Module Handbook
Economics Engineering M.Sc.

SPO 2015

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KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT

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1 General information

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

1.1 Structural elements

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

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

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

1.2 Begin and completion of a module

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

1.3 Module versions

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

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

1.4 General and partial examinations

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

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

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

1.5 Types of exams

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

Caution: exam type dependent on further pandemic developments

Due to the current situation, online formats are also available for examinations that are typically offered as **presence examinations**, depending on the circumstances.

All assessments that are announced in the modules as a written exam (written exam/sP according to SPO § 4 Abs. 2, Pkt. 1) can therefore also be offered as an alternative exam assessment/PLaA (according to SPO § 4 Abs. 2, Pkt. 3) depending on further pandemic developments. And vice versa. As alternative examination formats, **a) online examinations with video supervision** (sP) and optionally a face-to-face examination in the same examination period are offered. Or **b)** the **Online Open Book exam** (PLaA) format.

This option applies to all modules and assessments listed in the module handbook, regardless of whether or not corresponding references are already made to them there. It is also at the discretion of the responsible examiners whether they allow a 'free shot' for their examination when determining the type of examination.

1.6 Repeating exams

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

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

1.7 Examiners

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

1.8 Additional accomplishments

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

1.9 Further information

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

Information around the legal and official framework of the study program can be found in the respective study and examination regulations of your study program. These are available under the Official Announcements of KIT (http://www.sle.kit.edu/amtlicheBekanntmachungen.php).

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

1.10 Contact

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

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2 Study plan

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

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

Term	Credits	Business Administration	Economics	Informatics	Operations Research	Electives 1	Electives 2	Master Thesis
1	27	BUS 9 CP	ECON 9 CP	INFO 9 CP	OR 9 CP	Seminar Module 9 CP	Elect. Module 3 9 CP	
2	31					Elect. Module 1 9 CP		
3	32		ECON 9 CP			Elect. Module 2 9 CP	Elect. Module 4 9 CP	
4	30							Master Thesis 30 CP
	120							

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

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

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

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

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

They have generalized or specialized expertise in the different disciplines.

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

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

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

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

4 Key Skills

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

Soft skills

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

Enabling skills

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

Orientational knowledge

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

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

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

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

5 Field of study structure

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

5.1 Master's Thesis

Credits 30

Mandatory		
M-WIWI-101659	Module Master's Thesis	30 CR

Modelled Conditions

The following conditions have to be fulfilled:

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

5.2 Economics

Credits 18

Economics (Election: 2 items)		
M-WIWI-101497	Agglomeration and Innovation	9 CR
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-101514	Innovation Economics	9 CR
M-WIWI-101478	Innovation and Growth	9 CR
M-WIWI-101500	Microeconomic Theory	9 CR
M-WIWI-101406	Network Economics	9 CR
M-WIWI-101638	Econometrics and Statistics I	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

5.3 Business Administration

Credits
9

Business Administration (Election: 1 item)		
M-WIWI-105659	Advanced Machine Learning and Data Science	9 CR
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-105714	Consumer Research	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-103117	Data Science: Data-Driven Information Systems	9 CR
M-WIWI-101647	Data Science: Evidence-based Marketing	9 CR
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	9 CR
M-WIWI-104080	Designing Interactive Information Systems	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-WIWI-101409	Electronic Markets	9 CR
M-WIWI-101451	Energy Economics and Energy Markets	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101488	Entrepreneurship (EnTechnon)	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research neu	9 CR
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations neu	9 CR
M-WIWI-101471	Industrial Production II	9 CR
M-WIWI-101412	Industrial Production III	9 CR
M-WIWI-101411	Information Engineering	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-WIWI-101507	Innovation Management	9 CR
M-WIWI-105312	Marketing and Sales Management	9 CR
M-WIWI-101446	Market Engineering	9 CR
M-WIWI-101506	Service Analytics	9 CR
M-WIWI-101448	Service 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-105010	Student Innovation Lab (SIL) 1	9 CR

5.4 Informatics

Credits
9

Informatics (Election: 1 item)		
M-WIWI-101472	Informatics	9 CR

5.5 Operations Research

Credits
9

Operations Research (Election: 1 item)		
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

5.6 Compulsory Elective Modules 1

Credits
27

Election notes

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

Mandatory		
M-WIWI-101808	Seminar Module	9 CR

Economics (Election: at most 9 credits)		
M-WIWI-101497	Agglomeration and Innovation	9 CR
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-101638	Econometrics and Statistics I	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

Business Administration (Election: at most 9 credits)		
M-WIWI-105659	Advanced Machine Learning and Data Science	9 CR
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-105714	Consumer Research	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-103117	Data Science: Data-Driven Information Systems	9 CR
M-WIWI-101647	Data Science: Evidence-based Marketing	9 CR
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	9 CR
M-WIWI-104080	Designing Interactive Information Systems	9 CR
M-WIWI-102808	Digital Service Systems in Industry	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-WIWI-101409	Electronic Markets	9 CR
M-WIWI-101451	Energy Economics and Energy Markets	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101488	Entrepreneurship (EnTechnon)	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research neu	9 CR
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations neu	9 CR
M-WIWI-101471	Industrial Production II	9 CR
M-WIWI-101412	Industrial Production III	9 CR
M-WIWI-101411	Information Engineering	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-WIWI-101507	Innovation Management	9 CR
M-WIWI-105312	Marketing and Sales Management	9 CR
M-WIWI-101446	Market Engineering	9 CR
M-WIWI-101506	Service Analytics	9 CR
M-WIWI-101503	Service Design Thinking	9 CR
M-WIWI-102754	Service Economics and Management	9 CR
M-WIWI-102806	Service Innovation, Design & Engineering	9 CR
M-WIWI-101448	Service Management	9 CR

M-WIWI-103119	Advanced Topics in Strategy and Management	9 CR
M-WIWI-105010	Student Innovation Lab (SIL) 1	9 CR
M-WIWI-105011	Student Innovation Lab (SIL) 2	9 CR
Informatics (Election: at most 9 credits)		
M-WIWI-101628	Emphasis in Informatics	9 CR
M-WIWI-101630	Electives in Informatics	9 CR
Operations Research (Election: at most 9 credits)		
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
Natural and Engineering Sciences (Election: at most 9 credits)		
M-MACH-101298	Automated Manufacturing Systems	9 CR
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-MACH-101290	BioMEMS	9 CR
M-BGU-105592	Digitalization in Facility Management	9 CR
M-MACH-101296	Energy and Process Technology I	9 CR
M-MACH-101297	Energy and Process Technology II	9 CR
M-ETIT-101164	Generation and Transmission of Renewable Power	9 CR
M-BGU-105597	Facility Management in Hospitals	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-MACH-101282	Global Production and Logistics	9 CR
M-BGU-101064	Fundamentals of Transportation	9 CR
M-CIWVT-101120	Principles of Food Process Engineering	9 CR
M-ETIT-101163	High-Voltage Technology	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-BGU-101884	Lean Management in Construction	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101278	Material Flow in Networked Logistic Systems	9 CR
M-MACH-101291	Microfabrication	9 CR
M-MACH-101292	Microoptics	9 CR
M-MACH-101293	Microsystem Technology	9 CR
M-MACH-101294	Nanotechnology	9 CR
M-WIWI-104837	Natural Hazards and Risk Management	9 CR
M-MACH-101295	Optoelectronics and Optical Communication	9 CR
M-BGU-101888	Project Management in Construction	9 CR
M-ETIT-101157	Control Engineering II	9 CR
M-MACH-105455	Strategic Design of Modern Production Systems	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-BGU-101110	Process Engineering in Construction	9 CR
M-BGU-101065	Transportation Modelling and Traffic Management	9 CR
M-MACH-101284	Specialization in Production Engineering	9 CR
M-CIWVT-101119	Specialization in Food Process Engineering	9 CR
M-MACH-104888	Advanced Module Logistics	9 CR
M-MACH-101283	Virtual Engineering A	9 CR
M-MACH-101281	Virtual Engineering B	9 CR

M-CIWVT-101121	Water Chemistry and Water Technology I	9 CR
M-CIWVT-101122	Water Chemistry and Water Technology II	12 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Statistics (Election: at most 9 credits)		
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

5.7 Compulsory Elective Modules 2	Credits 18

Election notes

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

Economics (Election: at most 9 credits)		
M-WIWI-101497	Agglomeration and Innovation	9 CR
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-101638	Econometrics and Statistics I	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
Business Administration (Election: at most 9 credits)		
M-WIWI-105659	Advanced Machine Learning and Data Science	9 CR
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-105714	Consumer Research	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-103117	Data Science: Data-Driven Information Systems	9 CR
M-WIWI-101647	Data Science: Evidence-based Marketing	9 CR
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	9 CR
M-WIWI-104080	Designing Interactive Information Systems	9 CR
M-WIWI-102808	Digital Service Systems in Industry	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-WIWI-101409	Electronic Markets	9 CR
M-WIWI-101451	Energy Economics and Energy Markets	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101488	Entrepreneurship (EnTechnon)	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research [neu]	9 CR
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations [neu]	9 CR
M-WIWI-101411	Information Engineering	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-WIWI-101471	Industrial Production II	9 CR
M-WIWI-101412	Industrial Production III	9 CR
M-WIWI-101507	Innovation Management	9 CR
M-WIWI-105312	Marketing and Sales Management	9 CR
M-WIWI-101446	Market Engineering	9 CR
M-WIWI-101506	Service Analytics	9 CR
M-WIWI-101503	Service Design Thinking	9 CR
M-WIWI-102754	Service Economics and Management	9 CR
M-WIWI-102806	Service Innovation, Design & Engineering	9 CR
M-WIWI-101448	Service Management	9 CR
M-WIWI-103119	Advanced Topics in Strategy and Management	9 CR
M-WIWI-105010	Student Innovation Lab (SIL) 1	9 CR

M-WIWI-105011	Student Innovation Lab (SIL) 2	9 CR
Informatics (Election: at most 9 credits)		
M-WIWI-101628	Emphasis in Informatics	9 CR
M-WIWI-101630	Electives in Informatics	9 CR
Operations Research (Election: at most 9 credits)		
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
Natural and Engineering Sciences (Election: at most 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101298	Automated Manufacturing Systems	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-MACH-101290	BioMEMS	9 CR
M-BGU-105592	Digitalization in Facility Management	9 CR
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M-MACH-101297	Energy and Process Technology II	9 CR
M-ETIT-101164	Generation and Transmission of Renewable Power	9 CR
M-BGU-105597	Facility Management in Hospitals	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-MACH-101282	Global Production and Logistics	9 CR
M-BGU-101064	Fundamentals of Transportation	9 CR
M-CIWVT-101120	Principles of Food Process Engineering	9 CR
M-ETIT-101163	High-Voltage Technology	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-BGU-101884	Lean Management in Construction	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101278	Material Flow in Networked Logistic Systems	9 CR
M-MACH-101291	Microfabrication	9 CR
M-MACH-101292	Microoptics	9 CR
M-MACH-101293	Microsystem Technology	9 CR
M-MACH-101294	Nanotechnology	9 CR
M-WIWI-104837	Natural Hazards and Risk Management	9 CR
M-MACH-101295	Optoelectronics and Optical Communication	9 CR
M-BGU-101888	Project Management in Construction	9 CR
M-ETIT-101157	Control Engineering II	9 CR
M-MACH-105455	Strategic Design of Modern Production Systems	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-BGU-101110	Process Engineering in Construction	9 CR
M-BGU-101065	Transportation Modelling and Traffic Management	9 CR
M-MACH-101284	Specialization in Production Engineering	9 CR
M-CIWVT-101119	Specialization in Food Process Engineering	9 CR
M-MACH-104888	Advanced Module Logistics	9 CR
M-MACH-101283	Virtual Engineering A	9 CR
M-MACH-101281	Virtual Engineering B	9 CR
M-CIWVT-101121	Water Chemistry and Water Technology I	9 CR
M-CIWVT-101122	Water Chemistry and Water Technology II	12 CR

M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Statistics (Election: at most 9 credits)		
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
Law and Sociology (Election: at most 9 credits)		
M-INFO-101217	Public Business Law	9 CR
M-INFO-101216	Private Business Law	9 CR
M-INFO-101215	Intellectual Property Law	9 CR
M-GEISTSOZ-101169	Sociology	9 CR

6 Modules

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

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

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

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

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

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

Competence Goal
After a successful project, the students can:

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

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

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

Recommendation
None

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

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

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

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

Specialization module logistics (Election:)			
T-MACH-102160	Selected Applications of Technical Logistics	4 CR	Milushev, Mittwollen
T-MACH-108945	Selected Applications of Technical Logistics - Project	2 CR	Milushev, Mittwollen
T-MACH-105230	Decentrally Controlled Intralogistic Systems	4 CR	Furmans, Hochstein
T-MACH-102159	Elements and Systems of Technical Logistics	4 CR	Fischer, Mittwollen
T-MACH-108946	Elements and Systems of Technical Logistics - Project	2 CR	Fischer, Mittwollen
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Kramer, Schönung
T-MACH-111003	Global Logistics	4 CR	Furmans
T-MACH-102128	Information Systems and Supply Chain Management	3 CR	Kilger
T-MACH-105187	IT-Fundamentals of Logistics	4 CR	Thomas
T-MACH-105174	Warehousing and Distribution Systems	3 CR	Furmans
T-MACH-105175	Airport Logistics	3 CR	Richter
T-MACH-106693	Plug-and-Play Material Handling	4 CR	Auberle, Furmans
T-MACH-105171	Safety Engineering	4 CR	Kany

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

Prerequisites
One of the modules M-MACH-101279, M-MACH-101277, M-MACH-101280 or M-MACH-105298 must be completed.

Competence Goal
The student aquires

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

Workload
270 hours

Learning type
Lecture, tutorial.

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

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

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

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

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

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

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

Competence Goal
The student

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

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

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

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

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

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

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

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

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

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

Students

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

Content

The module is divided into three main topics:

The students

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

Annotation

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

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

Recommendation

None

M   6.5 Module: Agglomeration and Innovation [M-WIWI-101497]

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

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102840	Innovation Theory and Policy	4,5 CR	Ott
T-WIWI-103107	Spatial Economics	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 add up to at least 9.

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

Prerequisites

None

Competence Goal

The student

- applies quantitative methods in the context of economic models
- learns advanced micro- and macroeconomic theories
- is able to derive policy recommendations based on theory
- can identify the importance of alternative incentive mechanisms for the development and spread of innovations
- begins to understand the connections between market form and the development of innovations
- analyzes the determinants of the spatial distribution of economic activity
- understands how processes of concentration result from the interplay of agglomeration and dispersion forces

Content

The module comprises theories of incentives for the development of innovations as well as theories of wage-based labor mobility, which leads to spatial concentration processes. The microfounded optimality decisions of the actors are in each case transformed into macroeconomic results. In the context of the theory of innovations the diffusion of technological knowledge and the resulting effect on growth due to technological progress is discussed and economic-policy implications are derived. Spatial economics adds to the picture of economic activity by introducing a spatial point of view.

Workload

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

Recommendation

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

M   6.6 Module: Analytics and Statistics [M-WIWI-101637]

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

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

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

Competence Certificate

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

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

Prerequisites

The course "*Advanced Statistics*" is compulsory.

Competence Goal

A Student

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

Content

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

Annotation

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

Workload

The total workload for this module is approximately 270 hours.

M   6.7 Module: Applied Strategic Decisions [M-WIWI-101453]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

Students

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

Content

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

Annotation

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

Workload

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

Recommendation

Basic knowledge in game theory is assumed.

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

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

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

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

Mandatory			
T-MACH-102162	Automated Manufacturing Systems	9 CR	Fleischer

Competence Certificate
written exam (120 minutes)

Prerequisites
none

Competence Goal
The students

- are able to analyze implemented automated manufacturing systems and describe their components.
- are capable to assess the implemented examples of implemented automated manufacturing systems and apply them to new problems.
- are able to name automation tasks in manufacturing plants and name the components which are necessary for the implementation of each automation task.
- are capable with respect to a given task to plan the configuration of an automated manufacturing system and to determine the necessary components to its realization.
- are able to design and select components for a given use case of the categories: "Handling Technology", "Industrial Robotics", "Sensory" and "Controls".
- are capable to compare different concepts for multi-machine systems and select a suitable concept for a given use case.

Content
The lecture provides an overview of the structure and functioning of automated manufacturing systems. In the introduction chapter the basic elements for the realization of automated manufacturing systems are given. This includes:

- Drive and control technology
- Handling technology for handling work pieces and tools
- Industrial Robotics
- Quality assurance in automated manufacturing
- automatic machines, cells, centers and systems for manufacturing and assembly
- structures of multi-machine systems
- planning of automated manufacturing systems

In the second part of the lecture, the basics are illustrated using implemented manufacturing processes for the production of automotive components (chassis and drive technology).The analysis of automated manufacturing systems for manufacturing of defined components is also included. In the field of vehicle power train both, the automated manufacturing process for the production of the conventional internal-combustion engine and the automated manufacturing process for the production of the prospective electric power train (electric motor and battery) are considered. In the field of car body, the focus is on the analysis of the process chain for the automated manufacturing of conventional sheet metal body parts, as well as for automated manufacturing of body components made out of fiber-reinforced plastics. Within tutorials, the contents from the lecture are advanced and applied to specific problems and tasks.

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

Learning type
Lectures, exercise, excursion

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

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

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

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

Mandatory			
T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	3 CR	Guber
BioMEMS (Election: at least 6 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-102165	Selected Topics on Optics and Microoptics for Mechanical Engineers	3 CR	Heckele, Mappes
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CR	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CR	Guber
T-MACH-101910	Microactuators	3 CR	Kohl
T-MACH-102172	Bionics for Engineers and Natural Scientists	3 CR	Hölscher
T-MACH-102176	Current Topics on BioMEMS	4 CR	Guber

Competence Certificate

The assessment is carried out as partial exams

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

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

Prerequisites
none

Competence Goal
The student

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

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

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

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

Workload
270 hours

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

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

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102848	Personalization and Services	4,5 CR	Sonnenbichler
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-WIWI-102641	Service Innovation	4,5 CR	Satzger
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

Competence Certificate

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

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

Prerequisites

None

Competence Goal

The student should

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

Content

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

Annotation

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

Workload

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

Recommendation

None

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

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

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

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

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

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

Prerequisites
None

Competence Goal
Students

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

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

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

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

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

Organisation: KIT Department of Mechanical Engineering

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

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

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

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

Prerequisites
None

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

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

Content
Working Principle og ICE

Characteristic Parameters

Characteristic parameters

Engine parts

Crank drive

Fuels

Gasolien engine operation modes

Diesel engine operation modes

Emissions

Fundamentals of ICE combustion

Thermodynamics of ICE

Flow field

Wall heat losses

Combsution in Gasoline and Diesel engines

Heat release calculation

Waste heat recovery

CO2-free engine technology

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

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

Responsible: Dr.-Ing. Heiko Kubach
                Julia Reichel

Organisation: KIT Department of Mechanical Engineering

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

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

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

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

Prerequisites
None

Competence Goal
See courses.

