrig-Homburg)

2530580, SS 2019, 2 SWS, Language: German, Open in study portal

Seminar (S)

Learning Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

V Masterseminar Big Data Mining in Finance

2540510, SS 2019, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Literature
Literature:

- Goodfellow, I., Bengio, Y., & Courville, A. (2017). Deep Learning. MIT Press.
- Jean, N., Burke, M., Xie, M., Davis, W. M., Lobell, D. B., & Ermon, S. (2016). Combining satellite imagery and machine learning to predict poverty. *Science*, *353*(6301), 790-794.
- LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. N*ature*, *521*(7553), 436-444.
- Leskovec, J., Rajaraman, A., & Ullman, J. D. (2014). Mining of Massive Datasets. Cambridge University Press.
- Lopez De Prado, M. (2018). Advances in Financial Machine Learning. John Wiley & Sons

V Hospital Management

2550493, SS 2019, 2 SWS, Language: German, Open in study portal

Block (B)

Description
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Learning Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Annotation
It is planned to offer the course every semester.

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

V Seminar Management Accounting

2579904, SS 2019, 2 SWS, Language: English, Open in study portal

Seminar (S)

Notes
see Module Handbook

Learning 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.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Special Topics in Management Accounting

2579905, SS 2019, 2 SWS, Language: English, Open in study portal

Seminar (S)

Notes
see Module Handbook

Learning 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 four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Seminar Human Resource Management (Master)

2500006, WS 19/20, 2 SWS, Open in study portal

Seminar (S)

Notes
See Module Handbook

V Seminar Human Resources and Organizations (Master)
2500007, WS 19/20, 2 SWS, Open in study portal — **Seminar (S)**

Notes
See Module Handbook

V Seminar in Data Science for Finance
2500029, WS 19/20, 2 SWS, Language: English, Open in study portal — **Seminar (S)**

Description
The aim of this seminar is to master real-world challenges of computational risk and asset management. The CRAM team offers a wide range of topics across different asset classes and different stages of the investment process.

Learning Content
Students will work on a quantitative problem related to risk and asset management. This seminar is ideally suited for students who want to deepen and apply their statistics / programming skills and knowledge about financial markets. Industry-relevant problems will be solved with financial data and modern statistical tools in close collaboration with a supervisor. Topics which students solved in the past include the option-based pricing of dividends during the Euro crisis, the estimation of risk neutral moments with high-frequent data and the application of a particle filter to estimate stochastic volatility. The current topics will be presented during the first meeting.

V Data Science in Service Management
2540473, WS 19/20, 2 SWS, Language: German/English, Open in study portal — **Seminar (S)**

Notes
wird auf deutsch und englisch gehalten

V Masterseminar in Data Science and Machine Learning
2540510, WS 19/20, 2 SWS, Language: German, Open in study portal — **Seminar (S)**

Workload
The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

V Digital Service Design Seminar
2540559, WS 19/20, 3 SWS, Open in study portal — **Seminar (S)**

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of **Future Corporate Management.** The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

V 2572181, WS 19/20, 2 SWS, Language: German, Open in study portal **Seminar (S)**

Learning Content
The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Annotation
Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
will be announced in the seminary.

V **Seminar: Human Resources and Organizations (Bachelor)** **Seminar (S)**
2573010, WS 19/20, 2 SWS, Open in study portal

Notes
See Module Handbook

V **Seminar: Human Resource Management (Bachelor)** **Seminar (S)**
2573011, WS 19/20, 2 SWS, Open in study portal

Notes
See Module Handbook

V **Seminar Management Accounting - Special Topics** **Seminar (S)**
2579919, WS 19/20, 2 SWS, Language: English, Open in study portal

Notes
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 four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Learning objectives: Students

- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Proof:

- The final grade of the course is the grade awarded to the paper.

Recommendation:

- 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 24 students.

Learning 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 four to five meetings that are spread throughout the semester.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

T 7.343 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	Recurrence	Version
Examination of another type	3	Each term	1

Exams				
SS 2019	7900051	Seminar in Economic Policy (Master)	Prüfung (PR)	Ott
WS 19/20	7900103	Data-driven innovation and science communication (Master)	Prüfung (PR)	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 graded 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 7.344 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, Görgen
SS 2019	2560282	Wirtschaftspolitisches Seminar	2 SWS	Seminar (S)	Ott, Assistenten
SS 2019	2560552	Topics in Political Economics (Master)	2 SWS	Seminar (S)	Szech, Maus
SS 2019	2560554	Morals and Social Behavior (Master)	2 SWS	Seminar (S)	Szech, Huber
WS 19/20	2560140	Topics on Political Economics (Bachelor)	2 SWS	Seminar (S)	Ehrlich, Huber
WS 19/20	2560141	Morals & Social Behavior (Bachelor & Master)	2 SWS	Seminar (S)	Huber, Ehrlich
WS 19/20	2560142	Topics on Political Economics (Master)	2 SWS	Seminar (S)	Ehrlich, Huber
WS 19/20	2561208	Ausgewählte Aspekte der europäischen Verkehrsplanung und -modellierung	1 SWS	Seminar (S)	Szimba
Exams					
SS 2019	7900051	Seminar in Economic Policy (Master)		Prüfung (PR)	Ott
SS 2019	7900059	Seminar in Economics B (Master)		Prüfung (PR)	Szech
SS 2019	7900060	Seminar in Economics B (Master)		Prüfung (PR)	Szech
SS 2019	7900147	Seminar in Economics (Bachelor)		Prüfung (PR)	Fuchs-Seliger
SS 2019	7900222	Seminar in Economics B (Master)		Prüfung (PR)	Melik-Tangian
SS 2019	7900237	Seminar Strategic Decisions		Prüfung (PR)	Ehrhart
SS 2019	7900266	Seminar in Macroeconomics I		Prüfung (PR)	Scheffel
SS 2019	7900272	Seminar in Macroeconomics II		Prüfung (PR)	Scheffel
SS 2019	7900282	Digital IT-Solutions and Services Transforming the Field of Public Transportation		Prüfung (PR)	Mitusch
SS 2019	791192ee	Topics in Experimental Economics		Prüfung (PR)	Reiß
SS 2019	79sefi2	Seminar Infrastructure and Science Networks A (Master)		Prüfung (PR)	Wigger
WS 19/20	7900103	Data-driven innovation and science communication (Master)		Prüfung (PR)	Ott
WS 19/20	7900132	Seminar in Economics A (Master)		Prüfung (PR)	Fuchs-Seliger
WS 19/20	79sefi2	Seminar in Economics A (Master)		Prüfung (PR)	Wigger

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 **Advanced Topics in Econometrics** **Seminar (S)**
2521310, SS 2019, 2 SWS, Language: English, Open in study portal

Annotation
The course will be offered in English.