Content
Compulsory:

Supercharging and air management

Engine mapsEmissions and Exhaust gas aftertreatment

Transient engine operationECU application

Electrification and alternative powertrains

Elective:

Fuels and lubricants for ICE

Fundamentals of catalytic EGA

Analysis tools for combustion diagnostics

Engine measurement techniques

Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines

Workload
regular attendance: 62 h

self-study: 208 h

Learning type
Lecture, Tutorial

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

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

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

Compulsory Elective Courses (Election:)			
T-WIWI-111393	Behavioral Experiments in Action	4,5 CR	Scheibehenne
T-WIWI-111806	Behavioral Lab Exercise	4,5 CR	Nieken, Scheibehenne
T-WIWI-111392	Cognitive Modeling	4,5 CR	Scheibehenne
T-WIWI-111100	Current Directions in Consumer Psychology	3 CR	Scheibehenne
T-WIWI-111395	Experimental Design	4,5 CR	Scheibehenne
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-111394	Open Science & Reproducibility	4,5 CR	Scheibehenne

Competence Certificate

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

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

Prerequisites

Willingness to actively engage with the topic.

Competence Goal

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

Content

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

Workload

The total workload for this module is approximately 270 hours.

Recommendation

Interest in behavioral research.

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

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

Organisation: KIT Department of Electrical Engineering and Information Technology

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

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

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

Competence Certificate

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

Prerequisites

Module grade calculation

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

Recommendation

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

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

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

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

Mandatory			
T-WIWI-102885	Advanced Management Accounting	4,5 CR	Wouters
Supplementary Courses (Election: 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-111848	Online Concepts for Karlsruhe City Retailers	1,5 CR	Klarmann
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-108651	Extraordinary additional course in the module Cross-Functional Management Accounting	4,5 CR	Wouters

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

Prerequisites
The course "Advanced Management Accounting" is compulsory.

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

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

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

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

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

Recommendation
None

M 6.17 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: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

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

Compulsory Elective Courses (Election:)		
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-106187	Business Data Strategy	4,5 CR	Weinhardt
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-110918	Introduction to Bayesian Statistics for Analyzing Data	3 CR	Scheibehenne
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CR	Weinhardt
T-WIWI-106207	Practical Seminar: Data-Driven Information Systems	4,5 CR	Mädche, Satzger, Setzer, Weinhardt

Competence Certificate

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

Prerequisites

None.

Competence Goal

The student

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

Content

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

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

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

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

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

Texteintrag

Annotation

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

Recommendation

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

M 6.18 Module: Data Science: Evidence-based Marketing [M-WIWI-101647]

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

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

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

Competence Certificate

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

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

Prerequisites

Keine.

Competence Goal

Students

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

Content

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

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

Workload

The total workload for this module is approximately 270 hours.

Recommendation

None

M 6.19 Module: Data Science: Intelligent, Adaptive, and Learning Information Services [M-WIWI-105661]

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

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

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

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

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

Recommendation
None

M 6.20 Module: Designing Interactive Information Systems [M-WIWI-104080]

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

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

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

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

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

Competence Goal
The student

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

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

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

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

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

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

M   6.21 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: Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

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

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

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

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

Competence Goal
Students

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

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

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

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

Recommendation
None

M 6.22 Module: Digitalization in Facility Management [M-BGU-105592]

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

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

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

Competence Certificate

- 'Teilleistung' T-BGU-108941 with examination of other type according to § 4 Par. 2 No. 3

according to selected course:

- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111212 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111921 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

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

Annotation
As from summer term 2022 the new selectable course Turnkey Construction replaces the selectable course Turnkey Construction II. With queries about the completion of the old module version please contact Dr. Schneider.

Workload

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

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

according to selected courses or examinations respectively:

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

independent study:

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

according to selected courses or examinations respectively:

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

total: 270 h

Recommendation

M   6.23 Module: Econometrics and Statistics I [M-WIWI-101638]

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

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

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

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

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

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

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

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

M   6.24 Module: Econometrics and Statistics II [M-WIWI-101639]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

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

Content

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

Workload

The total workload for this module is approximately 270 hours.

M 6.25 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
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

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

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

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

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

Competence Goal
The students

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

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

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

M 6.26 Module: eEnergy: Markets, Services and Systems [M-WIWI-103720]

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

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CR	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CR	Weinhardt
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

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

Prerequisites
None.

Competence Goal
The student

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

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

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

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

M 6.27 Module: Electives in Informatics [M-WIWI-101630]

Responsible: Dr.-Ing. Michael Färber
Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

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

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	15

Compulsory Elective Area (Election:)			
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-102680	Computational Economics	4,5 CR	Shukla
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CR	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CR	Oberweis
T-WIWI-106423	Information Service Engineering	4,5 CR	Sack
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-102667	Management of IT-Projects	4,5 CR	Schätzle
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-102697	Business Process Modelling	4,5 CR	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CR	Shukla
T-WIWI-109799	Process Mining	4,5 CR	Oberweis
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
Seminars and Advanced Labs (Election:)			
T-WIWI-110144	Emerging Trends in Digital Health	4,5 CR	Sunyaev
T-WIWI-110143	Emerging Trends in Internet Technologies	4,5 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development	4,5 CR	Sunyaev
T-WIWI-111126	Advanced Lab Blockchain Hackathon (Master)	4,5 CR	Sunyaev
T-WIWI-111125	Advanced Lab Sociotechnical Information Systems Development (Master)	4,5 CR	Sunyaev
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer
T-WIWI-109786	Advanced Lab Security	4,5 CR	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	4,5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	4,5 CR	Zöllner
T-WIWI-109251	Selected Issues in Critical Information Infrastructures	4,5 CR	Sunyaev

Competence Certificate

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

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

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

Prerequisites

None.

Competence Goal

The student

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

Content

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

Workload

The total workload for this module is approximately 270 hours.

M 6.28 Module: Electronic Markets [M-WIWI-101409]

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

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

The student

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

Content

What are the conditions that make electronic markets develop and how can one 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

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

Recommendation
None

M 6.29 Module: Emphasis in Informatics [M-WIWI-101628]

Responsible: Dr.-Ing. Michael Färber
                    Prof. Dr. Andreas Oberweis
                    Prof. Dr. Harald Sack
                    Prof. Dr. Ali Sunyaev
                    Prof. Dr. Melanie Volkamer
                    Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules 1 (Informatics)
                    Compulsory Elective Modules 2 (Informatics)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	15

Compulsory Elective Area (Election: between 1 and 3 items)			
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-102680	Computational Economics	4,5 CR	Shukla
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CR	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CR	Oberweis
T-WIWI-106423	Information Service Engineering	4,5 CR	Sack
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-102667	Management of IT-Projects	4,5 CR	Schätzle
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-102697	Business Process Modelling	4,5 CR	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CR	Shukla
T-WIWI-109799	Process Mining	4,5 CR	Oberweis
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
Seminars and Advanced Labs (Election:)			
T-WIWI-110144	Emerging Trends in Digital Health	4,5 CR	Sunyaev
T-WIWI-110143	Emerging Trends in Internet Technologies	4,5 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development	4,5 CR	Sunyaev
T-WIWI-111126	Advanced Lab Blockchain Hackathon (Master)	4,5 CR	Sunyaev
T-WIWI-111125	Advanced Lab Sociotechnical Information Systems Development (Master)	4,5 CR	Sunyaev
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer
T-WIWI-109786	Advanced Lab Security	4,5 CR	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	4,5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	4,5 CR	Zöllner
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 Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

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

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

Prerequisites

None.

Competence Goal

The student

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

Content

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

Workload

The total workload for this module is approximately 270 hours.

M   6.30 Module: Energy and Process Technology I [M-MACH-101296]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

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

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

Mandatory			
T-MACH-102211	Energy and Process Technology I	9 CR	Bauer, Maas, Schwitzke, Velji

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

Prerequisites
None

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

Content
Energy and Process Technology 1:

1. thermodynamic basics and cycle processes (ITT)

2. basics of piston engines (IFKM)

3. basics of turbomachines (FSM)

4. basics of thermal turbomachines (ITS)

Annotation
All lectures and exams are hold in German only.

M 6.31 Module: Energy and Process Technology II [M-MACH-101297]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

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

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

Mandatory			
T-MACH-102212	Energy and Process Technology II	9 CR	Maas, Schwitzke

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

Prerequisites
None

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

Content
Energy and Process Technology 2:

1. basics in combustion and pollutant formation (ITT)

2. technical realisation and application of piston engines (IFKM) fluid flow engines (FSM) and thermal turbomachines (ITS)

3. technical aspects of energy supply systems and networks (ITS)

Annotation
All lectures and exams are hold in German only.

M   6.32 Module: Energy Economics and Energy Markets [M-WIWI-101451]

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

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

Mandatory			
T-WIWI-107043	Liberalised Power Markets	3 CR	Fichtner
Supplementary Courses (Election: at least 6 credits)			
T-WIWI-102691	Energy Trade and Risk Management	3 CR	N.N.
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	Plötz
T-WIWI-102712	Regulation Theory and Practice	4,5 CR	Mitusch

Competence Certificate

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

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

Prerequisites

The lecture Liberalised Power Markets has to be examined.

Competence Goal

The student

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

Content

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

Workload

The total workload for this module is approximately 270 hours.

Recommendation

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

M 6.33 Module: Energy Economics and Technology [M-WIWI-101452]

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

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

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

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

M 6.34 Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

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

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

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

Competence Certificate
See German version.

Prerequisites
None

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

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

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

Recommendation
None

M 6.35 Module: Environmental Economics [M-WIWI-101468]

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

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

The students

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

Content

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

Workload

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

Recommendation

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

M 6.36 Module: Experimental Economics [M-WIWI-101505]

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

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

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

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

Prerequisites
None.

Competence Goal
Students

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

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

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

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

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

M 6.37 Module: Extracurricular Module in Engineering [M-WIWI-101404]

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

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

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

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

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

Prerequisites
The intended composition of courses, the module designation and the details of the examination for an Extracurricular Module in Engineering must be confirmed by a module coordinator (professor) of the responsible engineering department. The module coordinator makes sure that the individual courses of the module complement each other in a meaningful way and that no random sequence of various individual examinations is combined.

The responsible module coordinator certifies that the examination can be taken as described and that the details of the courses in the application are correct.

The informal application (not handwritten!) will then be submitted to the Examination Office of the KIT Department of Economics and Management.

The examination board of the KIT Department of Economics and Management decides on the basis of the rules and regulations that have been adopted, in particular with regard to the content (see also https://www.wiwi.kit.edu/ Genehmigung_Ingenieurmodul.php_Ingenieurmodul.php) as well as the application form completed by the student and signed by the respective module coordinator.

A maximum of one Extracurricular Module in Engineering can be taken.

Competence Goal
See German version.

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

| M | **6.38 Module: Facility Management in Hospitals [M-BGU-105597]** |

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

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

Mandatory			
T-BGU-108004	Facility Management in Hospitals	4,5 CR	Lennerts
Comnpulsory Elective (Election: at most 3 items as well as at least 4,5 credits)			
T-BGU-111218	Upgrading of Existing Buildings	3 CR	Lennerts
T-BGU-111211	Energetic Refurbishment	1,5 CR	Lennerts, Schneider
T-BGU-111212	Facility and Real Estate Management II	1,5 CR	Lennerts
T-BGU-111217	Project Development with Case Study	1,5 CR	Lennerts

Competence Certificate

- 'Teilleistung' T-BGU-108004 with examination of other type according to § 4 Par. 2 No. 3

according to selected course:

- 'Teilleistung' T-BGU-111218 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111212 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111217 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

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

Annotation

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

- Facility Management in Hospitals lecture/exercise: 45 h

according to selected courses or examinations respectively:

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

independent study:

- preparation and follow-up lecture/exercises Facility Management in Hospitals: 30 h
- preparation of term paper Facility Management in Hospitals (partial exam): 60 h

according to selected courses or examinations respectively:

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

total: 270 h

Recommendation

M 6.39 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: Business Administration
Compulsory Elective Modules 1 (Business Administration)
Compulsory Elective Modules 2 (Business Administration)

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

The student

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

Content

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

Workload

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

M 6.40 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:	Business Administration
	Compulsory Elective Modules 1 (Business Administration)
	Compulsory Elective Modules 2 (Business Administration)

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

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

Content

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

Annotation

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

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

M | **6.41 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:	Business Administration
	Compulsory Elective Modules 1 (Business Administration)
	Compulsory Elective Modules 2 (Business Administration)

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

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

Content

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

Workload

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

M   6.42 Module: Foundations for Advanced Financial -Quant and -Machine Learning Research [M-WIWI-105894]

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

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

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

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

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

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

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

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

Annotation

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

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

M 6.43 Module: Fundamentals of Transportation [M-BGU-101064]

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

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

Compulsory Examination (Election: between 1 and 2 items as well as between 3 and 6 credits)		
T-BGU-106609	Characteristics of Transportation Systems	3 CR	Vortisch
T-BGU-106610	Transportation Systems	3 CR	Vortisch
Electives (Election: between 1 and 2 items as well as between 3 and 6 credits)		
T-BGU-106611	Freight Transport	3 CR	Chlond
T-BGU-106301	Long-Distance and Air Traffic	3 CR	Chlond
T-BGU-101005	Tendering, Planning and Financing in Public Transport	3 CR	Vortisch
T-BGU-100014	Seminar in Transportation	3 CR	Chlond, Vortisch
T-WIWI-103174	Seminar Mobility Services (Master)	3 CR	Satzger, Stryja
T-BGU-103425	Mobility Services and New Forms of Mobility	3 CR	Kagerbauer
T-BGU-103426	Strategic Transport Planning	3 CR	Waßmuth
T-BGU-106608	Information Management for Public Mobility Services	3 CR	Vortisch
T-BGU-111057	Sustainability in Mobility Systems	3 CR	Kagerbauer

Prerequisites
None

Competence Goal
See German version.

Recommendation
None

M 6.44 Module: Generation and Transmission of Renewable Power [M-ETIT-101164]

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

Organisation: KIT Department of Electrical Engineering and Information Technology

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

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

compulsory optional subject (Election: at least 9 credits)			
T-ETIT-101941	Power Transmission and Power Network Control	5 CR	Leibfried
T-ETIT-101915	High-Voltage Test Technique	4 CR	Badent

Prerequisites

The module is passed only after the final partial exam of the module 101163 Hochspannungstechnik [WI4INGETIT6] is additionally passed.

Wirtschaftsingenieurwesen Bachelor 2015

The module is passed only after the final partial exam of the module 101163 Hochspannungstechnik [WI4INGETIT6] is additionally passed.

Technische Volkswirtschaftslehre Bachelor 2015

The module is passed only after the final partial exam of the module 101163 Hochspannungstechnik [WI4INGETIT6] is additionally passed.

Competence Goal

The student

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

Content

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

M 6.45 Module: Global Production and Logistics [M-MACH-101282]

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

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

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

Mandatory			
T-MACH-110991	Global Production	4 CR	Lanza
T-MACH-111003	Global Logistics	4 CR	Furmans
T-MACH-110981	Tutorial Global Production	1 CR	Lanza

Competence Certificate

Oral exams: duration approx. 5 min per credit point

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

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

Prerequisites

None

Competence Goal

The students

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

Content

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

Workload

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

Learning type

Lectures, seminars, workshops, excursions

M	**6.46 Module: Growth and Agglomeration [M-WIWI-101496]**

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

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

The student

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

Content

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

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

Workload

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

Recommendation

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

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

M 6.47 Module: High-Voltage Technology [M-ETIT-101163]

Responsible: Dr.-Ing. Bernd Hoferer
                   Prof. Dr.-Ing. Thomas Leibfried
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
                   Compulsory Elective Modules 2 (Natural and Engineering Sciences)

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

Mandatory			
T-ETIT-110266	High-Voltage Technology	6 CR	Badent
T-ETIT-100723	Electronics and EMC	3 CR	Sack

Competence Goal
The student

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

M   6.48 Module: Incentives, Interactivity & Decisions in Organizations [M-WIWI-105923]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

The student

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

Content

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

Workload

Total workload for 9 credits: approx. 270 hours.

Recommendation

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

M 6.49 Module: Industrial Production II [M-WIWI-101471]

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

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

Mandatory			
T-WIWI-102631	Planning and Management of Industrial Plants	5,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CR	Bosch, Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CR	Schultmann, 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
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-112103	Global Manufacturing	3,5 CR	Sasse
T-WIWI-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.

Prerequisites

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

Competence Goal

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

Content

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

Annotation

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

Workload

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

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

M 6.50 Module: Industrial Production III [M-WIWI-101412]

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

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

Mandatory			
T-WIWI-102632	Production and Logistics Management	5,5 CR	Glöser-Chahoud, Schultmann
Supplementary Courses from Module Industrial Production II (Election: at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-112103	Global Manufacturing	3,5 CR	Sasse
T-WIWI-110512	Life Cycle Assessment	3,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CR	Bosch, Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CR	Schultmann, 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.

Prerequisites

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

Competence Goal

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

Content

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

Annotation

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

Workload

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

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

M   6.51 Module: Informatics [M-WIWI-101472]

Responsible:	Dr.-Ing. Michael Färber
	Prof. Dr. Andreas Oberweis
	Prof. Dr. Harald Sack
	Prof. Dr. Ali Sunyaev
	Prof. Dr. Melanie Volkamer
	Prof. Dr.-Ing. Johann Marius Zöllner
Organisation:	KIT Department of Economics and Management
Part of:	Informatics

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	15

Compulsory Elective Area (Election:)			
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-102680	Computational Economics	4,5 CR	Shukla
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CR	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CR	Oberweis
T-WIWI-106423	Information Service Engineering	4,5 CR	Sack
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-102667	Management of IT-Projects	4,5 CR	Schätzle
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-102697	Business Process Modelling	4,5 CR	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CR	Shukla
T-WIWI-109799	Process Mining	4,5 CR	Oberweis
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
Seminars and Advanced Labs (Election: between 0 and 1 items)			
T-WIWI-110144	Emerging Trends in Digital Health	4,5 CR	Sunyaev
T-WIWI-110143	Emerging Trends in Internet Technologies	4,5 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development	4,5 CR	Sunyaev
T-WIWI-111126	Advanced Lab Blockchain Hackathon (Master)	4,5 CR	Sunyaev
T-WIWI-111125	Advanced Lab Sociotechnical Information Systems Development (Master)	4,5 CR	Sunyaev
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer
T-WIWI-109786	Advanced Lab Security	4,5 CR	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	4,5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	4,5 CR	Zöllner
T-WIWI-109251	Selected Issues in Critical Information Infrastructures	4,5 CR	Sunyaev

Competence Certificate

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

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

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

Prerequisites

It is only allowed to choose one lab.