V **Topics in Political Economics (Master)** **Seminar (S)**
2560552, SS 2019, 2 SWS, Language: English, Open in study portal

Description
In many companies relative reward schemes are used whereby employees earn a bonus if they perform better than their colleagues. Moreover, hierarchical structures mean that in many organizations, employees find themselves in constant competition for promotions. This is meant to provide incentives for higher performance. However, competitive remuneration schemes could also have detrimental effects such that individual workers may view their colleagues as direct competitors generating more selfish and/or less helpful behavior in the workplace. Furthermore, age, gender and culture seem to have impacts on willingness to compete. For example, in western cultures, adult men sometimes enter competition even though their performance level is way too low for success, i.e., they harm themselves by over-competitiveness. In contrast, adult females sometimes compete less than they could do successfully.

Another challenge in contest design, e.g. in sports, is that when competition takes place among workers with mixed abilities it may lead to a discouragement effect, which establishes that lower ability individuals often reduce effort competing against an individual they do not feel up to (e.g. it has been found that average golf players performed significantly worse when competing against a superstar like Tiger Woods). One solution suggested by the economic literature is to level the playing field between advantaged and disadvantaged individuals by favoring weaker individuals through bid-caps, asymmetric tie-breaking rules, or advances. In sports, asymmetric tie-breaking is already common, for instance, in the
Champions League soccer playoffs “away goals” become the decisive factor in determining the winning team in case of a tie.

Contests are not only a well-established mechanism for incentivizing workers but also for encouraging innovation and advancing R&D. Elements of research and innovation contests can be found in the procurement of various goods and services. For instance, the construction of new buildings, proposals in a venture capital firm or TV shows for entertainment companies all flow through a similar innovation process that involves the solicitation of bids from multiple potential suppliers and the preparation of a pilot or a proposal. In other cases, e.g., in lobbying contests, it is often discussed whether investments are beneficial or not. Some authors have argued that investments into lobbying should be capped in order to soften competition among asymmetrically strong interest groups (e.g. the lobbying industry versus consumers’ interest groups). Of course, then the question arises whether such caps achieve the respective design goal or not.

In this seminar, we discuss questions like: How can we design workplaces and labor contracts to increase motivation and productivity? How can contests be used to foster innovation? Which role should social preferences play and how could they inspire specific contest designs? How should sport contests be engineered depending on the respective goals? How should we design lobbying contests?

Also related topics are very welcome!

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact Patrick Maus (Patrick.Maus@kit.edu).

Workload
About 90 hours

Literature
Charness, G., Kuhn, P. (2011) Lab labor: What can labor economists learn from the lab? Handbook of labor economics, 4, 229-330.

Cassar, A., Friedman, D. (2004) Economics lab: an intensive course in experimental economics. Routledge.

Croson, R., Gneezy, U. (2009). Gender differences in preferences. Journal of Economic literature, 47(2), 448-474.

Dechenaux, Emmanuel, Dan Kovenock, and Roman M. Sheremeta. "A survey of experimental research on contests, all-pay auctions and tournaments." Experimental Economics 18.4 (2015): 609-669.

V Morals and Social Behavior (Master)

2560554, SS 2019, 2 SWS, Language: English, Open in study portal

Seminar (S)

Description
For a long time, economists studied given markets and mechanisms to predict outcomes, future developments or generally the participants' behavior. In contrast, Market Design uses theory, empirical and experimental work to design markets which incentivize their participants in a way that leads to a "desirable" outcome. In this, the designer can have different objectives, for example: Maximizing efficiency, welfare or minimizing negative externalities.

Prominent applications of Market Design include, quite topical, Germany's auction of 5G mobile licenses and matching markets, where there are two large populations that need to be matched to one another (think of hospitals and interns, students and dorm rooms or kidney donors and receivers). In this seminar, we think about ways to either design new markets or how we could alter existing ones in a socially beneficial way. Alternatively, research ideas could focus on finding failures or shortcomings of ineffectively designed markets.

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.

V Topics on Political Economics (Bachelor)

2560140, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Workload
About 90 hours.

V Topics on Political Economics (Master)

2560142, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Workload
About 90 hours.

T 7.345 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102822 - Seminar Module Informatics

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2512300	Knowledge Discovery and Data Mining	3 SWS		Sure-Vetter, Färber, Nguyen, Weller
SS 2019	2513306	Data Science & Real-time Big Data Analytics	2 SWS		Sure-Vetter, Riemer, Zehnder
SS 2019	2513400	Emerging Trends in Critical Information Infrastructures	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2019	2595470	Seminar Service Science, Management & Engineering	2 SWS	Seminar (S)	Weinhardt, Nickel, Fichtner, Satzger, Sure-Vetter, Fromm
WS 19/20	2400125	Security and Privacy Awareness	2 SWS	Seminar (S)	Boehm, Seidel-Saul, Volkamer, Aldag, Gerber, Gottschalk
WS 19/20	2512301	Linked Data and the Semantic Web	3 SWS		Sure-Vetter, Acosta Deibe, Käfer, Heling
WS 19/20	2512311	Real-World Challenges in Data Science and Analytics	3 SWS		Sure-Vetter, Nickel, Weinhardt, Zehnder, Brandt
WS 19/20	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar (S)	Zöllner
WS 19/20	2595470	Seminar Service Science, Management & Engineering	3 SWS	Seminar (S)	Weinhardt, Satzger, Nickel, Fromm, Fichtner, Sure-Vetter
Exams					
SS 2019	7900090	Data Science & Real-time Big Data Analytics		Prüfung (PR)	Sure-Vetter
SS 2019	7900092	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
SS 2019	7900094	Knowledge Discovery and Data Mining		Prüfung (PR)	Sure-Vetter
SS 2019	7900114	Selected Issues in Critical Information Infrastructures		Prüfung (PR)	Sunyaev
SS 2019	7900187	Emerging Trends in Critical Information Infrastructures		Prüfung (PR)	Sunyaev
WS 19/20	7900038	Linked Data and the Semantic Web		Prüfung (PR)	Sure-Vetter
WS 19/20	7900044	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
WS 19/20	7900129	Security and Privacy Awareness		Prüfung (PR)	Volkamer
WS 19/20	7900187	Real-World Challenges in Data Science und Analytics		Prüfung (PR)	Sure-Vetter

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

Knowledge Discovery and Data Mining

2512300, SS 2019, 3 SWS, Language: English, Open in study portal

Description
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.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- 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

Data Science & Real-time Big Data Analytics

2513306, SS 2019, 2 SWS, Language: German/English, Open in study portal

Description
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.

V

Seminar Service Science, Management & Engineering

2595470, SS 2019, 2 SWS, Language: German, Open in study portal

Seminar (S)

Learning Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.

V Security and Privacy Awareness
2400125, WS 19/20, 2 SWS, Open in study portal — **Seminar (S)**

Notes
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.

Dates:

- Kick-Off (with topic placing): 25.10.19, 11:30-13:00 Building 5.20 Room 1C-01
- Final version: 10.03.20
- Presentation: 25.03.20

Topics will be assigned at the Kick-Off.

Further information about the concrete topics will follow shortly.

ATTENTION: The seminar is only for MASTER students!

V Linked Data and the Semantic Web
2512301, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Notes
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 Real-World Challenges in Data Science and Analytics
2512311, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Notes
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 Service Science, Management & Engineering

2595470, WS 19/20, 3 SWS, Language: German, Open in study portal

Seminar (S)

Notes
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis (15-20 pages), a presentation and active participation in class.