Competence Goal

The student

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

Content

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

Workload

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

M 6.52 Module: Information Engineering [M-WIWI-101411]

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

Credits	**Grading scale**	**Recurrence**	**Duration**	**Level**	**Version**
9	Grade to a tenth	Each term	1 term	4	7

Supplementary Courses (Election:)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

Competence Certificate

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

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

Competence Goal

The student

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

Content

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

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

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

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

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

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

Annotation
New module starting summer term 2018.

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

M 6.54 Module: Innovation and Growth [M-WIWI-101478]

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

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

Students shall be given the ability to

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

Content

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

Workload

Total expenditure of time for 9 credits: 270 hours

Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

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

Recommendation

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

M 6.55 Module: Innovation Economics [M-WIWI-101514]

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

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

Students shall be given the ability to

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

Content

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

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

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

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

Workload

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

Recommendation

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

M 6.56 Module: Innovation Management [M-WIWI-101507]

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

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

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

Competence Certificate
See German version.

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

Competence Goal

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

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

Content

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

Workload

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

Recommendation

None

M 6.57 Module: Integrated Production Planning [M-MACH-101272]

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

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

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

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

Competence Certificate
Written Exam (120 min)

Prerequisites
none

Competence Goal
The students

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

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

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

Learning type
Lecture, exercise, excursion

M 6.58 Module: Intellectual Property Law [M-INFO-101215]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules 2 (Law and Sociology)

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

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

Prerequisites
None

M　6.59 Module: Lean Management in Construction [M-BGU-101884]

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

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

Election notes

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

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

Competence Certificate

- 'Teilleistung' T-BGU-108000 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-101007 with examination of other type according to § 4 Par. 2 No. 3

according to selected course:

- 'Teilleistung' T-BGU-111921 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-111922 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103432 with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-BGU-103433 with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

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

Annotation
As from summer term 2022 the selectable courses are partly replaced. With queries about the completion of the old module version please contact Dr. Schneider.

Workload

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

- Lean Construction lecture/exercise: 60 h

according to selected courses or examinations respectively:

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

independent study:

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

according to selected courses or examinations respectively:

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

total: 270 h

Recommendation

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

Literature

Gehbauer, F. (2013) Lean Management Im Bauwesen. Skript des Instituts für Technologie und Management im Baubetrieb, Karlsruher Institut für Technologie (KIT).

Liker, J. & Meier, D. (2007) Praxisbuch, der Toyota Weg: für jedes Unternehmen. Finanzbuch Verlag.

Rother, M., Shook, J., & Wiegand, B. (2006). Sehen lernen: mit Wertstromdesign die Wertschöpfung erhöhen und Verschwendung beseitigen. Lean Management Institut.

M 6.60 Module: Logistics and Supply Chain Management [M-MACH-105298]

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

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

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

Learning type
Lectures, tutorials, case studies.

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

Dieter Arnold et. al.: Handbuch Logistik, 2008

Marc Goetschalkx: Supply Chain Engineering, 2011

M 6.61 Module: Machine Tools and Industrial Handling [M-MACH-101286]

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

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

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

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

Competence Certificate
Written exam (120 minutes)

Prerequisites
None

Competence Goal
The students

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

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

The individual topics are:

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

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

Learning type
Lecture, exercise, excursio

M   6.62 Module: Management Accounting [M-WIWI-101498]

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

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

Prerequisites

None

Competence Goal

Students

• are familiar with various management accounting methods,

• can apply these methods for cost estimation, profitability analysis, and product costing,

• are able to analyze short-term and long-decisions with these methods,

• have the capacity to devise instruments for organizational control.

Content

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

Annotation

The following courses are part of this module:

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

Workload

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

M   6.63 Module: Manufacturing Technology [M-MACH-101276]

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

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

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

Mandatory		
T-MACH-102105	Manufacturing Technology	9 CR	Schulze, Zanger

Competence Certificate
Written Exam (180 min)

Prerequisites
None

Competence Goal
The students

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

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

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

Learning type
Lectures, exercise, excursion

M 6.64 Module: Market Engineering [M-WIWI-101446]

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

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

Mandatory			
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CR	Weinhardt
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CR	Weinhardt

Competence Certificate

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

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

Prerequisites

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

Competence Goal

The students

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

Content

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

Annotation

The course "Computational Economics" [2590458] will not be offered any more in this module from winter term 2015/2016 on. The examination will be offered latest until summer term 2016 (repeaters only).

Workload

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

Recommendation
None

M 6.65 Module: Marketing and Sales Management [M-WIWI-105312]

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

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

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CR	Klarmann, Konhäuser
T-WIWI-110985	International Business Development and Sales	6 CR	Casenave , Klarmann, Terzidis
T-WIWI-102835	Marketing Strategy Business Game	1,5 CR	Klarmann
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	1,5 CR	Klarmann
T-WIWI-102891	Price Negotiation and Sales Presentations	1,5 CR	Klarmann, Schröder
T-WIWI-111246	Pricing Excellence	1,5 CR	Bill, Klarmann

Competence Certificate

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

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

Prerequisites

None

Competence Goal

Students

- have an advanced knowledge about central marketing contents

- have a fundamental understanding of the marketing instruments

- know and understand several strategic concepts and how to implement them

- are able to implement their extensive marketing knowledge in a practical context

- know several qualitative and quantitative approaches to prepare decisions in Marketing

- have the theoretical knowledge to write a master thesis in Marketing

- have the theoretical knowledge to work in/together with the Marketing department

Content

The aim of this module is to deepen central marketing contents in different areas.

Annotation

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

Workload

The total workload for this module is approximately 270 hours.

M 6.66 Module: Material Flow in Logistic Systems [M-MACH-101277]

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

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

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

Mandatory			
T-MACH-102151	Material Flow in Logistic Systems	9 CR	Furmans

Competence Certificate
The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
  - 40% assessment of the result of the case studies as group work,
  - 20% assessment of the oral examination during the case study colloquiums as individual performance.

A detailed description of the learning control can be found under T-MACH-102151.

Prerequisites
none

Competence Goal
The student

- acquires comprehensive and well-founded knowledge on the main topics of logistics, an overview of different logistic questions in practice and knows the functionality of material handling systems,
- is able to illustrate logistic systems with adequate accuracy by using simple models,
- is able to realize coherences within logistic systems,
- is able to evaluate logistic systems by using the learnt methods.

Content
The module *Material Flow in Logistic Systems* provides comprehensive and well-founded basics for the main topics of logistics. Within the lectures, the interaction between several components of logistic systems will be shown. The module focuses on technical characteristics of material handling systems as well as on methods for illustrating and evaluating logistics systems. To gain a deeper understanding, the course is accompanied by exercises and case studies.

Workload
270 hours

Learning type
Lectures, tutorials.

M 6.67 Module: Material Flow in Networked Logistic Systems [M-MACH-101278]

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

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

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

Mandatory			
T-MACH-105189	Mathematical Models and Methods for Production Systems	6 CR	Baumann, Furmans
Material flow in interconnected logistics systems (Election:)			
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Kramer, Schönung
T-MACH-111003	Global Logistics	4 CR	Furmans
T-MACH-102128	Information Systems and Supply Chain Management	3 CR	Kilger
T-MACH-105187	IT-Fundamentals of Logistics	4 CR	Thomas
T-MACH-105174	Warehousing and Distribution Systems	3 CR	Furmans
T-MACH-105175	Airport Logistics	3 CR	Richter
T-MACH-105171	Safety Engineering	4 CR	Kany

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

Prerequisites
none

Competence Goal
The student

- acquires in-depth knowledge on the main topics of logistics, gets an overview of different logistic questions in practice,
- is able to evaluate logistic systems by using the learnt methods,
- is able to analyze and explain the phenomena of industrial material and value streams.

Content
The module *Material Flow in networked Logistic Systems* provides in-depth basics for the main topics of logistics and industrial material and value streams. The obligatory lecture focuses on queuing methods to model production systems. To gain a deeper understanding, the course is accompanied by exercises.

Workload
Regular attendance: 270 hours (9 credits). Lectures with 180 hours attendance 6 credits. Lectures with 120 hours 4 credits.

Recommendation
It is recommended to successfully complete the course "Material Flow in Logistics Systems" [T-MACH-102151] before starting the module.

Learning type
Lecture, tutorial.

M 6.68 Module: Mathematical Programming [M-WIWI-101473]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Research
Compulsory Elective Modules 1 (Operations Research)
Compulsory Elective Modules 2 (Operations Research)

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

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-103638	Global Optimization I and II	9 CR	Stein
T-WIWI-102856	Convex Analysis	4,5 CR	Stein
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CR	Stein
T-WIWI-102855	Parametric Optimization	4,5 CR	Stein
Supplementary Courses (Election: at most 2 items)			
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-102727	Global Optimization II	4,5 CR	Stein
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CR	Grothe
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-102725	Nonlinear Optimization II	4,5 CR	Stein
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

Competence Certificate

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

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

Prerequisites

At least one of the courses "Mixed Integer Programming I", "Parametric Optimization", "Convex Analysis", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.

Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Competence Goal

The student

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content

The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous and mixed integer decision variables.

Annotation

The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload

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

M 6.69 Module: Microeconomic Theory [M-WIWI-101500]

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

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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
T-WIWI-102859	Social Choice Theory	4,5 CR	Puppe
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken

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

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

Prerequisites
None

Competence Goal
Students

- are able to model practical microeconomic problems mathematically and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs.

An example of a positive question is: which regulation policy results in which firm decistions under imperfect competition? An example of a normative question is: which voting rule has appealing properties?

Content
The student should gain an understanding of advanced topics in economic theory, game theory and welfare economics. Core topics are, among others, strategic interactions in markets, cooperative and non-cooperative bargaining (Advanced Game Theory), allocation under asymmetric information and general equilibrium over time (Advanced Topics in Economic Theory), voting and the aggregation of preferences and judgements (Social Choice Theory).

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

M 6.70 Module: Microfabrication [M-MACH-101291]

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

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

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

Mandatory			
T-MACH-102166	Fabrication Processes in Microsystem Technology	3 CR	Bade
Mikrofertigung (Ergänzungsbereich) (Election: at least 6 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-100530	Physics for Engineers	6 CR	Dienwiebel, Gumbsch, Nesterov-Müller, Weygand
T-MACH-102167	Nanotribology and -Mechanics	3 CR	Dienwiebel, Hölscher
T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications	3 CR	Worgull
T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications	3 CR	Rapp
T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics	3 CR	Rapp, Worgull
T-MACH-105556	Practical Course Polymers in MEMS	3 CR	Rapp, Worgull
T-MACH-109122	X-ray Optics	4 CR	Last

Competence Certificate
The assessment is carried out as partial exams

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

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

Prerequisites
none

Competence Goal
The student

- gains advanced knowledge concerning fabrication techniques in micrometer scale
- aquires knowledge in up-to-date developing research
- can detect and use causal relation in microfabrication process chains.

Content
This engineering module allows the student to gain advanced knowledge in the area of microfabrication. Different manufacturing methods are described and analyzed in an advanced manner. Necessary interdisciplinary knowledge from physics, chemistry, materials science and also up-to-date developments (nano and x-ray optics) in micro fabrication is offered.

Workload
270 hours

M 6.71 Module: Microoptics [M-MACH-101292]

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

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

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

Mikrooptik (Election: at least 9 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-102165	Selected Topics on Optics and Microoptics for Mechanical Engineers	3 CR	Heckele, Mappes
T-MACH-101910	Microactuators	3 CR	Kohl
T-ETIT-100741	Laser Physics	4 CR	Eichhorn
T-ETIT-101945	Optical Waveguides and Fibers	4 CR	Koos
T-MACH-109122	X-ray Optics	4 CR	Last

Competence Certificate
The assessment is carried out as partial exams

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

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

Prerequisites
none

Competence Goal
The student

- basic knowlegde for the applications of microoptical systems
- understanding fabrication processes of microoptical elements & systems
- analyzing strengths and weaknesses of lithography processes
- knowledge on the basics of optical sources and detectors and their use in technical systems
- fundamental knowledge on different lasers and their design
- knowlegde on X-ray imaging methodes

Content
Optical imaging, measuring and sensor systems are a base for modern natural sciences. In particular life sciences and telecommunications have an intrinsic need for the application of optical technologies. Numerous fields of physics and engineering, e.g. astronomy and material sciences, require optical techniques. Micro optical systems are introduced in medical diagnostics and biological sensing as well as in products of the daily life.

In this module, an introduction to the basics of optics is provided; optical effects are presented with respect to their technical use.

Optical elements and instruments are presented. Fabrication processes of micro optical systems and elements, in particular lithography, are discussed.

In addition X-ray optics and X-ray imaging systems are presented as well as elements of optical telecommunication. A closer look on the physics behind lasers, being one of the most important technical light sources, is provided. As high end technology and clean room equipment is present in all the lectures of this module, the students will have a hands-on training with several experiments in micro optics.

Workload
270 hours

M 6.72 Module: Microsystem Technology [M-MACH-101293]

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

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

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

Mandatory			
T-MACH-105182	Introduction to Microsystem Technology I	3 CR	Badilita, Jouda, Korvink

Mikrosystemtechnik (Ergänzungsbereich) (Election: at least 6 credits)			
T-MACH-102165	Selected Topics on Optics and Microoptics for Mechanical Engineers	3 CR	Heckele, Mappes
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CR	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CR	Guber
T-MACH-102172	Bionics for Engineers and Natural Scientists	3 CR	Hölscher
T-MACH-105183	Introduction to Microsystem Technology II	3 CR	Jouda, Korvink
T-MACH-101910	Microactuators	3 CR	Kohl
T-MACH-102080	Nanotechnology with Clusterbeams	3 CR	Gspann
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-ETIT-101907	Optoelectronic Components	4 CR	Freude
T-MACH-100530	Physics for Engineers	6 CR	Dienwiebel, Gumbsch, Nesterov-Müller, Weygand
T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications	3 CR	Rapp
T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications	3 CR	Worgull
T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics	3 CR	Rapp, Worgull
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last

Competence Certificate
The assessment is carried out as partial exams

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

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

Prerequisites
none

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

Workload
270 hours

M 6.73 Module: Module Master's Thesis [M-WIWI-101659]

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

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

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

Competence Certificate
See German version.

Prerequisites
See German version.

Competence Goal
The student can independently handle a complex and unfamiliar subject based on scientific criteria and on the current state of research.

He/she is in a position to critically analyze and structure the researched information as well as derive principles and regularities. He/she knows how to apply the thereby achieved results to solve the task at hand. Taking into account this knowledge and his/her interdisciplinary knowledge, he/she can draw own conclusions, derive improvement potentials, propose and implement science-based decisions.

This is basically also done under consideration of social and/or ethical aspects.

He/she can interpret, evaluate and if required, graphically present the obtained results.

He/she is in a position to sensibly structure a research paper, document them and clearly communicate the results in scientific form.

Content
See German version.

Annotation
See German version.

Workload
The total workload for this module is approximately 900 hours. For further information see German version.

M   6.74 Module: Nanotechnology [M-MACH-101294]

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

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

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

Mandatory			
T-MACH-105180	Nanotechnology for Engineers and Natural Scientists	4 CR	Dienwiebel, Hölscher, Walheim
Nanotechnologie (Ergänzungsbereich) (Election: at least 5 credits)			
T-MACH-102080	Nanotechnology with Clusterbeams	3 CR	Gspann
T-MACH-102167	Nanotribology and -Mechanics	3 CR	Dienwiebel, Hölscher
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-MACH-102172	Bionics for Engineers and Natural Scientists	3 CR	Hölscher
T-ETIT-100740	Quantum Functional Devices and Semiconductor Technology	3 CR	Koos

Competence Certificate
The assessment is carried out as partial exams

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

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

Prerequisites
none

Competence Goal
The student

- has detailed knowledge in the field of nanotechnology
- is able to evaluate the specific characteristics of nanosystems.

Content
The module deals with the most important principles and fundamentals of modern nanotechnology. The compulsory module "Nanotechnology with scanning probe methods" introduces the basics of nanotechnology and nanoanalytics. The specific phenomena and properties found in nanoscale systems are the main topic of the module.

Workload
270 hours

M	6.75 Module: Natural Hazards and Risk Management [M-WIWI-104837]

Responsible:	apl. Prof. Dr. Michael Kunz
Organisation:	KIT Department of Economics and Management
Part of:	Compulsory Elective Modules 1 (Natural and Engineering Sciences)
	Compulsory Elective Modules 2 (Natural and Engineering Sciences)

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

Wahlpflichtangebot (Election: between 9 and 12 credits)			
T-BGU-101499	Introduction to Hydrogeology	5 CR	Goldscheider
T-BGU-108943	Engineering Hydrology	3 CR	Ehret
T-BGU-111275	Integrated Design Project in Water Resources Management	6 CR	Ehret, Seidel
T-BGU-101859	Morphodynamics	3 CR	Rodrigues Pereira da Franca
T-BGU-106620	Examination Prerequisite Environmental Communication	0 CR	Kämpf
T-BGU-101676	Environmental Communication	4 CR	Kämpf

Competence Certificate

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

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

Prerequisites

None

Competence Goal

See German version

Content

See German version

Annotation

Students, who successfully completed both modules "Understanding and Prediction of Disasters" I and II (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

Workload

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

M 6.76 Module: Network Economics [M-WIWI-101406]

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

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102712	Regulation Theory and Practice	4,5 CR	Mitusch
T-WIWI-102713	Telecommunication and Internet Economics	4,5 CR	Mitusch

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

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

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

Prerequisites
None

Competence Goal
The students

- have acquired the basic knowledge for a future job in a network company or in a regulatory agency, ministry etc.
- recognize the specific characterizations of network sectors, know fundamental methods for an economic analysis of network sectors and recognize the interfaces for an interdisciplinary cooperation of economists, engineers and lawyers
- understand the interactions between infrastructures, control systems, and the users of networks, especially concerning their implications on investments, price setting and competitive behavior, and they can model or simulate exemplary applications
- can assess the necessity of regulation of natural monopolies and identify regulatory measures that are important for networks.

Content
The module is concerned with network or infrastructure industries in the economy, e.g. telecommunication, traffic and energy sectors. These sectors are characterized by close interdependencies of operators and users of infrastructure as well as on states. States intervene in various forms, by the public and regulation authorities, due to the importance of network industries and due to limited abilities of markets to work properly in these industries. The students are supposed to develop a broad knowledge of these sectors and of the political options available.