The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Learning objectives:

The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- 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.

Recommendations:

Lecture *eServices* [2595466] is recommended.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

T 7.346 Course: Seminar in Information Systems (Master) [T-WIWI-109827]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104815 - Seminar Information Systems

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Exams				
SS 2019	7900261	Information Systems and Design (ISSD) Seminar	Prüfung (PR)	Mädche

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.

T 7.347 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar (S)	Stein, Mohr, Neumann
SS 2019	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack, Assistenten
SS 2019	2550491	Seminar zur diskreten Optimierung	SWS	Block (B)	Nickel, Mitarbeiter
WS 19/20	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack, Sinske
WS 19/20	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar (S)	Nickel, Mitarbeiter
Exams					
SS 2019	00025	Seminar in Operations Research A (Master)		Prüfung (PR)	Nickel
SS 2019	7900018_SS2019	Seminar in Operations Research A (Master)		Prüfung (PR)	Stein
SS 2019	7900251	Seminar in Operations Research A (Master)		Prüfung (PR)	Nickel

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 zur diskreten Optimierung

2550491, SS 2019, SWS, Language: German, Open in study portal

Block (B)

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

V

Seminar: Modern OR and Innovative Logistics

2550491, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

T 7.348 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, Görgen
Exams					
SS 2019	7900150	Advanced Topics in Econometrics, Seminar in Statistics A (Master)		Prüfung (PR)	Schienle
SS 2019	7900250	Data Mining and Applications (Projectseminar)		Prüfung (PR)	Nakhaeizadeh

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 Advanced Topics in Econometrics

2521310, SS 2019, 2 SWS, Language: English, Open in study portal — **Seminar (S)**

Annotation
The course will be offered in English.

T 7.349 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	Version
Examination of another type	3	1

Events					
SS 2019	2400011	Hot Topics in Bioinformatics	2 SWS	Seminar (S)	Stamatakis
SS 2019	24344	Advanced Methods of Information Fusion	2 SWS	Seminar (S)	Hanebeck, Radtke
WS 19/20	24844	Seminar: Ubiquitous Systems	2 SWS	Seminar (S)	Beigl, Pescara
Exams					
SS 2019	7500013	Advanced Methods of Information Fusion		Prüfung (PR)	Hanebeck, Noack
SS 2019	7500014	Seminar: Hot Topics in Bioinformatics		Prüfung (PR)	Stamatakis
SS 2019	7500040	Seminar Information Systems		Prüfung (PR)	Böhm
SS 2019	7500106	Title not available		Prüfung (PR)	Bless, Hartenstein, Mädche, Zitterbart, Boehm, Sunyaev
SS 2019	7500148	Proseminar: Practical Seminar: Interactive Analytics		Prüfung (PR)	Beigl, Mädche
SS 2019	7500149	Seminar: Designing and Conducting Experimental Studies		Prüfung (PR)	Beigl
SS 2019	7500162	Seminar: Ubiquitous Systems		Prüfung (PR)	Beigl, Riedel
SS 2019	7500198	Seminar in Security		Prüfung (PR)	Geiselmann, Müller-Quade, Hofheinz
SS 2019	7500199	Seminar in Cryptography		Prüfung (PR)	Geiselmann, Müller-Quade, Hofheinz
WS 19/20	7500021	Advanced Methods of Information Fusion		Prüfung (PR)	Hanebeck
WS 19/20	7500220	Seminar Ubiquitous Computing		Prüfung (PR)	Beigl

Below you will find excerpts from events related to this course:

V Advanced Methods of Information Fusion

24344, SS 2019, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Learning Content

- The students will research selected theoretical works of the field of information fusion and data analysis, and present the results to their colleagues.
- The Seminar will prepare the students to write their Master thesis.
- Moreover, the students will learn to work with LaTeX and Powerpoint.

T 7.350 Course: Seminar: Governance, Risk & Compliance [T-INFO-102047]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Version
Examination of another type	3	1

Events					
SS 2019	2400041	Governance, Risk & Compliance	2 SWS	Seminar (S)	Herzig
Exams					
SS 2019	7500140	Seminar: Legal Studies I		Prüfung (PR)	Dreier, Matz, Boehm

T 7.351 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2019	2400041	Governance, Risk & Compliance	2 SWS	Seminar (S)	Herzig
SS 2019	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar (S)	Bless, Boehm, Hartenstein, Mädche, Sunyaev, Zitterbart
SS 2019	24820	Current Issues in Patent Law	2 SWS	Seminar (S)	Melullis
WS 19/20	24389	IT-Sicherheit und Recht	2 SWS	Seminar (S)	Schallbruch
Exams					
SS 2019	7500106	Title not available		Prüfung (PR)	Bless, Hartenstein, Mädche, Zitterbart, Boehm, Sunyaev
SS 2019	7500140	Seminar: Legal Studies I		Prüfung (PR)	Dreier, Matz, Boehm
SS 2019	7500159	Seminar: Legal Studies I		Prüfung (PR)	Marsch

Below you will find excerpts from events related to this course:

V Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung

Seminar (S)

2400061, SS 2019, 2 SWS, Open in study portal

Notes
Registration via https://portal.wiwi.kit.edu/ys/2708

T 7.352 Course: Service Analytics [T-WIWI-102809]

Responsible: Prof. Dr. Hansjörg Fromm
Prof.Dr. Thomas Setzer

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104814 - Information Systems: Analytical and Interactive Systems

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2595501	Service Analytics A	2 SWS	Lecture (V)	Fromm, Setzer
SS 2019	2595502	Übung zu Service Analytics A	1 SWS	Practice (Ü)	Baier, Kühl

Competence Certificate
The assessment consists of a written exam (60 min). By successful completion of the exercises 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
The lecture is addresed to students with interests and basic knowledge in the topics of Operations Research, decritptive and inductive statistics.

Below you will find excerpts from events related to this course:

V Service Analytics A

2595501, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Today's service-oriented companies are starting to optimize the way services are planned, operated, and personalized by analyzing vast amounts of data from customers, IT-systems, or sensors. As the statistical learning and business optimization world continues to progress, skills and expertise in advanced data analytics and data and fact-based optimization become vital for companies to be competitive. In this lecture, relevant methods and tools will be considered as a package, with a strong focus on their inter-relations. Students will learn to analyze and structure large amounts of potentially incomplete and unreliable data, to apply multivariate statistics to filter data and to extract key features, to predict future behavior and system dynamics, and finally to formulate data and fact-based service planning and decision models.