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

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

M 6.77 Module: Operations Research in Supply Chain Management [M-WIWI-102832]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	Operations Research
	Compulsory Elective Modules 1 (Operations Research)
	Compulsory Elective Modules 2 (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	8

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
Supplementary Courses (Election: at most 1 item)			
T-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-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

Competence Certificate
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

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

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

Prerequisites
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Competence Goal
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of SCM and their respective optimization problems,
- is acquainted with classical location problem models (in planes, in networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Content

Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

This module considers several areas of SCM. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of Supply Chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of supply chain management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Mangement, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Annotation

Some lectures and courses are offered irregularly.

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

Workload

Total effort for 9 credits: ca. 270 hours

- Presence time: 84 hours
- Preparation/Wrap-up: 112 hours
- Examination and examination preparation: 74 hours

Recommendation

Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

M 6.78 Module: Optoelectronics and Optical Communication [M-MACH-101295]

Responsible:	Prof. Dr. Jan Gerrit Korvink
Organisation:	KIT Department of Mechanical Engineering
Part of:	Compulsory Elective Modules 1 (Natural and Engineering Sciences)
	Compulsory Elective Modules 2 (Natural and Engineering Sciences)

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

Optoelektronik und Optische Kommunikationstechnik (Kernbereich) (Election: 1 item)		
T-ETIT-100639	Optical Transmitters and Receivers	6 CR	Freude

Optoelektronik und Optische Kommunikationstechnik (Ergänzungsbereich) (Election: at least 5 credits)		
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-ETIT-101938	Communication Systems and Protocols	5 CR	Becker, Becker
T-ETIT-100741	Laser Physics	4 CR	Eichhorn
T-ETIT-100740	Quantum Functional Devices and Semiconductor Technology	3 CR	Koos
T-ETIT-101945	Optical Waveguides and Fibers	4 CR	Koos

Competence Certificate

The assessment is carried out as partial exams

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

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

Prerequisites

Competence Goal

Student has basic knowledge of optical communication systems and related device and fabrication technologies.

- He/she can apply this knowledge to specific problems.

Content

This module covers practical and theoretical aspects in the areas of optical communications and optoelectronics. System aspects of communication networks are complemented by fundamental principles and device technologies of optoelectronics as well as and microsystem fabrication technologies.

Workload

270 hours

M 6.79 Module: Principles of Food Process Engineering [M-CIWVT-101120]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

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

Principles of Food Process Engineerung (Election: 1 item)		
T-CIWVT-111536	Process Engineering: Example Food Processing	6 CR	Gaukel
T-CIWVT-100152	Advanced Food Processing	3 CR	Gaukel
Elective Courses: Food Process Engineering (Election: between 3 and 6 credits)		
T-CIWVT-111434	Additives and Active Substances	1,5 CR	van der Schaaf
T-CIWVT-111435	Extrusion Technology	1,5 CR	Emin
T-CIWVT-111535	Food Science and Functionality	3 CR	Watzl

Prerequisites
none

Competence Goal
See German version.

M 6.80 Module: Private Business Law [M-INFO-101216]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules 2 (Law and Sociology)

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

Private Business Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-111405	Seminar: Commercial and Corporate Law in the IT Industry	3 CR	Dreier, Nolte
T-INFO-101288	Corporate Compliance	3 CR	Herzig
T-INFO-102036	Computer Contract Law	3 CR	Bartsch
T-INFO-111436	Employment Law	3 CR	Hoff
T-INFO-111437	Tax Law	3 CR	Dietrich

Prerequisites
None

Competence Goal
The student

- has gained in-depth knowledge of German company law, commercial law and civil law;
- is able to analyze, evaluate and solve complex legal and economic relations and problems;
- is well grounded in individual labour law, collective labour law and commercial constitutional law, evaluates and critically assesses clauses in labour contracts;
- recognizes the significance of the parties to collective labour agreements within the economic system and has differentiated knowledge of labour disputes law and the law governing the supply of temporary workers and of social law;
- possesses detailed knowledge of national earnings and corporate tax law and is able to deal with provisions of tax law in a scientific manner and assesses the effect of these provisions on corporate decision-making.

Content
The module provides the student with knowledge in special matters in business law, like employment law, tax law and business law, which are essential for managerial decisions.

M   6.81 Module: Process Engineering in Construction [M-BGU-101110]

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

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

Mandatory			
T-BGU-101844	Process Engineering	3 CR	Schneider
Electives (Election: between 2 and 3 items as well as between 6 and 7,5 credits)			
T-BGU-101845	Construction Equipment	3 CR	Gentes
T-BGU-101832	Operation Methods for Foundation and Marine Construction	1,5 CR	Schneider
T-BGU-101801	Operation Methods for Earthmoving	1,5 CR	Schlick
T-BGU-101846	Tunnel Construction and Blasting Engineering	3 CR	Haghsheno
T-BGU-101847	Project Studies	3 CR	Gentes
T-BGU-101850	Disassembly Process Engineering	3 CR	Gentes

Competence Certificate
- 'Teilleistung' T-BGU-101844 with written examination according to § 4 Par. 2 No. 1

according to selected course:

- 'Teilleistung' T-BGU-101845 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-101832 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101801 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101846 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101847 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101850 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
The course Verfahrenstechnik [6241704] is compulsory and must be examined.

Competence Goal
Students understand different processes and the related construction equipment, it's technology, capabilities and constraints. Students can define process solutions consisting of machinery and devices. They can evaluate existing processes through knowledge about process performance and operating conditions, and the can identify potential for improvement.

Content
Within the frame of this module, various construction und conditioning processes will be presented as well as performance calculations conducted. Students learn about the construction machinery and devices of these processes. Transmission, generation, conversion and controlling of power are explained with the help of various practical examples. Moreover, the module includes possibilities for an on-site familiarization.

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

Annotation
None

Workload
see German version

Recommendation

M 6.82 Module: Project Management in Construction [M-BGU-101888]

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

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

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

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

Competence Certificate
- 'Teilleistung' T-BGU-103432 with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-BGU-111921 with written examination according to § 4 Par. 2 No. 1

according to selected course:

- 'Teilleistung' T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111922 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-103433 with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

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

Annotation
As from summer term 2022 the selectable courses are partly replaced. With queries about the completion of the old module version please contact Dr. Schneider.

Workload
see German version

Recommendation
see German version

Literature

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M 6.83 Module: Public Business Law [M-INFO-101217]

Responsible:	Prof. Dr. Thomas Dreier
Organisation:	KIT Department of Informatics
Part of:	Compulsory Elective Modules 2 (Law and Sociology)

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

Public Business Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-101309	Telecommunications Law	3 CR	Hermstrüwer
T-INFO-101312	European and International Law	3 CR	Brühann
T-INFO-111404	Seminar: IT- Security Law	3 CR	Schallbruch
T-INFO-111406	Data Protection Law	3 CR	Eichenhofer

Competence Certificate
see course description.

M   6.84 Module: Rail System Technology [M-MACH-101274]

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

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

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

Mandatory			
T-MACH-102143	Rail System Technology	9 CR	Geimer, Gratzfeld

Competence Certificate

Oral examination

Duration: ca. 45 minutes

No tools or reference materials may be used during the exam.

Competence Goal

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- Based on operating requirements and legal framework they derive the requirements concerning a capable infrastructure and suitable concepts of rail vehicles.
- They recognize the impact of alignment, understand the important function of the wheel-rail-contact and estimate the impact of driving dynamics on the operating program.
- They evaluate the impact of operating concepts on safety and capacity of a rail system.
- They know the infrastructure to provide power supply to rail vehicles with different drive systems.
- The students learn the role of rail vehicles and understand their classification. They understand the basic structure und know the functions of the main systems. They understand the overall tasks of vehicle system technology.
- They learn functions and requirements of car bodies and jugde advantages and disadvantages of design principles. They know the functions of the car body's interfaces.
- They know about the basics of running dynamics and bogies.
- The students learn about advantages and disadvantages of different types of traction drives and judge, which one fits best for each application.
- They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems.
- They know the basic setup of train control management system and understand the most important functions.
- They specify and define suitable vehicle concepts based on requirements for modern rail vehicles.

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations
8. Vehicle system technology: structure and main systems of rail vehicles
9. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
10. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
11. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
12. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
13. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
14. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Annotation

A bibliography is available for download (Ilias-platform).

The lectures can be attended in the same term.

Workload

1. Regular attendance: 42 hours
2. Self-study: 42 hours
3. Exam and preparation: 186 hours

Learning type

Lectures

M 6.85 Module: Seminar Module [M-WIWI-101808]

Responsible: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules 1 (mandatory)

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

Seminar in Economics and Management, Mathematics and Law (Election: between 3 and 6 credits)			
T-WIWI-103474	Seminar in Business Administration A (Master)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103476	Seminar in Business Administration B (Master)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103477	Seminar in Economics B (Master)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103478	Seminar in Economics A (Master)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103479	Seminar in Informatics A (Master)	3 CR	Professorenschaft des Instituts AIFB
T-WIWI-103480	Seminar in Informatics B (Master)	3 CR	Professorenschaft des Instituts AIFB
T-WIWI-103481	Seminar in Operations Research A (Master)	3 CR	Nickel, Rebennack, Stein
T-WIWI-103482	Seminar in Operations Research B (Master)	3 CR	Nickel, Rebennack, Stein
T-WIWI-103483	Seminar in Statistics A (Master)	3 CR	Grothe, Schienle
T-WIWI-103484	Seminar in Statistics B (Master)	3 CR	Grothe, Schienle
T-INFO-101997	Seminar: Legal Studies I	3 CR	Dreier
T-INFO-105945	Seminar: Legal Studies II	3 CR	Dreier
Seminar in Engineering Science (Election: at most 1 item)			
T-MACH-102135	Conveying Technology and Logistics	3 CR	Furmans, Pagani
T-MACH-109062	Seminar Production Technology	3 CR	Fleischer, Lanza, Schulze
T-MACH-108737	Seminar Data-Mining in Production	3 CR	Lanza
T-BGU-100014	Seminar in Transportation	3 CR	Chlond, Vortisch
T-WIWI-108763	Seminar in Engineering Science Master (approval)	3 CR	Fachvertreter ingenieurwissenschaftlicher Fakultäten
T-WIWI-110215	Wildcard Seminar Module Master	3 CR	
Interdisciplinary Qualifications (Election: at least 3 credits)			
T-WIWI-111438	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	1 CR	
T-WIWI-111439	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	2 CR	
T-WIWI-111440	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	3 CR	
T-WIWI-111441	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	1 CR	
T-WIWI-111442	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	2 CR	
T-WIWI-111443	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	3 CR	

Competence Certificate

The modul examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examintaion regulation). A detailed description of every singled assessment is given in the specific course characerization.

The final mark for the module is the average of the marks for each of the two seminars weighted by the credits and truncated after the first decimal. Grades of the KQ courses are not included.

Prerequisites

The course specific preconditions must be observed.

- *Seminars*: Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.
- Alternatively one of the two seminars can be absolved at a engineering department. The seminar has to be offered by a representative of the respective department as well. The assessment has to meet the demands of the Department of Economics and Management (active participation, term paper with a workload of at least 80 h, presentation). This alternative seminar **requires an official approval** and can be applied at the examination office of the Department of Economics and Management. Seminars at the institutes wbk and IFL do not require these approval.
- *Key Qualification (KQ)-course(s)*: One or more courses with at least 3 CP in total of additional key qualifications have to be chosen among the courses [HoC, ZAK, Sprachenzentrum].

Competence Goal

- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Content

Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailed description o these qualifications is given in the section "Key Qualifications" of the module handbook.

Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload

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

M 6.86 Module: Service Analytics [M-WIWI-101506]

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

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

Compulsory Elective Courses (Election: 9 credits)		
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

Competence Certificate

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

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

Prerequisites
None

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content

The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

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

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

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

M 6.87 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:	Business Administration
	Compulsory Elective Modules 1 (Business Administration)
	Compulsory Elective Modules 2 (Business Administration)

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

Mandatory			
T-WIWI-102849	Service Design Thinking	12 CR	Satzger

Competence Certificate

The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

Prerequisites

None

Competence Goal

- Deep knowledge of the innovation method Design Thinking, as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Learn to apply the method to a real innovation projects issued by industry partners.

Content

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (intern. Design Thinking network).
- Design Space Exploration: Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are in the focus of this phase.
- Funky Prototype: Integration of the individually tested and successful functions to several complete solution scenarios, which are further tested and developed.
- Functional Prototype: Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is lade out in detail and tested with users.
- Final Prototype: Implementing the functional prototype and presenting it to the customer.

Annotation

Due to practical project work as a component of the program, access is limited.

The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.

For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).

Furthermore, the KSRI conducts an information event for applicants every year in May.

This module is part of the KSRI Teaching Program „Digital Service Systems". For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

Workload

The total amount of work for this module is approx. 270 hours (9 credits). The workload for this course is comparably high as the course runs in cooperation with partner universities from around the world as well as partner companies. This causes overhead.

Recommendation

This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

M 6.88 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:	Business Administration
	Compulsory Elective Modules 1 (Business Administration)
	Compulsory Elective Modules 2 (Business Administration)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
T-WIWI-102641	Service Innovation	4,5 CR	Satzger

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

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

Prerequisites
None

Competence Goal
Students

- understand the scientific basics of the management of digital services and corresponding systems
- gain a comprehensive insight in the importance and the most important features of information systems as an central component of the digitalization of business processes, products and services
- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully
- understand the OR methods in the sector of service management and apply them adequately
- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems
- are able to develop market-oriented coordination mechanisms and apply service systems.

Content
This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

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

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

Recommendation
None

M 6.89 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:	Business Administration
	Compulsory Elective Modules 1 (Business Administration)
	Compulsory Elective Modules 2 (Business Administration)

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-110877	Engineering Interactive Systems	4,5 CR	
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	4,5 CR	Mädche
T-WIWI-102641	Service Innovation	4,5 CR	Satzger

Competence Certificate

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

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

Prerequisites
Dependencies between courses:

The course Practical Seminar Service Innovation cannot be applied in combination with the course Practical Seminar Digital Service Design.

Competence Goal
Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.
- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.
- are able to embed the concepts of innovation management, development and design of services into organisations
- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation
- elaborate concrete and problem-solving solutions for practical tasks in teams.

Content

This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

Annotation

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

Workload

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

Recommendation

Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].

Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

M 6.90 Module: Service Management [M-WIWI-101448]

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

Organisation: KIT Department of Economics and Management

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

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

Compulsory Elective Courses (Election: 4,5 credits)		
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-102641	Service Innovation	4,5 CR	Satzger

Competence Certificate

The assessment is carried out as partial exams (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.

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.

Workload

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

Recommendation

None

M 6.91 Module: Service Operations [M-WIWI-102805]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	Operations Research
	Compulsory Elective Modules 1 (Operations Research)
	Compulsory Elective Modules 2 (Operations Research)

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

Compulsory Elective Courses (Election: 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
Supplementary Courses (Election: at most 2 items)			
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr
T-WIWI-110971	Demand-Driven Supply Chain Planning	4,5 CR	Packowski

Competence Certificate

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

Prerequisites

At least one of the fourcourses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management orDiscrete-Event Simulation in Production and Logistics has to be assigned.

Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Competence Goal

Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content

The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Annotation

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

Workload

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

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

M   6.92 Module: Sociology [M-GEISTSOZ-101169]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: Compulsory Elective Modules 2 (Law and Sociology)

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

Mandatory			
T-GEISTSOZ-104565	Computer Aided Data Analysis	0 CR	Nollmann
T-GEISTSOZ-109052	Application of Social Science Methods (WiWi)	9 CR	Nollmann

Prerequisites
Students must pass three excersise sheets within the seminar "Computer based data analysis".

Competence Goal
The student

- Gains theoretical and methodical knowledge of social processes and structures,
- learns a script based data analysis tool (R, Stata, Python),
- gathers his/her data within an own framework and/or analyzes complex data,
- is able to present his/her work results in a precise and clear way.

Content
The Sociology module offers students the opportunity to learn a data analysis tool (R, Stata, Python) within the framework of a two-semester course and to independently transfer this tool to a content-related question. Both the tool and the contents are determined by the lecturers. The contents can refer to the analysis of large population surveys (SOEP, Microcensus, ALLBUS), to own experiments, to own field studies or to Big Data analyses.

Annotation
Basic knowledge in multivariate regression and inference statistics is required.

M 6.93 Module: Specialization in Food Process Engineering [M-CIWVT-101119]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
                   Compulsory Elective Modules 2 (Natural and Engineering Sciences)

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

Elective Courses: Specialization in Food Process Engineering (Election: at least 9 credits)			
T-CIWVT-111433	Drying of Dispersions	1,5 CR	Karbstein
T-CIWVT-108871	Microbiology for Engineers	3 CR	Schwartz
T-CHEMBIO-109442	Food Chemistry Basics	3 CR	Bunzel
T-CIWVT-111434	Additives and Active Substances	1,5 CR	van der Schaaf
T-CIWVT-111435	Extrusion Technology	1,5 CR	Emin
T-CIWVT-111534	Introduction to Sensory Analysis with Practice	1,5 CR	Scherf
T-CIWVT-111535	Food Science and Functionality	3 CR	Watzl
T-CHEMBIO-108091	Introduction to Food Law	1,5 CR	Kuballa

Competence Goal

The students

- can explain and apply engineering fundamentals of process engineering
- Know and understand various specific aspects of food processing and can apply their basic knowledge to the specifics of food processing/ to the professional practice of food processing.

Content

See courses.

M 6.94 Module: Specialization in Production Engineering [M-MACH-101284]

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

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

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

Vertiefung der Produktionstechnik (Election: at least 9 credits)			
T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry	4 CR	Wawerla
T-MACH-110991	Global Production	4 CR	Lanza
T-MACH-110981	Tutorial Global Production	1 CR	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-105783	Learning Factory "Global Production"	6 CR	Lanza
T-MACH-108878	Laboratory Production Metrology	5 CR	Häfner
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-110984	Production Technology for E-Mobility	4 CR	Fleischer, Ruhland
T-MACH-110960	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	4 CR	Zanger
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-105185	Control Technology	4 CR	Gönnheimer
T-MACH-105177	Metal Forming	4 CR	Herlan
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber

Competence Certificate
Oral exams: duration approx. 5 min per credit point

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

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

Prerequisites
none

Competence Goal
The students

- are able to apply the methods of production science to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Content
Within this module the students will get to know and learn about production science. Manifold lectures and excursions as part of several lectures provide specific insights into the field of production science.