More specifically, the lessons of this lecture will include:

- Co-Creation of Value Across Enterprises
- Instrumentation, Measurement, Monitoring of Service Systems
- Descriptive, predictive, and prescriptive Analytics
- Usage Characteristics and Customer Dynamics
- Big Data, Dimensionality Reduction, and Real-Time Analytics
- System Models and What-If-Analysis
- Robust Mechanisms for Service Management
- Industry Applications of Service Analytics

Tutorials
Students will conduct lecture accompanying, guided exercises throughout the semester.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- The Geometry of Multivariate Statistics, Wickens, T. D., Psychology Press, 2014.
- Data Mining: Concepts and Techniques, Han, J., Pei, J., Kamber, M., Elsevier, 2011.
- Data Mining and Analysis, Zaki, M. J., Meira Jr, W., Meira, W., Cambridge University Press, 2014.
- An Introduction to Statistical Learning with Applications in R, James, G. et al., Springer, 2013.
- Forecasting – Principles and Practice, Hyndman, R. J., Athanasopoulos, G., OTexts, 2018.
- Fundamentals of Predictive Text Mining, Weiss S. M. et al., Springer, 2015.

Paper:

- How Big Data can make Big Impact: Findings from a systematic review and a longitudinal case study. International Journal of Production Economics, 2015.
- Business Intelligence and Analytics: from Big Data to Big Impact, Chen, H. et al., MIS quarterly, 2012.
- Building Watson – An Overview of the DeepQA Project, Ferrucci, D. et al., AI Magazine, 2010.

Further readings will be provided in the lecture.

T 7.353 Course: Service Analytics A [T-WIWI-105778]

Responsible: Prof. Dr. Hansjörg Fromm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101470 - Data Science: Advanced CRM
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2595501	Service Analytics A	2 SWS	Lecture (V)	Fromm, Setzer
SS 2019	2595502	Übung zu Service Analytics A	1 SWS	Practice (Ü)	Baier, Kühl
Exams					
SS 2019	7900220	Service Analytics A		Prüfung (PR)	Fromm, Setzer
SS 2019	7900293	Service Analytics A		Prüfung (PR)	Fromm, Setzer
WS 19/20	7900086	Service Analytics A		Prüfung (PR)	Fromm

Competence Certificate
The assessment consists of a written exam (60 min) according to §4(2), 1 of the examination regulations.

Prerequisites
None

Recommendation
The lecture is addresed to students with interests and basic knowledge in the topics of Operations Research, decritptive and inductive statistics.

Below you will find excerpts from events related to this course:

V Service Analytics A

2595501, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Today's service-oriented companies are starting to optimize the way services are planned, operated, and personalized by analyzing vast amounts of data from customers, IT-systems, or sensors. As the statistical learning and business optimization world continues to progress, skills and expertise in advanced data analytics and data and fact-based optimization become vital for companies to be competitive. In this lecture, relevant methods and tools will be considered as a package, with a strong focus on their inter-relations. Students will learn to analyze and structure large amounts of potentially incomplete and unreliable data, to apply multivariate statistics to filter data and to extract key features, to predict future behavior and system dynamics, and finally to formulate data and fact-based service planning and decision models.

More specifically, the lessons of this lecture will include:

- Co-Creation of Value Across Enterprises
- Instrumentation, Measurement, Monitoring of Service Systems
- Descriptive, predictive, and prescriptive Analytics
- Usage Characteristics and Customer Dynamics
- Big Data, Dimensionality Reduction, and Real-Time Analytics
- System Models and What-If-Analysis
- Robust Mechanisms for Service Management
- Industry Applications of Service Analytics

Tutorials
Students will conduct lecture accompanying, guided exercises throughout the semester.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- The Geometry of Multivariate Statistics, Wickens, T. D., Psychology Press, 2014.
- Data Mining: Concepts and Techniques, Han, J., Pei, J., Kamber, M., Elsevier, 2011.
- Data Mining and Analysis, Zaki, M. J., Meira Jr, W., Meira, W., Cambridge University Press, 2014.
- An Introduction to Statistical Learning with Applications in R, James, G. et al., Springer, 2013.
- Forecasting – Principles and Practice, Hyndman, R. J., Athanasopoulos, G., OTexts, 2018.
- Fundamentals of Predictive Text Mining, Weiss S. M. et al., Springer, 2015.

Paper:

- How Big Data can make Big Impact: Findings from a systematic review and a longitudinal case study. International Journal of Production Economics, 2015.
- Business Intelligence and Analytics: from Big Data to Big Impact, Chen, H. et al., MIS quarterly, 2012.
- Building Watson – An Overview of the DeepQA Project, Ferrucci, D. et al., AI Magazine, 2010.

Further readings will be provided in the lecture.

T 7.354 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	Recurrence	Version
Examination of another type	12	Irregular	3

Exams				
SS 2019	7900217	Service Design Thinking	Prüfung (PR)	Satzger

Competence Certificate
Alternative exam assessment.

Prerequisites
The course is compulsory and must be examined.

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 7.355 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-102806 - Service Innovation, Design & Engineering
M-WIWI-104813 - Information Systems: Internet-based Markets and Services

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2595468	Service Innovation	2 SWS	Lecture (V)	Satzger
Exams					
SS 2019	7900221	Service Innovation		Prüfung (PR)	Satzger

Competence Certificate
The assessment consists of an 1h written exam and of assignments during the course.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Service Innovation

2595468, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
While innovation in manufacturing or agriculture can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice - while many organizations have a well-understood process for innovating in the product business - innovating in services is often still a fuzzy and complex undertaking.

In this lecture we will

- discuss the state of research
- compare product and service innovation
- understand how innovation diffusion works
- examine case studies of service innovation
- compare open vs. closed innovation
- learn how to leverage user communities to drive innovation and
- understand obstacles, and enablers and how to manage, incentivize and foster service innovation

Learning Content
While innovation in manufacturing can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice, while many organizations have a well-understood process for innovating in the product business, innovating in services is often still a fuzzy and complex undertaking. In this lecture we will discuss the state of research, compare product and service innovation and understand how innovation diffusion works. We examine case studies on service innovation, compare open vs. closed innovation and learn how to apply different innovation tools, methods and strategies (e.g. service design thinking as a human-centered approach to innovation or technology and strategic foresight, as methods supporting the generation of assumptions on the impact of technology).

Annotation
The credits have been changed from 5 to 4,5.

Workload
Total workload: approximately 136 hours

Attendance time: 30 hours

Self-study: 105 hours

Literature

- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.). (2015). Fundamentals of service systems (Vol. 12). Heidelberg: Springer.
- Lusch, R. F., & Nambisan, S. (2015). Service innovation: A service-dominant logic perspective. MIS quarterly, 39(1).
- Christensen, Clayton M. (2003).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.
- Chesbrough, H. W. (2011). Open services innovation - rethinking your business to grow and compete in a new era. 1. ed. San Francisco: Jossey-Bass.
- 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. 2. ed. Amsterdam: Academic Press

T 7.356 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	24137	Signals and Codes	2 SWS	Lecture (V)	Geiselmann, Müller-Quade
Exams					
SS 2019	7500179	Signals and Codes		Prüfung (PR)	Geiselmann, Müller-Quade

Below you will find excerpts from events related to this course:

V Signals and Codes

24137, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
The course covers essentially the question of how the exchange of information can be realized reliably and efficiently. The lecture gives an overview of how to secure signals against random errors. In signal theory, source coding and the Theorem of Shannon will be covered. In the coding theory part, 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.