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

Learning type
Lectures, seminars, workshops, excursions

M 6.95 Module: Stochastic Optimization [M-WIWI-103289]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: Operations Research
                        Compulsory Elective Modules 1 (Operations Research)
                        Compulsory Elective Modules 2 (Operations Research)

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

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CR	Grothe
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-106545	Optimization under Uncertainty	4,5 CR	Rebennack
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

Competence Certificate

The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

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

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

Prerequisites

At least one of the courses "Advanced Stochastic Optimization", "Large-scale Optimization" or "Introduction to Stochastic Optimization" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Competence Goal

The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,
- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content

The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

Annotation

The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload

The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

Recommendation

It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

M   6.96 Module: Strategic Design of Modern Production Systems [M-MACH-105455]

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

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

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

Strategic Design of Modern Production Systems (Election: at least 9 credits)			
T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry	4 CR	Wawerla
T-MACH-110991	Global Production	4 CR	Lanza
T-MACH-110981	Tutorial Global Production	1 CR	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-105783	Learning Factory "Global Production"	6 CR	Lanza
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-102107	Quality Management	4 CR	Lanza

Competence Certificate
Oral exams: duration approx. 5 min per credit point

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

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

Prerequisites
none

Competence Goal
The students

- are able to apply the methods of the strategic design of modern production systems to new problems.
- are able to outline the underlying conditions and influencing factors of today's production and derive recommendations for action for an integrated strategy.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Content
Within this module the students will get to know and learn about methods for the strategic design of modern production systems. Manifold lectures and excursions as part of several lectures provide specific insights into the field of science.

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

Learning type
Lectures, seminars, workshops, excursions

M 6.97 Module: Student Innovation Lab (SIL) 1 [M-WIWI-105010]

Responsible:	Prof. Dr.-Ing. Sören Hohmann
	Prof. Dr. Orestis Terzidis
Organisation:	KIT Department of Economics and Management
Part of:	Business Administration
	Compulsory Elective Modules 1 (Business Administration)
	Compulsory Elective Modules 2 (Business Administration)

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

Mandatory		
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
T-WIWI-110166	SIL Entrepreneurship Project	3 CR	Terzidis
T-WIWI-110287	SIL Entrepreneurship Emphasis	3 CR	Terzidis

Competence Certificate

The assessment of this module comprises a written examination of 60 minutes on the lecture contents of the lecture "Entrepreneurship" as well as two seminars. All examinations are graded. In both seminars the following tasks have to be fulfilled:

- "SIL Entrepreneurship Project": Presentation of the Value Profile & submission of the Business Plan
- "SIL Entrepreneurship Emphasis": Submission of price calculation, market potential analysis, competition analysis, financial plan, risk analysis, decision basis for funding and legal form

In addition, both courses provide for smaller, ungraded tasks to monitor progress.

The grade consists of 60 % of the written examination, 20 % of the examination "SIL Entrepreneurship Project" and 20 % of the examination "SIL Entrepreneurship Advanced".

Prerequisites

The module can only be completed together with the module M-WIWI-105011 "Student Innovation Lab 2".

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.

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Competence Goal
Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
  Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
- Conflict ability: Students can recognise conflicts at an early stage, analyse conflict situations and name solution concepts.

Innovation and Entrepreneurship Competence

- Agile product development: Students can apply methods of agile product development such as Scrum.
  Methodical innovation finding: Students can perform user- or technology-centric innovation processes to develop sustainable value propositions for dedicated target groups (e.g. Design Thinking (DT), Technology Application Selection (TAS) process).
- Orientation on the management of new technology-based companies (NTBF): Students can name the central concepts of intellectual property and legal form. Students can name the most important tasks of entrepreneurial leadership. They can identify the relevant forms of business modelling and draw up a business plan. Students know the central approaches to building an organisation. Students will be able to identify the ownership structure of investments and how to develop a strategy. The students can name marketing concepts and create a business model.
- Create investment readiness: The students are able to create a rudimentary sales and cost planning. Furthermore, they are able to create a project plan for a company and derive an investment plan from it. The students can present the business plan to potential investors and develop investor empathy.
- Business model development competence: Students are able to use relevant tools for business modelling, e.g. the Business Model Canvas. Students can develop and evaluate alternative business models.
- Dealing with risks:Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

- Problem-solving competence: Students can analyse, assess and solve a technical problem in a structured way.
- Agile Methodology of System Development: Students can name the different system development processes and apply them appropriately.
- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Content

In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one's own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

- As an innovation platform, the Automation Innovation Lab offers flying robots for cooperative swarm solutions.
- The Industry 4.0 Innovation Lab enables innovations in the area of the next industrial revolution with mobile robot platforms.
- In the Internet of Things Innovation Lab, innovations in Assisted Living and Smart Housing are made possible by a comprehensive kit of mobile robots and sensors.
- The Computer Vision for Health Lab offers a selection of state-of-the-art imaging devices and powerful computing hardware for innovative image-based applications for medicine and healthcare.

The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Workload

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

M 6.98 Module: Student Innovation Lab (SIL) 2 [M-WIWI-105011]

Responsible:	Prof. Dr.-Ing. Sören Hohmann
	Prof. Dr. Werner Nahm
	Prof. Dr.-Ing. Eric Sax
	Prof. Dr. Wilhelm Stork
	Prof. Dr. Orestis Terzidis
	Prof. Dr.-Ing. Thomas Zwick
Organisation:	KIT Department of Economics and Management
Part of:	Compulsory Elective Modules 1 (Business Administration)
	Compulsory Elective Modules 2 (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a third	Each winter term	2 terms	English	4	1

Mandatory			
T-ETIT-110291	Innovation Lab	9 CR	Hohmann, Nahm, Sax, Stork, Zwick

Competence Certificate

The examination in this module comprises the submission of graded intermediate results in the form of prototypes (low fidelity and high fidelity) as well as various technical and economic reports (according to § 4 (2), 3 SPO):

1. Submission of a technical report with requirements list and system architectur
2. Submission of the reflection of the gate plans
3. Presentation of the High-fidelity

The module grade consists of 50% of the evaluation of the low fidelity prototype including intermediate results of a technical and economic nature and 50% of the evaluation of the high fidelity prototype including intermediate results of a technical and economic nature.

Prerequisites

The module can only be completed together with the module M-WIWI-105010 "Student Innovation Lab (SIL) 1".

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.

Competence Goal
Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
  Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
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Innovation and Entrepreneurship Competence

- Agile product development: Students can apply methods of agile product development such as Scrum.
  Methodical innovation finding: Students can perform user- or technology-centric innovation processes to develop sustainable value propositions for dedicated target groups (e.g. Design Thinking (DT), Technology Application Selection (TAS) process).
- Orientation on the management of new technology-based companies (NTBF): Students can name the central concepts of intellectual property and legal form. Students can name the most important tasks of entrepreneurial leadership. They can identify the relevant forms of business modelling and draw up a business plan. Students know the central approaches to building an organisation. Students will be able to identify the ownership structure of investments and how to develop a strategy. The students can name marketing concepts and create a business model.
- Create investment readiness: The students are able to create a rudimentary sales and cost planning. Furthermore, they are able to create a project plan for a company and derive an investment plan from it. The students can present the business plan to potential investors and develop investor empathy.
- Business model development competence: Students are able to use relevant tools for business modelling, e.g. the Business Model Canvas. Students can develop and evaluate alternative business models.
- Dealing with risks:Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

- Problem-solving competence: Students can analyse, assess and solve a technical problem in a structured way.
- Agile Methodology of System Development: Students can name the different system development processes and apply them appropriately.
- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Content

In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one's own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

- As an innovation platform, the Automation Innovation Lab offers flying robots for cooperative swarm solutions.
- The Industry 4.0 Innovation Lab enables innovations in the area of the next industrial revolution with mobile robot platforms.
- In the Internet of Things Innovation Lab, innovations in Assisted Living and Smart Housing are made possible by a comprehensive kit of mobile robots and sensors.
- The Computer Vision for Health Lab offers a selection of state-of-the-art imaging devices and powerful computing hardware for innovative image-based applications for medicine and healthcare.

The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Annotation

New module starting winter term 2019/2020.

Workload

The module comprises a total of 270 hours (8 hours attendance time, 213 hours preparation and follow-up time, 49 hours preparation time for examination), which corresponds to a total of 9 credit points for two semesters.

M 6.99 Module: Technical Logistics [M-MACH-101279]

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

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

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

Mandatory			
T-MACH-109919	Basics of Technical Logistics I	4 CR	Mittwollen, Oellerich
T-MACH-109920	Basics of Technical Logistics II	5 CR	Hochstein

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

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

Prerequisites
none

Competence Goal
The student

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

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

Workload
270 hours

Learning type
Lecture

M 6.100 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
Compulsory Elective Modules 1 (Economics)
Compulsory Elective Modules 2 (Economics)

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

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-103107	Spatial Economics	4,5 CR	Ott
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba

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

Prerequisites
None

Competence Goal
The students

- understand the economic issues related to transport and regional development with a main focus on economic policy issues generated by the relationship of transport and regional development with the public sector
- are able to compare different considerations of politics, regulation and the private sector and to analyse and assess the respective decision problems both qualitatively and by applying appropriate methods from economic theory
- are prepared for careers in the public sector, particularly for public companies, politics, regulatory agencies, related consultancies, mayor construction companies or infrastructure project corporations

Content
The development infrastructure (e.g. transport, energy, telecommunications) has always been one of the most relevant factors for economic development and particularly influences the development of the regional economy. From the repertoire of state actions, investments into transport infrastructure are often regarded the most important measure to foster regional economic growth. Besides the direct effects of transport policy on passenger and freight transport, a variety of individual economic activities is significantly dependent on the available or potential transport options. Decisions on the planning, financing and realization of mayor infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs.

Through its combination of lectures the module reflects the complex interdependencies between infrastructure policy, transport industry and regional policy and provides its participants with a comprehensive understanding of the functionalities of one of the most important sectors of the economy and its relevance for economic policy.

Annotation
The courses *Assessment of Public Policies and Projects I* (winter term) and *Assessment of Public Policies and Projects II* (summer term) will no longer be part of this module. Student who have already had exams in this courses can integrate these exams in this module.

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

M 6.101 Module: Transportation Modelling and Traffic Management [M-BGU-101065]

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

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

Compulsory Examination (Election: between 2 and 3 items as well as between 6 and 9 credits)			
T-BGU-101797	Methods and Models in Transportation Planning	3 CR	Vortisch
T-BGU-101798	Traffic Engineering	3 CR	Vortisch
T-BGU-101799	Traffic Management and Transport Telematics	3 CR	Vortisch
T-BGU-101800	Traffic Flow Simulation	3 CR	Vortisch
Electives (Election: at most 1 item as well as between 0 and 3 credits)			
T-BGU-100010	Transportation Data Analysis	3 CR	Kagerbauer
T-BGU-106611	Freight Transport	3 CR	Chlond
T-BGU-106301	Long-Distance and Air Traffic	3 CR	Chlond
T-BGU-101005	Tendering, Planning and Financing in Public Transport	3 CR	Vortisch
T-BGU-100014	Seminar in Transportation	3 CR	Chlond, Vortisch
T-WIWI-103174	Seminar Mobility Services (Master)	3 CR	Satzger, Stryja
T-BGU-103425	Mobility Services and New Forms of Mobility	3 CR	Kagerbauer
T-BGU-103426	Strategic Transport Planning	3 CR	Waßmuth
T-BGU-106608	Information Management for Public Mobility Services	3 CR	Vortisch
T-BGU-111057	Sustainability in Mobility Systems	3 CR	Kagerbauer

Prerequisites
None

Competence Goal
See German version.

Recommendation
None

M   6.102 Module: Virtual Engineering A [M-MACH-101283]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

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

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

Mandatory			
T-MACH-102123	Virtual Engineering I	4 CR	Ovtcharova
Virtual Engineering A (Election: at least 5 credits)			
T-MACH-102185	CATIA CAD Training Course	2 CR	Ovtcharova
T-MACH-105312	CATIA Advanced	4 CR	Ovtcharova
T-MACH-108491	Digitalization of Products, Services & Production	4 CR	Pätzold
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-106743	IoT Platform for Engineering	4 CR	Ovtcharova
T-MACH-102181	PLM for Product Development in Mechatronics	4 CR	Eigner
T-MACH-106740	Virtual Engineering Lab	4 CR	Ovtcharova
T-MACH-106741	Virtual Training Factory 4.X	4 CR	Ovtcharova
T-MACH-111285	Virtual Solution Methods and Processes	4 CR	Maier, Ovtcharova

Competence Certificate

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

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

Prerequisites

None

Competence Goal

The students should:

- have basic knowledge about the industrial application of Information Technology in product development,
- have understanding about current and future application of information systems in product development processes in the context of Product Lifecycle Management and Virtual Engineering,
- be able to operate current CAx- and PLM-systems in the product development process
- understands demands and relevance of interconnected IT-systems and respective methods for product development

Content

The Module Virtual Engineering A gives an overview about product development processes, beginning with requirement engineering, verification of manufacturing feasibility and virtual operation in the scope of Digital Factory. The guest-lectures contained in this module complete the content of the lecture with introducing current product development processes focusing.

Workload

- regular attendance: 140 hours
- Preparation and reworking: 20 hours
- Exam and exam revision/preparation: 110 hours

Learning type

Lecture, exercise

M 6.103 Module: Virtual Engineering B [M-MACH-101281]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

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

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

Mandatory			
T-MACH-102124	Virtual Engineering II	4 CR	Ovtcharova
Virtual Engineering B (Election: at least 5 credits)			
T-MACH-102185	CATIA CAD Training Course	2 CR	Ovtcharova
T-MACH-105312	CATIA Advanced	4 CR	Ovtcharova
T-MACH-108491	Digitalization of Products, Services & Production	4 CR	Pätzold
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-106743	IoT Platform for Engineering	4 CR	Ovtcharova
T-MACH-102181	PLM for Product Development in Mechatronics	4 CR	Eigner
T-MACH-106740	Virtual Engineering Lab	4 CR	Ovtcharova
T-MACH-106741	Virtual Training Factory 4.X	4 CR	Ovtcharova
T-MACH-111285	Virtual Solution Methods and Processes	4 CR	Maier, Ovtcharova

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

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

Prerequisites
keine

Competence Goal
The students should:

- have basic knowledge about industrial practice of Information Technology in the field of product development,
- have basic knowledge about innovative visualization techniques like Virtual Reality and feasible application of Virtual Mock-Ups (VMU) for validating product properties.
- Is able to estimate potentials and risks of current Virtual Reality Systems in product development.
- understands demands and relevance of interconnected IT-systems and respective methods for product development

Content
The module Virtual Engineering B communicates basics of Virtual Reality applications and their fields of application for validating product properties and for supporting product development processes.

Optional courses of this module complete the content with practical application of VR techniques in product development (Virtual Reality Exercise) and current product development processes.

Workload
Workload at 9 graduate credits / credit points: ca. 270 hours.

- regular attendance: 100 hours
- Preparation and reworking: 50 hours
- Exam and exam revision/preparation: 120 hours

Detailed apportionment results from credit points of the courses of the module

Learning type
Lecture, Exercise.

| M | **6.104 Module: Water Chemistry and Water Technology I [M-CIWVT-101121]** |

Responsible: Prof. Dr. Harald Horn

Organisation: KIT Department of Chemical and Process Engineering

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

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

Mandatory			
T-CIWVT-101900	Water Chemistry and Water Technology I	6 CR	Horn
T-CIWVT-103351	Laboratory Work Water Chemistry	4 CR	Abbt-Braun, Horn

Prerequisites
none

Competence Goal
The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water.

Content
This module gives the basis to understand the most important methods of raw water treatment.

Therefore types and sum of water constituents and their interaction with each other and with water molecules are introduced. The effects of the different treatment and purification methods are shown

M 6.105 Module: Water Chemistry and Water Technology II [M-CIWVT-101122]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Compulsory Elective Modules 1 (Natural and Engineering Sciences)
Compulsory Elective Modules 2 (Natural and Engineering Sciences)

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

Mandatory			
T-CIWVT-108841	Water Quality Assessment	6 CR	Abbt-Braun
T-CIWVT-110864	Excursions: Membrane Technologies	1 CR	Horn, Saravia
T-CIWVT-110865	Membrane Technologies in Water Treatment	5 CR	Horn, Saravia

Prerequisites
The Module "Water Chemistry and Water Technology I" must be passed.

Competence Goal
The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- is able to explain the interrelationships of the occurrence of geogenic and anthropogenic substances as well as of microorganisms in the different areas of the hydrological cycle and is able to select suitable analytical methods for their determination,
- knows about the different types of water treatment and water purification methods to convert, reduce or concentrate water constituents, especially for membrane processes,
- is able to use methodical tools, analyze the correlations and critically evaluate the critically evaluate the different procedures.

Content
The types of water, water law, basic terms of water chemical analysis, analysis quality, sampling, rapid test procedures and general investigation methods as well as summary parameters are dealt with. The analytical methods for main and secondary constituents as well as for organic and inorganic trace substances are discussed with examples for orientation.
The effects of the different treatment and purification methods are shown and it is explained how they can convert, reduce or concentrate water constituents.

7 Courses

T 7.1 Course: Extrusion Technology [T-CIWVT-111435]

Responsible:	Dr.-Ing. Azad Emin
Organisation:	KIT Department of Chemical and Process Engineering
Part of:	M-CIWVT-101119 - Specialization in Food Process Engineering
	M-CIWVT-101120 - Principles of Food Process Engineering

Type Written examination	**Credits** 1,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 4

Events					
ST 2022	22246	Extrusion Technology in Food Processing	1 SWS	Lecture / 🎤	Emin

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

T   7.2 Course: A Closer Look at Social Innovation [T-WIWI-109932]

Responsible:	Dr. Daniela Beyer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Competence Certificate

Non exam assessment (following §4(2) 3 of the examination regulation). The grade consists of an innovation plan (comparable to an exposé) (15%), a guideline interview (25%), a presentation of the results (20%) and a seminar paper (40%).

Prerequisites

None

Recommendation

The previous attendance of the lecture Innovation Management is recommended.

T   7.3 Course: Additives and Active Substances [T-CIWVT-111434]

Responsible: Dr.-Ing. Ulrike van der Schaaf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering
                    M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each summer term	1

Events					
ST 2022	22209		1 SWS	Lecture / 🗣	van der Schaaf

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 7.4 Course: Advanced Empirical Asset Pricing [T-WIWI-110513]

Responsible:	TT-Prof. Dr. Julian Thimme
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2530569	Advanced Empirical Asset Pricing	2 SWS	Lecture / ⚙	Thimme
WT 21/22	2530570	Übung zu Advanced Empirical Asset Pricing	1 SWS	Practice / ⚙	Thimme
Exams					
WT 21/22	7900319	Advanced Empirical Asset Pricing			Thimme
ST 2022	7900321	Advanced Empirical Asset Pricing			Thimme

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 📍 On-Site, ✗ Cancelled

Competence Certificate

The success control takes place in form of a written examination (60 min) during the semester break. If the number of participants is low, an oral examination may also be offered. The examination is offered every semester and can be repeated at any regular examination date.