T 7.357 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2019	2581025	Simulation Game in Energy Economics	2 SWS	Lecture / Practice (VÜ)	Genoese
Exams					
SS 2019	7981025	Simulation Game in Energy Economics		Prüfung (PR)	Fichtner

Competence Certificate
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Prerequisites
None

Recommendation
Visiting the course "Introduction to Energy Economics"

Annotation
See German version.

Below you will find excerpts from events related to this course:

V Simulation Game in Energy Economics

2581025, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Learning 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.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:

Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

T 7.358 Course: Simulation of Stochastic Systems [T-WIWI-106552]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103289 - Stochastic Optimization

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	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 7.359 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581023	(Smart) Energy Infrastructure	2 SWS	Lecture (V)	Ardone, Pustisek, Jochem
Exams					
SS 2019	7981023	Smart Energy Infrastructure		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Annotation
New course starting winter term 2017/2018.

T 7.360 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540452	Smart Grid Applications	2 SWS	Lecture (V)	Staudt, van Dinther
WS 19/20	2540453	Übung zu Smart Grid Applications	1 SWS	Lecture (V)	Staudt, Golla

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 7.361 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2520537	Social Choice Theory	2 SWS	Lecture (V)	Puppe, Müller
SS 2019	2520539	Übung zu Social Choice Theory	1 SWS	Practice (Ü)	Puppe, Müller
Exams					
SS 2019	7900239	Social Choice Theory		Prüfung (PR)	Puppe
SS 2019	7900240	Social Choice Theory		Prüfung (PR)	Puppe

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

Below you will find excerpts from events related to this course:

V Social Choice Theory

2520537, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
The course provides a comprehensive treatment of preference and judgement aggregation, including proofs of general results that have Arrow's famous impossibility theorem and Gibbard's oligarchy theorem as corollaries. The second part of the course is devoted to voting theory. Among other things, we prove the Gibbard-Satterthwaite theorem.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

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 7.362 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	Recurrence	Version
Examination of another type	4,5	Each term	2

Events					
WS 19/20	2512400	Sociotechnical Information Systems Development	3 SWS	Practical course (P)	Sunyaev, Sturm
Exams					
SS 2019	7900016	Sociotechnical Information Systems Development		Prüfung (PR)	Sunyaev

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 Sociotechnical Information Systems Development

2512400, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

Notes
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Learning objectives:

- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

T 7.363 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24667	Software Architecture and Quality	2 SWS	Lecture (V)	Reussner
Exams					
SS 2019	7500021	Software Architecture and Quality		Prüfung (PR)	Reussner
WS 19/20	7500032	Software Architecture and Quality		Prüfung (PR)	Reussner

T 7.364 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24660	Softwareentwicklung für moderne, parallele Plattformen	2 SWS	Lecture (V)	Tichy, Tillmann
Exams					
SS 2019	7500246	Software Development for Modern, Parallel Platforms		Prüfung (PR)	Tichy

T 7.365 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	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	24076	Software Engineering II	4 SWS	Lecture (V)	Reussner

Below you will find excerpts from events related to this course:

V Software Engineering II

24076, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

Description
Students learn methods and techniques for systematic software development. Advanced topics of software engineering are covered.

Literature
Craig Larman, Applying UML and Patterns, 3rd edition, Prentice Hall, 2004. More references will be provided in the lectures.

T 7.366 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	Recurrence	Version
Examination of another type	6	Each term	2

Events					
SS 2019	2424880	Projektorientiertes Softwarepraktikum (Parallele Numerik)	6 SWS	Practical course (P)	Karl, Alefeld, Hoffmann
WS 19/20	2400012	Projektorientiertes Software-Praktikum (Parallele Numerik)	4 SWS	Practical course (P)	Karl, Alefeld, Hoffmann, Becker
Exams					
SS 2019	7500188	Lab: Project oriented Software Lab (Parallel Numerics)		Prüfung (PR)	Karl

T 7.367 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2511208	Software Quality Management	2 SWS	Lecture (V)	Oberweis
SS 2019	2511209	Übungen zu Software-Qualitätsmanagement	1 SWS	Practice (Ü)	Oberweis, N.N.
Exams					
SS 2019	7900031	Software Quality Management		Prüfung (PR)	Oberweis
WS 19/20	7900027	Software Quality Management		Prüfung (PR)	Oberweis

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

Annotation
This course was formely named "Software Technology: Quality Management".

Below you will find excerpts from events related to this course:

V Software Quality Management

2511208, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning 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.

Annotation
This course was formely named "Software Technology: Quality Management".

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

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

Further literature is given in lectures.

T 7.368 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	24164	Software Evolution	2 SWS	Lecture (V)	Heinrich
Exams					
SS 2019	7500023	Software-Evolution		Prüfung (PR)	Reussner
WS 19/20	7500004	Software-Evolution		Prüfung (PR)	Reussner

T 7.369 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561260	Spatial Economics	2 SWS	Lecture (V)	Ott
WS 19/20	2561261		1 SWS	Practice (Ü)	Ott, Bälz
Exams					
SS 2019	7900103	Spatial Economics		Prüfung (PR)	Ott

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

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 is not offered in the winter term 2018/19.

Below you will find excerpts from events related to this course:

V Spatial Economics

2561260, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Notes
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 Content
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

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

Steven Brakman, Harry Garretsen, Charles van Marrewijk (2009), The New Introduction to Geographical Economics

Further literature recommendations will be announced in the course of the lecture.

T 7.370 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

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each term	2

Exams				
SS 2019	7900224	Special Topics in Information Systems	Prüfung (PR)	Weinhardt

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
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 Management and Engineering” so far. With this course students majoring in “Industrial Engineering and Management“ and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 7.371 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

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2521350	Statistische Modellierung von Allgemeinen Regressionsmodellen	2 SWS	Lecture (V)	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 Statistische Modellierung von Allgemeinen Regressionsmodellen

2521350, WS 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Annotation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Workload
The total workload for this course is approximately 135 hours (4.5 credits).

regular attendance: 30 hours

self-study: 65 hours

exam preparation: 40 hours

T 7.372 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2521331	Stochastic Calculus and Finance	2 SWS	Lecture (V)	Safarian

Competence Certificate
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.) and of possibble additional assignments during the course (§4 (3) SPO).

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 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus. Stochastic Processes, Brownian Motion and Martingales, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes. Stable and tempered stable processes. 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), Option pricing with tempered stable and Levy-Processes and volatility clustering, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem), Equilibrium models, Consumption-Based CAPM, Numerical Methods.

Learning Content
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus. Stochastic Processes, Brownian Motion and Martingales, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes. Stable and tempered stable processes. 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), Option pricing with tempered stable and Levy-Processes and volatility clustering, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem), Equilibrium models, Consumption-Based CAPM, Numerical Methods.

Stochastic processes (Poisson-process, Brownian motion, martingales), stochastic Integral (Integral, quadratic und co-variation, Ito-formula), stochastic differential equation for price-processes, trading strategies, option pricing(Feynman-Kac), neutral risk rating(equivalent martingale measure, Girsanov theorem), term structure models

Workload
The total workload for this course is approximately 150 hours. For further information see German version.