A bonus can be acquired by submitting exercise solutions to 80% of the assigned exercise tasks. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Recommendation

We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course. In addition, prior participation in the Asset Pricing Master course is strongly recommended.

Annotation

New course from winter semester 2019/2020.

Below you will find excerpts from events related to this course:

V Advanced Empirical Asset Pricing
2530569, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

In this course we will discuss the fundamentals of Asset Pricing and how to test them. Although this is an Empirical Asset Pricing course, we deal with some concepts from Asset Pricing Theory that we can test afterwards (CAPM, ICAPM, CCAPM, recursive utility). Besides, the course will cover the most important empirical methods to do so. For that purpose, we will discuss the overarching tool *Generalized Method of Moments*, and the special cases of OLS and FMB regressions. Every second week, we will meet for a programing session, in which we will look at the data to draw our own conclusions. An introduction to the software MATLAB will be given at the beginning of the course. Students should bring a laptop to these sessions. Programing skills are not required but helpful.

We start with a review of the Stochastic Discount Factor, which is already known from the course „Asset Pricing". We then derive the CAPM and the Consumption-CAPM as special cases from the general consumption-savings optimization problem of the rational investor. In the first part of the course we discuss the CAPM and, as natural extensions, models with multiple factors. Prominent phenomena such as the value premium and momentum are discussed. In the second part of the lecture we will study extensions of Consumption-CAPM and study the implications of exotic preferences.

Literature
Basisliteratur

Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

zur Vertiefung/ Wiederholung

Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.

The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

T	**7.5 Course: Advanced Food Processing [T-CIWVT-100152]**

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	22214	Vertiefung verfahrenstechnischer Grundlagen am Beispiel Lebensmittel	2 SWS	Lecture / 🗣	Gaukel
Exams					
WT 21/22	7220004	Advanced Food Processing			Gaukel
ST 2022	7220004	Advanced Food Processing			Gaukel

Legend: 📱 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T   7.6 Course: Advanced Game Theory [T-WIWI-102861]

Responsible:	Prof. Dr. Karl-Martin Ehrhart
	Prof. Dr. Clemens Puppe
	Prof. Dr. Johannes Philipp Reiß
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101453 - Applied Strategic Decisions
	M-WIWI-101500 - Microeconomic Theory
	M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2521533	Advanced Game Theory	2 SWS	Lecture / ▯	Reiß
WT 21/22	2521534	Übung zu Advanced Game Theory	1 SWS	Practice / ▯	Reiß, Peters
Exams					
WT 21/22	7990004	Advanced Game Theory			Reiß

Legend: ▯ Online, ⚬ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Basic knowledge of mathematics and statistics is assumed.

Below you will find excerpts from events related to this course:

V	**Advanced Game Theory**	Lecture (V)
	2521533, WS 21/22, 2 SWS, Language: English, Open in study portal	Online

T   7.7 Course: Advanced Lab Blockchain Hackathon (Master) [T-WIWI-111126]

Responsible:	Prof. Dr. Ali Sunyaev
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

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

Events					
WT 21/22	2512403	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course / 🖥	Sunyaev, Kannengießer, Sturm, Beyene
Exams					
WT 21/22	7900141	Advanced Lab Blockchain Hackathon (Master)			Sunyaev
ST 2022	7900172	Lab Blockchain Hackathon (Master)			Sunyaev

Legend: 🖥 Online, ⚂ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites

None

T 7.8 Course: Advanced Lab Informatics (Master) [T-WIWI-110548]

Responsible:	Professorenschaft des Instituts AIFB
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

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

Events					
WT 21/22	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course /	Oberweis, Toussaint, Schüler, Schiefer
WT 21/22	2512401	Practical Course Sociotechnical Information Systems Development (Master)	3 SWS	Practical course /	Sunyaev, Pandl, Goram
WT 21/22	2512403	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course /	Sunyaev, Kannengießer, Sturm, Beyene
WT 21/22	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course /	Zöllner, Daaboul
WT 21/22	2512557	Practical Course Security (Master)	4 SWS	Practical course /	Baumgart, Volkamer, Mayer
WT 21/22	2512600	Project lab Information Service Engineering (Master)	3 SWS	Practical course	Sack
ST 2022	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course /	Schiefer, Schüler, Toussaint
ST 2022	2512207	Lab Automation in Everyday Life (Master)	3 SWS	Practical course /	Schiefer, Forell, Frister
ST 2022	2512401	Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course /	Sunyaev, Pandl, Goram
ST 2022	2512403	Advanced Lab Blockchain Hackathon (Master)		Practical course /	Sunyaev, Beyene, Kannengießer
ST 2022	2512500	Project Lab Machine Learning	3 SWS	Practical course /	Zöllner
ST 2022	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Mayer, Berens, Mossano, Düzgün, Hennig, Veit
ST 2022	2512603	Project Course Coding da Vinci - Cultural Heritage Hackathon (Master)	3 SWS	Practical course /	Sack, Bruns, Tietz
Exams					
WT 21/22	7900046	Advanced Lab Security (Master)			Volkamer
WT 21/22	7900102	Advanced Lab Information Service Engineering			Sack
WT 21/22	7900107	Advanced Lab Cognitive Automobile and Robots (Master)			Zöllner
WT 21/22	7900141	Advanced Lab Blockchain Hackathon (Master)			Sunyaev
WT 21/22	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev
WT 21/22	7900306	Advanced Lab Realization of Innovative Services (Master)			Oberweis
WT 21/22	7900307	Advanced Lab Security, Usability and Society (Master)			Volkamer
ST 2022	7900020	Lab Automation in Everyday Life (Master)			Oberweis
ST 2022	7900030	Lab Coding da Vinci - Cultural Heritage Hackathon (Master)			Sack
ST 2022	7900086	Project Lab Machine Learning			Zöllner

ST 2022	7900148	Advanced Lab Realization of innovative services (Master)	Oberweis
ST 2022	7900172	Lab Blockchain Hackathon (Master)	Sunyaev
ST 2022	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)	Sunyaev
ST 2022	7900178	Practical Lab Security, Usability and Society (Master)	Volkamer

Legend: ▯ Online, ✧ Blended (On-Site/Online), ◕ On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Annotation
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Lab Realisation of innovative services (Master)** 2512205, WS 21/22, 3 SWS, Language: German, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V	**Practical Course Sociotechnical Information Systems Development (Master)** 2512401, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content
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

V	**Practical Course Cognitive automobiles and robots (Master)** 2512501, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V	**Practical Course Security (Master)** 2512557, WS 21/22, 4 SWS, Language: German, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

The lab deals with the IT security of everyday utensils. Implemented security mechanisms are first theoretically investigated and put to the test with practical attacks. Finally, countermeasures and suggestions for improvement are worked out. The lab is offered within the competence center for applied security technologies (KASTEL) and is supervised by several institutes.

The success control takes the form of a final presentation, a thesis and the handing over of the developed code.

More information on ILIAS.

V	**Project lab Information Service Engineering (Master)** 2512600, WS 21/22, 3 SWS, Language: English, Open in study portal	**Practical course (P)**

Content

The ISE project lab is based on the summer semester lecture "Information Service Engineering". Goal of the course is to work on a given research problem in small groups (3-4 students) related to the ISE lecture topics, i.e. Natural Language Processing, Knowledge Graphs, and Machine Learning. The solution of the given research problem requires the development of a software implementation.

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

Required coursework includes:

- Mid term presentation (5-10 min)
- Final presentation (10-15 min)
- Course report (c. 20 pages)
- Participation and contribution of the students during the course
- Software development and delivery

Notes:

The ISE project lab can also be credited as a **seminar** (if necessary).

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

Participation will be restricted to 15 students.

Participation in the lecture "Information Service Engineering" (summer semester) is required. There are video recordings on our youtube channel.

ISE Tutor Team:

- M. Sc. Russa Biswas
- M. Sc. Genet Asefa Gesese
- M. Sc. Oleksandra Bruns
- M. Sc. Yiyi Chen
- M. Sc. Mary Ann Tan
- B. Sc. Tabea Tietz

Literature

ISE video channel on youtube: https://www.youtube.com/channel/UCjkkhNSNuXrJpMYZoeSBw6Q/

V	**Lab Realisation of innovative services (Master)** 2512205, SS 2022, 3 SWS, Language: German, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Further information can be found on the ILIAS page of the lab.

Organizational issues

Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V	**Lab Automation in Everyday Life (Master)** 2512207, SS 2022, 3 SWS, Language: German, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

As part of the lab, various topics on everyday automation are offered. During the lab, the participants will gain an insight into problem-solving oriented project work and work on a project together in small groups.

Further information can be found on the ILIAS page of the lab.

Organizational issues

Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V	**Development of Sociotechnical Information Systems (Master)** 2512401, SS 2022, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

V	**Project Lab Machine Learning** 2512500, SS 2022, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V	**Praktikum Security, Usability and Society (Master)** 2512555, SS 2022, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

The internship "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on hte WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu before the kick-off. You can find a better description of the topics in ILIAS (link below). Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

ILIAS link: https://ilias.studium.kit.edu/goto.php?target=crs_1792110&client_id=produktiv

Important dates:

Kick-off: 19.04.2022, 9:00-10:00 CET Uhr Microsoft Teams - - Link

Report + code submission : 09.09.2022, 23:59 CET

Presentation deadline : 25.09.2022, 23:59 CET

Presentation day: 25.09.2022

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Improving the PassSec+ browser extension by investigating a security vulnerability in Mozilla Firefox Relay
- Development of a tool for the automated search for tweets on the topic of "phishing"
- Hacking TORPEDO
- Restructuring TORPEDO
- Authenticating on AR glasses: Implementing an authentication scheme for the Google Glass

Designing Security User studies (online studies only)

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

- Investigate brainwaves authentication
- Replication and extension of "What is this URL's destination?"

Please, note that registration is not required to participate in the kick-off meeting.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V	**Project Course Coding da Vinci - Cultural Heritage Hackathon (Master)** 2512603, SS 2022, 3 SWS, Language: English, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

Cultural heritage includes tangible and intangible heritage assets inherited from past generations. Cultural heritage data are usually stored in galleries, museums, archives and libraries (GLAM institutions) and in recent years, efforts by culture domain experts and computer scientists have begun to make this data more findable, accessible, interoperable and reusable by the general public, but also by researchers in the domains of history, social science, etc. This seminar follows up on these efforts by having student groups participate in the official Coding da Vinci culture hackathon with guidance and coaching by the course tutors.

The culture hackathon Coding da Vinci has brought together the cultural sector with creative technology communities to explore the creative potential of digital cultural heritage. Over a sprint of seven weeks the hackathon teams, together with representatives of cultural institutions, develop working prototypes that show surprising and inspiring new ways to make use of institutions' collections and artifacts in the digital age.

As part of this "Projektpraktikum", the students will take part in the official hackathon "Coding da Vinci Baden-Württemberg" (https://codingdavinci.de/index.php/de/events/baden-wuerttemberg-2022). They will form groups and implement their own interesting culture project by using the dataset(s) provided by Coding da Vinci. The goal is to create a project that is useful for the culture community and helps to explore and experience cultural heritage data in an interesting, innovative and fun way.

This "Projektpraktikum" is furthermore a chance to network with the community of culture enthusiasts and developers while creating a working application that adds value to the community. The groups will present their work at the official Codings da Vinci kick-off event and the award ceremony.

Contributions of the students:

The students will form groups of 3-4 people. They will be expected to first get familiar with datasets presented in the event, the technologies and methods they will utilize and will develop their own project idea. Each group will present their **project idea on May 07, 2022** at the Coding da Vinci BW kick-off and will officially start the implementation of their project. On **June 24, 2022**, each group will present their **final projec**t at the official Coding da Vinci BW award ceremony. Following the event, each group will prepare a scientific seminar paper of not more than 16 pages.

Implementation:

Each group will implement their project idea based on the datasets given in the event using open source software and will publish their code using an open license via github.

Learning Goals:

- Basic understanding of knowledge graphs and Natural Language Processing
- Independent and self-organized realization of a group project
- Planning and execution of design, implementation and quality assurance of the group project
- Preparation of a scientific seminar paper for the group project of 16 pages
- Presentation of the group project in a comprehensible and structured manner

Registration:

The registration period for this course lasts from 01.02.2022 until 22.04.2022. The places are expected to be allocated on 25.04.2022 and must be accepted by the student within two days.

If you have any questions regarding the registration or course content, please contact tabea.tietz@kit.edu and oleksandra.bruns@kit.edu .

Modules: Informatik

Timeline:

20.04.2022 Plenary meeting: Introduction and Course Organization

27.04.2022 Plenary meeting: Forming of student groups and discussion of datasets

07.05.2022 Official Coding da Vinci Kick-off Event: Presentation of group idea

11.05.2022 Individual group sessions: Fixing a project plan and timeline

18.05.2022 Individual group sessions: Weekly progress meeting

25.05.2022 Individual group sessions: Weekly progress meeting

01.06.2022 Individual group sessions: Weekly progress meeting

08.06.2022 Individual group sessions: Weekly progress meeting

15.06.2022 Individual group sessions: Weekly progress meeting

22.06.2022 Individual group sessions: Weekly progress meeting

24.06.2022 Official Coding da Vinci Award Ceremony: Final Presentation

17.08.2022 Seminar paper submission and finalization (and documentation) of the code

Organizational issues

Considering the then current pandemic situation and in coordination with the participants the course will mostly taking place as online course with potentially a few "live" events (cf further description below).

T | 7.9 Course: Advanced Lab Security [T-WIWI-109786]

Responsible:	Prof. Dr. Melanie Volkamer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type Examination of another type	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 2

Events					
WT 21/22	2512557	Practical Course Security (Master)	4 SWS	Practical course / ♻	Baumgart, Volkamer, Mayer

Exams			
WT 21/22	7900046	Advanced Lab Security (Master)	Volkamer

Legend: 🖥 Online, ♻ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites

None

Recommendation

Knowledge from the lecture "Information Security" is recommended.

Below you will find excerpts from events related to this course:

V	**Practical Course Security (Master)** 2512557, WS 21/22, 4 SWS, Language: German, Open in study portal	**Practical course (P) Blended (On-Site/Online)**

Content

The lab deals with the IT security of everyday utensils. Implemented security mechanisms are first theoretically investigated and put to the test with practical attacks. Finally, countermeasures and suggestions for improvement are worked out. The lab is offered within the competence center for applied security technologies (KASTEL) and is supervised by several institutes.

The success control takes the form of a final presentation, a thesis and the handing over of the developed code.

More information on ILIAS.

T 7.10 Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

Responsible:	Prof. Dr. Melanie Volkamer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
WT 21/22	2500024	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course / 🖥	Volkamer, Mayer, Ghiglieri , Aldag, Beckmann, Mossano
WT 21/22	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course / 🖥	Volkamer, Mayer, Ghiglieri , Aldag, Beckmann, Mossano
ST 2022	2612554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course / 🖥	Volkamer, Strufe, Mayer, Berens, Mossano, Düzgün, Hennig, Veit
Exams					
WT 21/22	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
WT 21/22	7900307	Advanced Lab Security, Usability and Society (Master)			Volkamer
ST 2022	7900029	Practical lab Security, Usability and Society (Bachelor)			Volkamer

Legend: 🖥 Online, ⬨ Blended (On-Site/Online), 🔵 On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

Annotation
The course is expected to be offered from winter term 2018/2019.

Contents:

In the course of the programming lab, changing topics from the field of Human Factors in Security und Privacy will be worked on.

Learning goals:

The student

- can apply the basics of information security
- is able to implement appropriate measures to achieve different protection goals
- can structure a software project in the field of information security
- can use the Human Centred Security and Privacy by Design technique to develop user-friendly software
- can explain and present technical facts and the results of the programming lab in oral and written form

Below you will find excerpts from events related to this course:

V	**Praktikum Security, Usability and Society (Master)** 2500024, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

Registration is closed.

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

Important dates:

Kick-off: 11.10.2021, 11:30-12:30 CET in Microsoft Teams - Link

Report + code submission : 06.02.2022, 23:59 CET

Presentation deadline : 06.02.2022, 23:59 CET

Presentation day: 08.02.2022

Topics:

Privacy Friendly apps

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

- Notes 2.0

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and mor*e advanced ones that heighten the final grade.*

- *Password Manager Enrolment Add-On*
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Cookie Consent Manager for Websites

Designing Security User studies (online studies only)

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

- How to display URLs to support people's ability to detect phishing (English)
- *Studying the Effect of Static vs. Dynamic Phishing Detection*
- *How effective are QR-scanners in helping users detecting phishing emails?*

Please, note that registration is not required to participate in the kick-off meeting.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V	**Praktikum Security, Usability and Society (Bachelor)** 2512554, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

Registration is now closed.

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

Important dates:

Kick-off: 11.10.2021, 11:30-12:30 CET in Microsoft Teams - Link

Report + code submission : 06.02.2022, 23:59 CET

Presentation deadline : 06.02.2022, 23:59 CET

Presentation day: 08.02.2022

Topics:

Privacy Friendly apps

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

- *Notes 2.0*

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

- *Password Manager Enrolment Add-On*
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Cookie Consent Manager for Websites

Designing Security User studies (online studies only)

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

- *How to display URLs to support people's ability to detect phishing (English)*
- Studying the Effect of Static vs. Dynamic Phishing Detection
- *How effective are QR-scanners in helping users detecting phishing emails?*

Please, note that registration is not required to participate in the kick-off meeting.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V	**Practical lab Security, Usability and Society (Bachelor)** 2612554, SS 2022, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

The internship "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on hte WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu before the kick-off. You can find a better description of the topics in ILIAS (link below). Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

ILIAS link: https://ilias.studium.kit.edu/goto.php?target=crs_1792110&client_id=produktiv

Important dates:

Kick-off: 19.04.2022, 9:00-10:00 CET Uhr Microsoft Teams - - Link

Report + code submission : 09.09.2022, 23:59 CET

Presentation deadline : 25.09.2022, 23:59 CET

Presentation day: 25.09.2022

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Improving the PassSec+ browser extension by investigating a security vulnerability in Mozilla Firefox Relay
- Development of a tool for the automated search for tweets on the topic of "phishing"
- Hacking TORPEDO
- Restructuring TORPEDO

Please, note that registration is not required to participate in the kick-off meeting.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

T   7.11 Course: Advanced Lab Sociotechnical Information Systems Development (Master) [T-WIWI-111125]

Responsible: Prof. Dr. Ali Sunyaev

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

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

Events					
WT 21/22	2512401	Practical Course Sociotechnical Information Systems Development (Master)	3 SWS	Practical course / 📱	Sunyaev, Pandl, Goram
Exams					
WT 21/22	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev
ST 2022	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites

None

Below you will find excerpts from events related to this course:

V   Practical Course Sociotechnical Information Systems Development (Master)   Practical course (P) Online
2512401, WS 21/22, 3 SWS, Language: German/English, Open in study portal

Content

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 | **7.12 Course: Advanced Machine Learning [T-WIWI-109921]** |

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr. Abdolreza Nazemi
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	2540535	Advanced Machine Learning	2 SWS	Lecture	Nazemi
ST 2022	2540536	Exercise Advanced Machine Learning	1 SWS	Practice	Nazemi
Exams					
WT 21/22	7900253	Advanced Machine Learning (Nachklausur SS 2021)			Geyer-Schulz
ST 2022	7900227	Advanced Machine Learning			Geyer-Schulz

Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

| V | **Advanced Machine Learning**
2540535, SS 2022, 2 SWS, Language: English, Open in study portal | Lecture (V) |

Content

In recent years, the volume, variety, velocity, veracity, and variability of available data have increased due to improvements in computational and storage power. The rise of the Internet has made available large sets of data that allow us to use and merge them for different purposes. Data science helps us to extract knowledge from the continually-increasing large datasets. This course will introduce students to a wide range of machine learning and statistical techniques such as deep learning, LASSO, and support vector machine. You will get familiar with text mining, and the tools you need to analyze the various facets of data sets in practice. Students will learn theory and concepts with real data sets from different disciplines such as marketing, finance, and business.