Literature
To be announced in lecture.
Elective literature:

- Dynamic Asset Pricing Theory, Third Edition. by Darrell Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models, by Steven E. Shreve , Springer, 2003
- An Introduction to Stochastic Integration (Probability and its Applications) by Kai L. Chung , Ruth J. Williams , Birkhaueser,
- Methods of Mathematical Finance by Ioannis Karatzas , Steven E. Shreve , Springer 1998
- Kim Y.S. ,Rachev S.T. ,Bianchi M-L, Fabozzi F. Financial market models with Levy processes and time-varying volatility, Journal of Banking and Finance, 32/7,1363-1378, 2008.
- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, Sixth Edition, (2005).

T 7.373 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	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	24113	Stochastic Information Processing	3 SWS	Lecture (V)	Hanebeck, Frisch
Exams					
SS 2019	7500010	Stochastic Information Processing		Prüfung (PR)	Hanebeck, Noack
WS 19/20	7500031	Stochastic Information Processing		Prüfung (PR)	Hanebeck

T 7.374 Course: Strategic Finance and Technoloy 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	Recurrence	Version
Written examination	1,5	Each winter term	1

Events					
WS 19/20	2530214	Strategic Finance and Technology Change	1 SWS	Lecture (V)	N.N.

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 7.375 Course: Strategic Management of Information Technology [T-WIWI-102669]

Responsible: Thomas Wolf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101477 - Development of Business Information Systems

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2019	2511602	Strategic Management of Information Technology	2 SWS	Lecture (V)	Wolf
SS 2019	2511603	Übungen zu Strategisches Management der betrieblichen Informationsverarbeitung	1 SWS	Practice (Ü)	Wolf
Exams					
SS 2019	7900034	Strategic Management of Information Technology		Prüfung (PR)	Wolf
WS 19/20	7900030	Strategic Management of Information Technology		Prüfung (PR)	Wolf

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

Below you will find excerpts from events related to this course:

V Strategic Management of Information Technology

2511602, SS 2019, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Learning Content
The following topics will be covered: strategic planing of ICT, architecture of ICT, overall planning of ICT, outsourcing, operation and controlling of ICT.

Literature

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995
- Heinrich, L. J., Burgholzer, P.: Informationsmanagement, Planung, Überwachung, Steuerung d. Inform.-Infrastruktur. Oldenbourg, München 1990
- Nolan, R.: Managing the crises in data processing. Harvard Business Review, Vol. 57, Nr. 2 1979
- Österle, H. et al.: Unternehmensführung und Informationssystem. Teubner, Stuttgart 1992
- Thome, R.: Wirtschaftliche Informationsverarbeitung. Verlag Franz Vahlen, München 1990

T 7.376 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
WS 19/20	2577921	Strategy and Management Theory: Developments and "Classics" (Master)	2 SWS	Seminar (S)	Lindstädt

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)

2577921, WS 19/20, 2 SWS, Language: German, Open in study portal

Notes
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.

Learning 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.

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

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

T 7.377 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	Recurrence	Version
Oral examination	5	Irregular	1

T 7.378 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	Recurrence	Version
Oral examination	3	Irregular	1

T 7.379 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	Recurrence	Version
Written examination	4,5	Each term	1

Competence Certificate
The assessment of this course is a written examination (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Prerequisites
None

T 7.380 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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581957	Supply Chain Management in the automotive industry	2 SWS	Lecture (V)	Lang, Heupel
Exams					
SS 2019	7981957	Supply Chain Management in the Automotive Industry		Prüfung (PR)	Schultmann

Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Supply Chain Management in the automotive industry

2581957, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content

- Automotive industry significance
- The automotive supply chain
- Adding value structures of the automotive supply chain and mastering of the production systems as factors of success in the SCM
- Strategic procurement logistics
- Risk management
- Quality engineering and management in the automotive supply chain
- Cost engineering and management in the automotive supply chain
- Purchasing (Supplier selection, contract management)
- Performance measurement of the supply chain / organization

Annotation
None.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be announced in the course.

T 7.381 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	Recurrence	Version
Written examination	3,5	Each summer term	1

Events					
SS 2019	2581961	Supply Chain Management with Advanced Planning Systems	2 SWS	Lecture (V)	Göbelt, Bosch
Exams					
SS 2019	7981961	Supply Chain Management with Advanced Planning Systems		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (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
None

Below you will find excerpts from events related to this course:

V Supply Chain Management with Advanced Planning Systems

2581961, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
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
3.4. Production Planning and Detailed Scheduling
3.5. Deployment
3.6. Transportation Planning and Vehicle Scheduling
3.7. [Optional] Global Available to Promise
4. SAP SCM in Practice
4.1. Success Stories
4.2. SAP Implementation Methodology

Annotation
This lecture has 3,5 Credits since summer term 2014.

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course

T 7.382 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24629	Symmetric encryption	2 SWS	Lecture (V)	Müller-Quade, Geiselmann
Exams					
SS 2019	7500070	Symmetric Encryption		Prüfung (PR)	Geiselmann, Müller-Quade

Competence Certificate
Es wird empfohlen, das Modul Sicherheit zu belegen.

Below you will find excerpts from events related to this course:

V Symmetric encryption

24629, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
This lecture provides the theoretical and practical aspects of symmetric cryptography. The most important topics are:

- Historical ciphers, if they are useful for assessing the security of current ciphers,
- block ciphers and the most important types of attacks (differential and linear cryptanalysis, meet-in-the-middle attacks, slide attacks),
- hash functions - the focus is on attacks and techniques to forge meaningful messages through the use of "meaningless collisions",
- security definitions for symmetric encryption schemes and their modes of operation.

T 7.383 Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	3

Events					
SS 2019	2550486	Taktisches und operatives SCM	2 SWS	Lecture (V)	Nickel
SS 2019	2550487	Übungen zu Taktisches und operatives SCM	1 SWS	Practice (Ü)	Pomes
Exams					
SS 2019	00026	Tactical and Operational Supply Chain Management		Prüfung (PR)	Nickel

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.

Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every 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 Taktisches und operatives SCM

2550486, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Description
Since the classical work 'Theory of the Location of Industries' of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connectedto strategical logistics planning. 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 allows an efficient flow of materials and leads to lower costs and increased customer service.
Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

Learning Content
The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models).The exercisesaccompanying the lecture offer the possibility to apply the considered models to practical problems.

Annotation
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Literature
Elective Literature

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T 7.384 Course: Tax Law I [T-INFO-101315]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	24168	Tax Law I	2 SWS	Lecture (V)	Dietrich
Exams					
SS 2019	7500052	Tax Law I		Prüfung (PR)	Dreier, Matz
WS 19/20	7500066	Tax Law I		Prüfung (PR)	Dreier, Matz

T 7.385 Course: Tax Law II [T-INFO-101314]

Responsible: Detlef Dietrich
Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	24646	Tax Law II	2 SWS	Lecture (V)	Dietrich
Exams					
SS 2019	7500053	Tax Law II		Prüfung (PR)	Dreier, Matz
WS 19/20	7500067	Tax Law II		Prüfung (PR)	Dreier, Matz

T 7.386 Course: Technical Conditions Met [T-WIWI-106623]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions

Type	Credits	Recurrence	Version
Completed coursework	0	Each term	1

Competence Certificate
This module element is intended to record the Bachelor-examination "Introduction to Game Theory". In the master module M-WIWI-101453 "Applied Strategic Decisions", this means that the obligatory course "Advanced Game Theory" is not required.

Prerequisites
None

T 7.387 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	Recurrence	Version
Examination of another type	3	Each winter term	2

Events					
WS 19/20	2545106	Technologies for Innovation Management	2 SWS	Block (B)	Koch
Exams					
WS 19/20	7900239	Technologies for Innovation Management		Prüfung (PR)	Weissenberger-Eibl

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 19/20, 2 SWS, Language: German, Open in study portal

Block (B)

Notes
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.

Learning 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
Will be announced in the first session.

T 7.388 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.

T 7.389 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561232	Telecommunication and Internet Economics	2 SWS	Lecture (V)	Mitusch
WS 19/20	2561233	Übung zu Telekommunikations- und Internetökonomie	1 SWS	Practice (Ü)	Mitusch, Wisotzky
Exams					
SS 2019	7900276	Telecommunication and Internet Economics		Prüfung (PR)	Mitusch

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.

Below you will find excerpts from events related to this course:

V Telecommunication and Internet Economics

2561232, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content
Among the network sectors the telecommunication and internet sector is the most dynamic one and the one with and highest variety of phenomena. Problems of natural monopoly still exist in some parts. But there is also competition, not only at the service level but also at the infrastructural level. Both levels are characterized by (vertical) quality differentiations and by high technology dynamics. What should the regulation of this sector look like? How should the mutual network access prices of two telecommunication providers be regulated and how can regulators set incentives for infrastructure investments?

The internet is a free market par excellence, because everybody can open internet businesses without high entry costs. Why then can a company like ebay dominate the market for internet-auction platforms so strongly? The causes of market concentration on the internet will be analyzed. So will be the economic implications of the Next Generations Networks.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
J.-J. Laffont, J. Tirole (2000): Competition in Telecommunications, MIT Press.

Zarnekow, Wulf, Bronstaedt (2013): Internetwirtschaft: Das Geschäft des Datentransports im Internet.

Further literature will be provided during the lecture

T 7.390 Course: Telecommunications Law [T-INFO-101309]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2019	24632	Telekommunikationsrecht	2 SWS	Lecture (V)	Hermstrüwer
Exams					
SS 2019	7500085	Telecommunications Law		Prüfung (PR)	Marsch

T 7.391 Course: Telematics [T-INFO-101338]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-100801 - Telematics

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	24128	Telematics	3 SWS	Lecture (V)	Bauer, Friebe, Heseding, Hock, Zitterbart
Exams					
SS 2019	7500115	Telematics		Prüfung (PR)	Zitterbart

Below you will find excerpts from events related to this course:

V Telematics

24128, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture (V)

Description
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

T 7.392 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2019	24637	Testing Digital Systems I	2 SWS	Lecture (V)	Tahoori
Exams					
SS 2019	7500008	Testing Digital Systems I		Prüfung (PR)	Tahoori
WS 19/20	7500039	Testing Digital Systems I		Prüfung (PR)	Tahoori

Below you will find excerpts from events related to this course:

V Testing Digital Systems I

24637, SS 2019, 2 SWS, Language: English, Open in study portal

Lecture (V)

Learning Content
Testing of digital circuits plays a critical role during the design and manufacturing cycles. It also ensure the quality of parts shipped to the customers. Test generation and design for testability are integral parts of automated design flow of all electronics products. The objective of this course is to provide the foundations for developing test methods for digital systems and provides the techniques necessary to practice design for testability.

This course encompasses the theoretical and practical aspects of digital systems testing and the design of easily testable circuits. Topics include Introduction to Testing (testing definition, types of test, automatic test equipments, test economics, and quality models), Failures and Errors (definitions, failure modes, failure mechanisms, reliability defects), Faults (fault models, stuck-at faults, bridging faults, timing faults, transistor-level faults, functional-level faults, effectiveness of different fault models based on real data), Logic and Fault Simulation (fault equivalence and fault collapsing, true-value simulation, fault simulation algorithms, statistical methods), Test Generation for Combinational Circuits (algebraic methods, path-tracing (D-alg, PODEM, FAN), testability metrics, test file compression), Digital Design-For-Testability and Internal Scan Design (ad-hoc methods, scan architectures, scan-based test methodology).

For further information: http://cdnc.itec.kit.edu/

Workload
2 SWS / 3 ECTS

T 7.393 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	Recurrence	Version
Oral examination	3	Each summer term	1

Exams				
SS 2019	7500069	Testing Digital Systems II	Prüfung (PR)	Tahoori
WS 19/20	7500147	Testing Digital Systems II	Prüfung (PR)	Tahoori

T 7.394 Course: Theory of Endogenous Growth [T-WIWI-102785]

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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561503	Theory of endogenous growth	2 SWS	Lecture (V)	Ott
WS 19/20	2561504		1 SWS	Practice (Ü)	Ott, Eraydin
Exams					
SS 2019	7900105	Theory of Endogenous Growth		Prüfung (PR)	Ott

Competence Certificate
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. 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.

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 is not offered in the winter term 2018/19.

Below you will find excerpts from events related to this course:

V Theory of endogenous growth

2561503, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Learning Content

- Basic models of endogenous growth
- Human capital and economic growth
- Modelling of technological progress
- Diversity Models
- Schumpeterian growth
- Directional technological progress
- Diffusion of technologies

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Excerpt:

- Acemoglu, D. (2008): Introduction to modern economic growth. Princeton University Press, New Jersey.
- Aghion, P., Howitt, P. (2009): Economics of growth, MIT-Press, Cambridge/MA.
- Barro, R.J., Sala-I-Martin, X. (2003): Economic Growth. MIT-Press, Cambridge/MA.
- Sydsaeter, K., Hammond, P. (2008): Essential mathematics for economic analysis. Prentice Hall International, Harlow.
- Sydsæter, K., Hammond, P., Seierstad, A., Strom, A., (2008): Further Mathematics for Economic Analysis, Second Edition, Pearson Education Limited, Essex.

T 7.395 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	Recurrence	Version
Written examination	4,5	Irregular	1

Exams				
SS 2019	791192ee	Topics in Experimental Economics	Prüfung (PR)	Reiß

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 7.396 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	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24136	Trademark and Unfair Competition Law	2 SWS	Lecture (V)	Matz
Exams					
SS 2019	7500051	Trademark and Unfair Competition Law		Prüfung (PR)	Dreier, Matz
WS 19/20	7500061	Trademark and Unfair Competition Law		Prüfung (PR)	Dreier, Matz

T 7.397 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2019	2560230	Transport Economics	SWS	Lecture (V)	Mitusch, Szimba
SS 2019	2560231	Übung zu Transportökonomie	SWS	Practice (Ü)	Mitusch, Wisotzky, Szimba
Exams					
SS 2019	7900275	Transport Economics		Prüfung (PR)	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 2019, SWS, Language: German, Open in study portal

Lecture (V)

Learning 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

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Will be announced in the lecture.
(for literature to prepare the lecture - see additional literature)

Literature:

Aberle, G: Transportwirtschaft: einzelwirtschaftliche und gesamtwirtschaftliche Grundlagen München; Wien: Oldenbourg, 2003.