Tentative Course Outline:

- Introduction
- Statistical Inference
- Shrinkage Methods
- Model Assessment and Selection
- Tree-based Machine Learning Algorithms
- Dimensionality Reduction
- Neural Networks and Deep Learning
- Natural Language Processing with Deep Learning
- Support Vector Machine

Time of attendance

- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m

The student will learn

- A wide range of machine learning algorithms and their weaknesses.
- The fundamental issues and challenges: data, high-dimension, train, model selection, etc.
- How to imply machine learning algorithms for real-world applications.
- The fundamentals of deep learning, main research activities, and on-going research in this field.

Literature

- Alpaydin, E. (2014). Introduction to Machine Learning. Third Edition, MIT Press.
- De Prado, M. L. (2018). Advances in Financial Machine Learning. John Wiley & Sons.
- Goodfellow, I., Bengio, Y., and A. Courville (2017). Deep Learning. MIT Press. (online available)
- Hastie, T., Tibshirani, R., and J. Friedman (2009). Elements of Statistical Learning. Second Edition. Springer. (online available)
- Leskovec, J., Rajaraman, A., Ullman, J. D., (2014). Mining of Massive Datasets. Cambridge University Press. (online available)
- Witten, I. H., Eibe, F., Hall, M. A., Pal, C. J. (2016). Data Mining: Practical Machine Learning Tools and Techniques. Morgan Kaufmann.

T 7.13 Course: Advanced Machine Learning and Data Science [T-WIWI-111305]

Responsible:	Prof. Dr. Maxim Ulrich
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105659 - Advanced Machine Learning and Data Science

Type Examination of another type	Credits 9	Grading scale Grade to a third	Recurrence Each term	Version 2

Events					
WT 21/22	2530357	Advanced Machine Learning and Data Science	4 SWS	Practical course / 🗎	Ulrich
ST 2022	2530357	Advanced Machine Learning and Data Science	4 SWS	Practical course	Ulrich
Exams					
WT 21/22	7900381	Advanced Machine Learning and Data Science			Ulrich

Legend: 🗎 Online, ⚹ Blended (On-Site/Online), ◖ On-Site, ✗ Cancelled

Competence Certificate
The assessment is carried out in form of a written thesis based on the course "Advanced Machine Learning and Data Science".

Annotation
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning. Please apply via the link: https://portal.wiwi.kit.edu/forms/form/fbv-ulrich-msc-project.

An online meetup will be offered during the first week of summer semester 2022.

Below you will find excerpts from events related to this course:

V	**Advanced Machine Learning and Data Science** 2530357, WS 21/22, 4 SWS, Language: English, Open in study portal	**Practical course (P)** **Online**

Content
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning.

Organizational issues
14-tägig, tba

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

V	**Advanced Machine Learning and Data Science** 2530357, SS 2022, 4 SWS, Language: English, Open in study portal	**Practical course (P)**

Content
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning.

Organizational issues
Location: Räume des Lehrstuhls, Blücherstraße 17, E-008

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

T	7.14 Course: Advanced Management Accounting [T-WIWI-102885]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each winter term	2

Events					
WT 21/22	2579907	Advanced Management Accounting	4 SWS	Lecture / 🗣	Wouters
Exams					
WT 21/22	79-2579907-M	Advanced Management Accounting			Wouters

Legend: 📱 Online, 💥 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral exam (30 min) (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendation
The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Annotation
This course is held in English. Lectures and tutorials are integrated.

The course is compulsory and must be examined.

Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters∂kit.edu).

Below you will find excerpts from events related to this course:

V	**Advanced Management Accounting**	Lecture (V)
	2579907, WS 21/22, 4 SWS, Language: English, Open in study portal	On-Site

Content
This course is held in English. Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

Inhalt:

- The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

Learning objectives:

- Students will be able to consider advanced management accounting methods in an interdisciplinary way and to apply these to managerial decision-making problems in operations and innovation.
- They will also be able to identify relevant research results on such methods.

Examination:

- The assessment consists of an oral exam (30 min) taking place in the recess period (according to § 4 (2) No. 2 of the examination regulation).
- The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Required prior Courses:

- The course is compulsory and must be examined.

Recommendations:

- The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Workload:

- The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature is mostly made available via ILIAS.

T 7.15 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	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	see Annotations	1

Competence Certificate
The examination will no longer be offered as of summer semester 2021.

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
Lecture and examination will no longer be offered from summer semester 2021.

T	**7.16 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 21/22	2550552	Statistik für Fortgeschrittene	2 SWS	Lecture / 🖥	Grothe
WT 21/22	2550553	Übung zu Statistik für Fortgeschrittene	2 SWS	Practice / 🖥	Grothe, Rieger
Exams					
WT 21/22	7900289	Advanced Statistics			Grothe

Legend: 🖥 Online, ✣ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Statistik für Fortgeschrittene** 2550552, WS 21/22, 2 SWS, Open in study portal	**Lecture (V)** **Online**

Literature

Skript zur Vorlesung

T   7.17 Course: Advanced Stochastic Optimization [T-WIWI-106548]

Responsible:	Prof. Dr. Steffen Rebennack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Competence Certificate

The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites

None.

| **T** | **7.18 Course: Advanced Topics in Digital Management [T-WIWI-111912]** |

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Events					
ST 2022	2573016	Advanced Topics in Digital Management	2 SWS	Colloquium (K / 🗣	Nieken, Mitarbeiter

Legend: 🗎 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment. The following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendation
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas digital HRM, personnel economics, and leadership and those who are interest in an academic career path.

Below you will find excerpts from events related to this course:

| **V** | **Advanced Topics in Digital Management**
2573016, SS 2022, 2 SWS, Language: English, Open in study portal | **Colloquium (KOL)**
On-Site |

Content

The students will discuss and analyze selected research papers in the areas digital HRM, personnel economics, and leadership with a focus on digital management. The students will present research papers and discuss research methods and designs as well as content. They will develop an own research design on a predefined topic.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership with a focus on digital management and AI.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills and discussion skills.
- Practices scientific debating.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of digital HRM and management.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
- Learns how to develop an own research design and idea.

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues

Geb. 05.20, Raum 2A-25, Termine werden bekannt gegeben

T 7.19 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-101497 - Agglomeration and Innovation
	M-WIWI-101500 - Microeconomic Theory
	M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2022	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture / 🗣	Mitusch, Brumm
ST 2022	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice / 🗣	Pegorari, Corbo

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

Prerequisites
None

Recommendation
This course is designed for advanced Master students with a strong interest in economic theory and mathematical models. Bachelor students who would like to participate are free to do so, but should be aware that the level is much more advanced than in other courses of their curriculum.

Below you will find excerpts from events related to this course:

V Advanced Topics in Economic Theory
2520527, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Die Veranstaltung wird in englischer Sprache angeboten:

The course is based on the excellent textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

T 7.20 Course: Advanced Topics in Human Resource Management [T-WIWI-111913]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
ST 2022	2573014	Advanced Topics in Human Resource Management	2 SWS	Colloquium (K / 🗣	Nieken, Mitarbeiter

Legend: 📱 Online, 🎴 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment.The following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendation
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas HRM, personnel economics, and leadership and those who are interest in an academic career path.

Below you will find excerpts from events related to this course:

V	**Advanced Topics in Human Resource Management** 2573014, SS 2022, 2 SWS, Language: English, Open in study portal	**Colloquium (KOL) On-Site**

Content

The students will discuss and analyze selected research papers in the areas HRM, personnel economics, and leadership. The students will present research papers and discuss research methods and designs as well as content. They will develop an own research design on a predefined topic.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills and discussion skills.
- Practices scientific debating.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of HRM.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
- Learns how to develop an own research design and idea.

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues
Geb. 05.20, Raum 2A-25, Termine werden bekannt gegeben

T 7.21 Course: Airport Logistics [T-MACH-105175]

Responsible: Dr.-Ing. André Richter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
                 M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	2

Events					
WT 21/22	2117056	Airport logistics	2 SWS	Lecture / 🔊	Richter
Exams					
WT 21/22	76-T-MACH-105175	Airport Logistics			Richter, Furmans

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Airport logistics
2117056, WS 21/22, 2 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Content
Media
Presentations

Learning content

- Introduction
- Airport installations
- Luggage transport
- Passenger transport
- Security on the airport
- Legal bases of the air traffic
- Freight on the airport

Learning goals
The students are able to:

- Describe material handling and informations technology activities on airports,
- Evaluate processes and systems on airports as the law stands, and
- Choose appropriate processes and material handling systems for airports.

Recommendations
None

Workload
Regular attendance: 21 hours
Self-study: 99 hours

Note
Limited number of participants: allocation of places in sequence of registration (first come first served). Registration via "ILIAS" mandatory.
Personal presence during lectures mandatory.

Organizational issues
Termine: siehe ILIAS. Erste Vorlesung 02.November 2021.

Literature
„Gepäcklogistik auf Flughäfen" à http://www.springer.com/de/book/9783642328527

T   7.22 Course: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

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

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2134150	Gas, lubricating oil and operating media analysis in drive train development	2 SWS	Lecture / ✥	Gohl
Exams					
WT 21/22	76-T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	Koch		

Legend: ▯ Online, ✥ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

Competence Certificate
Letter of attendance or oral exam (25 minutes, no auxillary means)

Prerequisites
none

Below you will find excerpts from events related to this course:

V   Gas, lubricating oil and operating media analysis in drive train development
2134150, SS 2022, 2 SWS, Language: German, Open in study portal   **Lecture (V)**
Blended (On-Site/Online)

Literature
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.

T 7.23 Course: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

Responsible: Jürgen Pfeil
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2134134	Analysis tools for combustion diagnostics	2 SWS	Lecture / ❖	Pfeil
Exams					
WT 21/22	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Koch

Legend: 📱 Online, ❖ Blended (On-Site/Online), ♟ On-Site, ✗ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Analysis tools for combustion diagnostics** 2134134, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Literature
Skript, erhältlich in der Vorlesung

T 7.24 Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]

Responsible:	Dr. Daniela Beyer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Examination of another type	3	Grade to a third	Each winter term	1

Competence Certificate

Non exam assessment (following §4(2) 3 of the examination regulation).

Innovation plan (exposé) (20%), Guided interviews/ quantitative survey (20%), presentation of results (20%), seminar paper (about 5 pages per person) (40%).

Prerequisites

None

Recommendation

Prior attendance of the course Innovation Management is recommended.

| T | **7.25 Course: Application of Social Science Methods (WiWi) [T-GEISTSOZ-109052]** |

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101169 - Sociology

Type Examination of another type	**Credits** 9	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 2

Events					
ST 2022	5011002	Political Dedates and Polarization in the German Parliament Part 2	2 SWS	Seminar / ♻	Mäs
ST 2022	5011006	Gender Pay Gap	2 SWS	Seminar / ▯	Nollmann
ST 2022	5011008	Decomposition and Regression Analysis	2 SWS	Seminar / ▯	Nollmann
Exams					
ST 2022	7400368	Application of Social Science Methods			Nollmann
ST 2022	7400453	Application of Social Science Methods (WiWi)			Nollmann

Legend: ▯ Online, ♻ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T   7.26 Course: Applied Econometrics [T-WIWI-111388]

Responsible:	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101638 - Econometrics and Statistics I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
WT 21/22	2520020	Applied Econometrics	2 SWS	Lecture / ✲	Krüger
WT 21/22	2520021	Tutorial in Applied Econometrics	2 SWS	Practice / ✲	Krüger, Koster
Exams					
WT 21/22	7900251	Applied Econometrics			Krüger
WT 21/22	7900280	Applied Econometrics			Krüger

Legend: 🗎 Online, ✲ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation.

Prerequisites

None

Annotation

The course is not offered regularly.

Below you will find excerpts from events related to this course:

V   Applied Econometrics
2520020, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Content:

- Causal effects and prediction in the linear model, instrumental variables, analysis of natural experiments

- Theoretical exercises with computer-based illustrations

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Independent Study: 105 hours

Literature

Hansen (2021): Econometrics. Online textbook, University of Wisconsin.

Angrist und Pischke (2009): Mostly Harmless Econometrics. Princeton University Press, 2009.

Weitere Literatur wird in der Vorlesung bekanntgegeben.

7 COURSES

Course: Applied Informatics – Principles of Internet Computing: Foundations
for Emerging Technologies and Future Services [T-WIWI-110339]

T 7.27 Course: Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-110339]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2511032	Applied Informatics - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	2 SWS	Lecture / ▯	Sunyaev
ST 2022	2511033	Übungen zu Angewandte Informatik - Internet Computing	1 SWS	Practice / ▯	Sunyaev, Teigeler, Beyene
Exams					
WT 21/22	7900004	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services			Sunyaev
ST 2022	79AIFB_AI2_A2	Applied Informatics - Internet Computing (Registration until 18 July 2022)			Sunyaev

Legend: ▯ Online, ⚯ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

Successful participation in the exercise by submitting correct solutions to 50% of the exercises can earn a grade bonus. 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

Annotation
Replaces from winter semester 2019/2020 T-WIWI-109445 "Applied Informatics - Internet Computing".

Below you will find excerpts from events related to this course:

V Applied Informatics - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services

2511032, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

7 COURSES

Course: Applied Informatics – Principles of Internet Computing: Foundations
for Emerging Technologies and Future Services [T-WIWI-110339]

Content

The lecture Applied Computer Science - Internet Computing provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

Learning objectives:

The student learns about basic concepts and emerging technologies of distributed systems and internet computing. Practical topics will be deepened in lab classes.

Recommendations:

Knowledge of content of the module [WI1INFO].

Workload:

The total workload for this course is approximately 135-150 hours.

Literature

Wird in der Vorlesung bekannt gegeben

T 7.28 Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

Responsible:	Prof. Dr. Gerhard Satzger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101448 - Service Management
	M-WIWI-101506 - Service Analytics
	M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2595650	Artificial Intelligence in Service Systems	1,5 SWS	Lecture / 📱	Kühl, Vössing
Exams					
WT 21/22	7900321	Artificial Intelligence in Service Systems (16.03.22) - Hauptklausur			Satzger
ST 2022	7900001_neu	Artificial Intelligence in Service Systems			Satzger

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min). Successful completion of the exercises is a prerequisite for admission to the written exam.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Service Systems
2595650, WS 21/22, 1,5 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
Artificial Intelligence (AI) and the application of machine learning is becoming more and more popular to solve relevant business challenges — both within isolated entities but also within co-creating systems (like value chains). However, it is not only essential to be familiar with precise algorithms but rather a general understanding of the necessary steps with a holistic view—from real-world challenges to the successful deployment of an AI-based solution. As part of this course, we teach the complete lifecycle of an AI project focusing on supervised machine learning challenges. We do so by also introducing the use of Python and the required packages like scikit-learn with exemplary data and use cases. We then take this knowledge to the more complex case of service systems with different entities (e.g., companies) who interact with each other and show possibilities on how to derive holistic insights. Apart from the technical aspects necessary when developing AI within service systems, we also shed light on the collaboration of humans and AI in such systems (e.g., with the support of XAI), topics of ethics and bias in AI, as well as AI's capabilities on being creative.

Students of this course will be able to understand and implement the complete lifecycle of a typical Artificial Intelligence use case with supervised machine learning. Furthermore, they understand the importance and the means of applying AI and Machine Learning within service systems, which allows multiple, independent entities to collaborate and derive insights. Besides technical aspects, they will gain an understanding of the broader challenges and aspects when dealing with AI. Students will be proficient with typical Python code for AI challenges.

Organizational issues
Diese Veranstaltung findet mittwochs von 10:00 - 11.30 Uhr online statt.

Literature

- Baier, L., Kühl, N., & Satzger, G. (2019). How to cope with change?-preserving validity of predictive services over time. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Cawley, G. C., & Talbot, N. L. (2010). On over-fitting in model selection and subsequent selection bias in performance evaluation. The Journal of Machine Learning Research, 11, 2079-2107.
- Fink, O., Netland, T., & Feuerriegel, S. (2021). Artificial intelligence across company borders. arXiv preprint arXiv:2107.03912.
- Gama, J., Žliobaitė, I., Bifet, A., Pechenizkiy, M., & Bouchachia, A. (2014). A survey on concept drift adaptation. ACM computing surveys (CSUR), 46(4), 1-37.
- Hemmer, P., Schemmer, M., Vössing, M., & Kühl, N. (2021). Human-AI Complementarity in Hybrid Intelligence Systems: A Structured Literature Review. PACIS 2021 Proceedings.
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- Kühl, N., Goutier, M., Hirt, R., & Satzger, G. (2019, January). Machine Learning in Artificial Intelligence: Towards a Common Understanding. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Kühl, N., Hirt, R., Baier, L., Schmitz, B., & Satzger, G. (2021). How to Conduct Rigorous Supervised Machine Learning in Information Systems Research: The Supervised Machine Learning Report Card. Communications of the Association for Information Systems, 48(1), 46.
- Maleshkova, M., Kühl, N., & Jussen, P. (Eds.). (2020). Smart Service Management: Design Guidelines and Best Practices. Springer Nature.
- Martin, D., Hirt, R., & Kühl, N. (2019). Service Systems, Smart Service Systems and Cyber-Physical Systems—What's the difference? Towards a Unified Terminology. 14. Internationale Tagung Wirtschaftsinformatik 2019 (WI 2019), Siegen, Germany, February 24-27.
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- Müller, V. C., & Bostrom, N. (2016). Future progress in artificial intelligence: A survey of expert opinion. In Fundamental issues of artificial intelligence (pp. 555-572). Springer, Cham.
- Pan, S. J., & Yang, Q. (2009). A survey on transfer learning. IEEE Transactions on knowledge and data engineering, 22(10), 1345-1359.
- Schöffer, J., Machowski, Y., & Kühl, N. (2021). A Study on Fairness and Trust Perceptions in Automated Decision Making. In Joint Proceedings of the ACM IUI 2021 Workshops, April 13–17, 2021, College Station, USA.
- Shmueli, G., & Koppius, O. R. (2011). Predictive analytics in information systems research. MIS quarterly, 553-572.
- Zahn, M. V., Feuerriegel, S., & Kühl, N. (2021). The cost of fairness in AI: Evidence from e-commerce. Business & information systems engineering.