Blauwens, G., De Baere, P. and Van der Voorde, E. (2006): Transport Economics.

Frerich, J; Müller, G: Europäische Verkehrspolitik, Landverkehrspolitik München; Wien: Oldenbourg, 2004.

Dasgupta, A, Pearce, D (1972): Cost-Benefit Analysis, MacMillan, London.

Europäische Kommission (2008): Guide to Cost Benefit Analysis of Investment Projects, online unter http://ec.europa.eu/regional_policy/sources/Ben-Akiva, M., Meerseman, H., and Van de Voorde, E. (2008): Recent developments in transport modelling: Lessons for the freight sector.

Ortúzar, J. d. D. and Willumsen, L. (1990): Modelling Transport.

T 7.398 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	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	24146	Ubiquitäre Informationstechnologien	2+1 SWS	Lecture / Practice (VÜ)	Beigl
Exams					
SS 2019	7500122	Ubiquitous Computing		Prüfung (PR)	Beigl
SS 2019	7500122_191021	Ubiquitous Computing		Prüfung (PR)	Beigl

T 7.399 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530212	Valuation	2 SWS	Lecture (V)	Ruckes
WS 19/20	2530213	Übungen zu Valuation	1 SWS	Practice (Ü)	Ruckes, Stengel
Exams					
SS 2019	7900072	Valuation		Prüfung (PR)	Ruckes

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Valuation

2530212, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Description
Firms prosper when they create value for their shareholders and stakeholders. This is achieved by investing in projects that yield higher returns than their according cost of capital. Students are told the basic tools for firm and project valuation as well as ways to implement these tools in order to enhance a firm's value and improve its investment decisions. Among other things, the course will deal with the valuation of firms and individual projects using discounted cash flow and relative valuation approaches and the valuation of flexibility deploying real options.

Learning Content
Topics:

- Projections of cash flows
- Estimation of the cost of capital
- Valuation of the firm
- Mergers and acquisitions
- Real options

Literature
Elective Literature

Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T 7.400 Course: Visualization [T-INFO-101275]

Responsible: Prof. Dr.-Ing. Carsten Dachsbacher
Organisation: KIT Department of Informatics
Part of: M-INFO-100738 - Visualization

Type	Credits	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
WS 19/20	24183	Visualisation	2 SWS	Lecture (V)	Dachsbacher
Exams					
SS 2019	7500193	Visualization		Prüfung (PR)	Dachsbacher

T 7.401 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	Recurrence	Version
Written examination	4	Each summer term	3

Events					
SS 2019	2400062	Wearable Robotic Technologies	2 SWS	Lecture (V)	Asfour, Beigl, Beil
Exams					
SS 2019	7500219	Wearable Robotic Technologies		Prüfung (PR)	Asfour
WS 19/20	7500073	Wearable Robotic Technologies		Prüfung (PR)	Asfour

Below you will find excerpts from events related to this course:

V Wearable Robotic Technologies

2400062, SS 2019, 2 SWS, Language: German/English, Open in study portal

Lecture (V)

Learning 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.

Workload
120h

T 7.402 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	24677	Web Applications and Service oriented Architectures (II)	2 SWS	Lecture (V)	Abeck
Exams					
SS 2019	7500138	Web Applications and Service-oriented Architectures (II)		Prüfung (PR)	Abeck

Below you will find excerpts from events related to this course:

V Web Applications and Service oriented Architectures (II)

24677, SS 2019, 2 SWS, Language: German, Open in study portal

Lecture (V)

Notes

Students, who want to take the oral exam of Prof. Abeck, must be present in the first lecture appointment on Wednesday, 26.04.2017 at 9:45 in seminar room 301.

T 7.403 Course: Web Science [T-WIWI-103112]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101455 - Web Data Management
M-WIWI-101457 - Semantic Technologies
M-WIWI-102827 - Service Computing

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511312	Web Science	2 SWS	Lecture (V)	Sure-Vetter
WS 19/20	2511313	Exercises to Web Science	1 SWS	Practice (Ü)	Sure-Vetter, Heling
Exams					
SS 2019	7900032	Web Science		Prüfung (PR)	Sure-Vetter
WS 19/20	7900031	Web Science		Prüfung (PR)	Sure-Vetter

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

Annotation
New course starting winter term 2015/2016.

Below you will find excerpts from events related to this course:

V **Web Science** — **Lecture (V)**
2511312, WS 19/20, 2 SWS, Language: English, Open in study portal

Notes
The lecture provides insights into the analysis of social networks and the used metrics. Thereby, in particular, web phenomena and the available technologies are considered.

Web Science is the emergent study of the people and technologies, applications, processes and practices that shape and are shaped by the World Wide Web. Web Science aims to draw together theories, methods and findings from across academic disciplines, and to collaborate with industry, business, government and civil society, to develop our knowledge and understanding of the Web: the largest socio-technical infrastructure in human history.

The lecture provides an introduction to basic concepts of Web Science. Essential theoretical foundations, phenomena and approaches are presented and explained.

This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Learning objectives:

The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

V

Exercises to Web Science

2511313, WS 19/20, 1 SWS, Language: English, Open in study portal

Practice (Ü)

Notes
The exercises are related to the lecture Web Science.

Multiple exercises are held that capture the topics, held in the lecture Web Scienceand discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Learning objectives:

The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.

T 7.404 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
SS 2019	2577912	Workshop Business Wargaming - Analyzinig Strategic Interactions	2 SWS	Seminar (S)	Lindstädt
WS 19/20	2577922	Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)	2 SWS	Seminar (S)	Lindstädt
Exams					
SS 2019	7900071	Workshop Business Wargaming – Analyzing Strategic Interactions		Prüfung (PR)	Lindstädt

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 - Analyzinig Strategic Interactions

2577912, SS 2019, 2 SWS, Language: German, Open in study portal — **Seminar (S)**

Notes
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.

Learning Content
In this course, students simulate and analyze real-life conflict situations using Business Wargaming methods. The students will be able to understand the underlying structure and dynamics of various conflicts, this includes making own conclusions as well as deriving strategic recommendations.

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

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

V

Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)

Seminar (S)

2577922, WS 19/20, 2 SWS, Language: German, Open in study portal

Learning 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.

Annotation
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.

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

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

T 7.405 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
SS 2019	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar (S)	Lindstädt
Exams					
SS 2019	7900122	Workshop Current Topics in Strategy and Management		Prüfung (PR)	Lindstädt

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 2019, 2 SWS, Language: German, Open in study portal — **Seminar (S)**

Notes
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.

Learning 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.

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

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a