T 7.29 Course: Artificial Intelligence in Service Systems - Applications in Computer Vision [T-WIWI-111219]

Responsible:	Prof. Dr. Gerhard Satzger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101448 - Service Management
	M-WIWI-101506 - Service Analytics
	M-WIWI-103117 - Data Science: Data-Driven Information Systems
	M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

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

Events					
ST 2022	2595501	Artificial Intelligence in Service Systems - Applications in Computer Vision	3 SWS	Lecture / 🗣	Satzger, Schmitz
Exams					
WT 21/22	7900025	Artificial Intelligence in Service Systems - Applications in Computer Vision			Satzger
ST 2022	7900003_neu	Artificial Intelligence in Service Systems - Applications in Computer Vision			Satzger

Legend: 🗔 Online, 🕸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-105778 - Service Analytics A must not have been started.

Annotation
This course is admission restricted (see http://dsi.iism.kit.edu).

The course replaces "Service Analytics A" as of summer semester 2021.

Below you will find excerpts from events related to this course:

V	**Artificial Intelligence in Service Systems - Applications in Computer Vision**	Lecture (V)
	2595501, SS 2022, 3 SWS, Language: English, Open in study portal	On-Site

Content

---We renamed this course from "Service Analytics A" to "Artificial Intelligence in Service Systems - Applications in Computer Vision ---

Learning objectives

This course teaches students how to apply machine learning concepts to develop predictive models that form the basis of many innovative service offerings and business models today. Using a selected use case each term, students learn the foundations of selected algorithms and development frameworks and apply them to build a functioning prototype of an analytics-based service. Students will become proficient in writing code in Python to implement a data science use case over the course period.

Description

Data-driven services have become a key differentiator for many companies. Their development is based on the increasing availability of structured and unstructured data and their analysis through methods from data science and machine learning. Examples comprise highly innovative service offerings based on technologies such as natural language processing, computer vision or reinforcement learning.

Using a selected use case, this lecture will teach students how to develop analytics-based services in an applied setting. We teach the theoretical foundations of selected machine learning algorithms (e.g., convolutional neural networks) and development concepts (e.g., developing modeling, training, inference pipelines) and teach how to apply these concepts to build a functioning prototype of an analytics-based service (e.g., inference running on a device). During the course, students will work in small groups to apply the learned concepts in the programming language Python using packages such as Keras, Tensorflow or Scikit-Learn.

Recommendations

The course is aimed at students in the Master's program with basic knowledge in statistics and applied programming in Python. Knowledge from the lecture Artificial Intelligence in Service Systems may be beneficial.

Additional information

Due to the practical group sessions in the course, the number of participants is limited. The official application period in the WiWi portal will open mid of February. Please apply here until April, 3rd: http://go.wiwi.kit.edu/aiss_cv.

Literature

- Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. *The elements of statistical learning*. Vol. 1. No. 10. New York: Springer series in statistics, 2001.
- Russell, S., & Norvig, P. (2002). Artificial intelligence: a modern approach.
- Goldstein, E. B. (2009). Sensation and perception. 8th. *Belmont: Wadsworth, Cengage Learning, 496*(3).
- Gonzalez, Rafael C., Woods, Richard E. (2018). *Digital Image Processing.* 4th Pearson India
- Szeliski, R. (2010). *Computer vision: algorithms and applications*. Springer Science & Business Media.
- Redmon, J., Divvala, S., Girshick, R., & Farhadi, A. (2016). You only look once: Unified, real-time object detection. In *Proceedings of the IEEE conference on computer vision and pattern recognition*(pp. 779-788).
- Sermanet, P., Chintala, S., & LeCun, Y. (2012, November). Convolutional neural networks applied to house numbers digit classification. In *Proceedings of the 21st International Conference on Pattern Recognition (ICPR2012)*(pp. 3288-3291). IEEE.
- Ren, S., He, K., Girshick, R., & Sun, J. (2015). Faster r-cnn: Towards real-time object detection with region proposal networks. In *Advances in neural information processing systems*(pp. 91-99).
- Girshick, R., Donahue, J., Darrell, T., & Malik, J. (2014). Rich feature hierarchies for accurate object detection and semantic segmentation. In *Proceedings of the IEEE conference on computer vision and pattern recognition*(pp. 580-587).
- Krizhevsky, A., Sutskever, I., & Hinton, G. E. (2012). Imagenet classification with deep convolutional neural networks. In *Advances in neural information processing systems*(pp. 1097-1105).

| T | **7.30 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** Written examination | **Credits** 4,5 | **Grading scale** Grade to a third | **Recurrence** Each summer term | **Version** 2 |

Events					
ST 2022	2530555	Asset Pricing	2 SWS	Lecture / 🗣	Uhrig-Homburg, Thimme
ST 2022	2530556	Übung zu Asset Pricing	1 SWS	Practice / 🗣	Uhrig-Homburg, Böll
Exams					
WT 21/22	7900056	Asset Pricing			Uhrig-Homburg
ST 2022	7900110	Asset Pricing			Uhrig-Homburg, Thimme

Legend: 📱 Online, ⊗ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

Below you will find excerpts from events related to this course:

| V | **Asset Pricing** 2530555, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V) On-Site** |

Literature
Basisliteratur

- Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

Zur Wiederholung/Vertiefung

- Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.
- The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

T 7.31 Course: Auction Theory [T-WIWI-102613]

Responsible:	Prof. Dr. Karl-Martin Ehrhart
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101446 - Market Engineering
	M-WIWI-101453 - Applied Strategic Decisions
	M-WIWI-101500 - Microeconomic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2520408	Auktionstheorie	2 SWS	Lecture	Ehrhart
WT 21/22	2520409	Übungen zu Auktionstheorie	1 SWS	Practice	Ehrhart
Exams					
WT 21/22	7900216	Auction Theory			Ehrhart
ST 2022	7900255	Auction Theory			Ehrhart

Competence Certificate

The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites

None

Below you will find excerpts from events related to this course:

V Auktionstheorie
2520408, WS 21/22, 2 SWS, Open in study portal

Lecture (V)

Literature

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

T   7.32 Course: Automated Manufacturing Systems [T-MACH-102162]

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

Part of: M-MACH-101298 - Automated Manufacturing Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	2

Events					
ST 2022	2150904	Automated Manufacturing Systems	6 SWS	Lecture / Practice (/ ✦	Fleischer
Exams					
WT 21/22	76-T-MACH-102162	Automated Manufacturing Systems			Fleischer
ST 2022	76-T-MACH-102162	Automated Manufacturing Systems			Fleischer

Legend: ▌ Online, ✦ Blended (On-Site/Online), ✦ On-Site, ✗ Cancelled

Competence Certificate
written exam (120 minutes)

Prerequisites
"T-MACH-108844 - Automatisierte Produktionsanlagen" must not be commenced.

Below you will find excerpts from events related to this course:

V	**Automated Manufacturing Systems** 2150904, SS 2022, 6 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **Blended (On-Site/Online)**

Content

The lecture provides an overview of the structure and functioning of automated manufacturing systems. In the introduction chapter the basic elements for the realization of automated manufacturing systems are given. This includes:

- Drive and control technology
- Handling technology for handling work pieces and tools
- Industrial Robotics
- Quality assurance in automated manufacturing
- automatic machines, cells, centers and systems for manufacturing and assembly
- structures of multi-machine systems
- planning of automated manufacturing systems

An interdisciplinary view of these subareas enables Industry 4.0 solutions.

In the second part of the lecture, the basics are illustrated using implemented manufacturing processes for the production of automotive components (chassis and drive technology).The analysis of automated manufacturing systems for manufacturing of defined components is also included.

In the field of vehicle power train both, the automated manufacturing process for the production of the conventional internal-combustion engine and the automated manufacturing process for the production of the prospective electric power train (electric motor and battery) are considered. In the field of car body, the focus is on the analysis of the process chain for the automated manufacturing of conventional sheet metal body parts, as well as for automated manufacturing of body components made out of fiber-reinforced plastics.

Within tutorials, the contents from the lecture are advanced and applied to specific problems and tasks.

Learning Outcomes:

The students ...

- are able to analyze implemented automated manufacturing systems and describe their components.
- are capable to assess the implemented examples of implemented automated manufacturing systems and apply them to new problems.
- are able to name automation tasks in manufacturing plants and name the components which are necessary for the implementation of each automation task.
- are capable with respect to a given task to plan the configuration of an automated manufacturing system and to determine the necessary components to its realization.
- are able to design and select components for a given use case of the categories: "Handling Technology", "Industrial Robotics", "Sensory" and "Controls".
- are capable to compare different concepts for multi-machine systems and select a suitable concept for a given use case.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Start: 21.04.2022

Vorlesungstermine dienstags 8:00 Uhr und donnerstags 8:00 Uhr, Übungstermine donnerstags 09:45 Uhr.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T	7.33 Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

Responsible: Gerd Gutekunst
Prof. Dr. Berthold Wigger

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 21/22	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture / 🖳	Wigger, Gutekunst
Exams					
WT 21/22	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger
ST 2022	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger

Legend: 🖳 Online, ⬡ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5 h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course "Öffentliche Einnahmen" beforehand.

Below you will find excerpts from events related to this course:

V	**Basics of German Company Tax Law and Tax Planning** 2560134, WS 21/22, 3 SWS, Language: German, Open in study portal	Lecture (V) Online

Content
Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

T   7.34 Course: Basics of Technical Logistics I [T-MACH-109919]

Responsible: Dr.-Ing. Martin Mittwollen
                 Dr.-Ing. Jan Oellerich

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2117095	Basics of Technical Logistics	3 SWS	Lecture / Practice (/ ⚙	Mittwollen, Oellerich
Exams					
WT 21/22	76-T-MACH-109001	Basics of Technical Logistics I			Mittwollen
WT 21/22	76-T-MACH-109919	Basics of Technical Logistics I			Mittwollen

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌏 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites

Recommendation

Knowledge of the basics of technical mechanics preconditioned.

Below you will find excerpts from events related to this course:

V   Basics of Technical Logistics
2117095, WS 21/22, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content

- effect model of conveyor machines
- elements for the change of position and orientation
- conveyor processes
- identification systems
- drives
- mechanical behaviour of conveyors
- structure and function of conveyor machines
- elements of intralogistics
- sample applications and calculations in addition to the lectures inside practical lectures

Students are able to:

- Describe processes and machines of technical logistics,
- Model the fundamental structures and the impacts of material handling machines with mathematical models,
- Refer to industrially used machines
- Model real machines applying knowledge from lessons and calculate their dimensions.

Organizational issues

Die Erfolgskontrolle erfolgt in Form einer schritflichen oder mündlichen Prüfung (nach §4 (2), 1 bzw. 2SPO).

The assessment consists of a written or oral exam according to Section 4 (2), 1 or 2of the examination regulation.

Es wird Kenntnis der Grundlagen der Technischen Mechanik vorausgesetzt.

Basics knowledge of technical mechanics is preconditioned.

Ergänzungsblätter, Präsentationen,Tafel.

Supplementary sheets, presentations, blackboard.

Präsenz: 48Std

Nacharbeit: 132Std

presence: 48h

rework: 132h

Literature

Empfehlungen in der Vorlesung / Recommendations during lessons

T   7.35 Course: Basics of Technical Logistics II [T-MACH-109920]

Responsible: Dr.-Ing. Maximilian Hochstein
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type Written examination	Credits 5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2117098	Basics of Technical Logistics II	3 SWS	Lecture / Practice (/ ⚙	Oellerich
Exams					
WT 21/22	76-T-MACH-109002	Basics of Technical Logistics II			Hochstein, Mittwollen
WT 21/22	76-T-MACH-109920	Basics of Technical Logistics II			Mittwollen

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge of the basics of technical mechanics and out of "Basic of Technical Logstics I" (T-MACH-109919) preconditioned.

T 7.36 Course: Behavioral Experiments in Action [T-WIWI-111393]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105714 - Consumer Research

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

Events					
ST 2022	2540600	Behavioral Experiments in Action	3 SWS	Lecture / 🌐	Scheibehenne, Liu

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
Gradings will be based on the quality of the experimental program, data, and the research report in Stage 2.

Prerequisites
Experimental design (either take the course in our module, or gain basic knowledge of experimental design by self-education)

Annotation
In this course, students will gain first-hand experience into how to conduct an experimental study in the area of behavioral economics/psychology.

The course contains two stages. In Stage 1, students will learn how to plan, program, and run an experiment by attending to blocked lectures. In Stage 2, students will choose one classic experiment in the area of behavioral economics or psychology, conduct a replication of that experiment using the techniques acquired in Stage 1, and write a research report on the results of the replication.

The number of participants is limited. The registration will take place via the Wiwi-Portal.

Below you will find excerpts from events related to this course:

V Behavioral Experiments in Action
2540600, SS 2022, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Registration on wiwi portal required. Class size is limited to 15.

Content:

In this course, students will gain first-hand experience into how to conduct an experimental study in the area of behavioral economics/psychology.

The course contains two stages. In Stage 1, students will learn how to plan, program, and run an experiment by attending to blocked lectures. In Stage 2, students will choose one classic experiment in the area of behavioral economics or psychology, conduct a replication of that experiment using the techniques acquired in Stage 1, and write a research report on the results of the replication.

Evaluation:

Gradings will be based on the quality of the experimental program, data, and the research report in Stage 2.

Prerequisite: experimental design (either take the course in our module, or gain basic knowledge of experimental design by self-education)

ETCS: 4.5

Organizational issues
registration on WIWI portal required

| **T** | **7.37 Course: Behavioral Lab Exercise [T-WIWI-111806]** |

Responsible: Prof. Dr. Petra Nieken
Prof. Dr. Benjamin Scheibehenne

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105714 - Consumer Research
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Events					
WT 21/22	2500040	Behavioral Lab Exercise	4.5 SWS	Seminar / 🎤	Scheibehenne, Nieken
ST 2022	2540489	Behavioral Lab Exercise	4.5 SWS	Seminar / 📱	Scheibehenne, Nieken
Exams					
WT 21/22	7900368	Behavioral Lab Exercise			Nieken, Scheibehenne

Legend: 📱 Online, ✡ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment.

Recommendation
This class caters towards Master students who are interested in empirical research and in running lab experiments.

Annotation
The course will be offered for the first time in the winter semester 21/22.

Due to the interactive nature of the class, the number of participants is limited. If you are interested, please contact the teachers directly via email.

Below you will find excerpts from events related to this course:

| **V** | **Behavioral Lab Exercise** 2500040, WS 21/22, 4.5 SWS, Language: English, Open in study portal | **Seminar (S) On-Site** |

Content
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback enabling them to improve their drafts for future research.

| **V** | **Behavioral Lab Exercise** 2540489, SS 2022, 4.5 SWS, Language: English, Open in study portal | **Seminar (S) Online** |

Content
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback enabling them to improve their drafts for future research.

T 7.38 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I [T-MACH-100966]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 21/22	2141864	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	2 SWS	Lecture / 🧩	Guber, Ahrens
Exams					
WT 21/22	76-T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I			Guber
ST 2022	76-T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I			Guber

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
written exam (75 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I** 2141864, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.39 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101293 - Microsystem Technology

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	2142883	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	2 SWS	Lecture / 🗐	Guber, Ahrens
Exams					
WT 21/22	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber
ST 2022	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber

Legend: 🗐 Online, 🕸 Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Written exam (75 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II
2142883, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
Examples of use in Life-Sciences and biomedicine: Microfluidic Systems:
LabCD, Protein Cristallisation
Microarrys
Tissue Engineering
Cell Chip Systems
Drug Delivery Systems
Micro reaction technology
Microfluidic Cells for FTIR-Spectroscopy
Microsystem Technology for Anesthesia, Intensive Care and Infusion
Analysis Systems of Person´s Breath
Neurobionics and Neuroprosthesis
Nano Surgery

Organizational issues
Die Vorlesung findet im Sommersemester aufgrund der aktuellen Situation bis auf Weiteres **online** statt. Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

Die Vorlesung wird voraussichtlich mit der Software ZOOM oder MS Teams zu den im Vorlesungsverzeichnis angekündigten Terminen (hier: Montag 11:30 - 13:00 Uhr) durchgeführt werden. Weitere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

Literature

Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994

M. Madou
Fundamentals of Microfabrication

Literature

Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994

T   7.40 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III [T-MACH-100968]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	2142879	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	2 SWS	Lecture / 🖥	Guber, Ahrens
Exams					
WT 21/22	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber
ST 2022	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ✊ On-Site, ✗ Cancelled

Competence Certificate
Written exam (75 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V   BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III
2142879, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
Examples of use in minimally invasive therapy
Minimally invasive surgery (MIS)
Endoscopic neurosurgery
Interventional cardiology
NOTES
OP-robots and Endosystems
License of Medical Products and Quality Management

Organizational issues
Die Vorlesung findet im Sommersemester aufgrund der aktuellen Situation bis auf Weiteres **online** statt. Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.
Die Vorlesung wird voraussichtlich mit der Software ZOOM oder MS Teams zu den im Vorlesungsverzeichnis angekündigten Terminen (hier: Montag: 14:00 - 15:30 Uhr) durchgeführt werden. Weitere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994
M. Madou
Fundamentals of Microfabrication

T 7.41 Course: Bionics for Engineers and Natural Scientists [T-MACH-102172]

Responsible: apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
   M-MACH-101293 - Microsystem Technology
   M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Exams			
WT 21/22	76-T-MACH-102172	Bionics for Engineers and Natural Scientists	Hölscher
ST 2022	76-T-MACH-102172	Einführung in die Bionik	Hölscher

Competence Certificate
written or oral exam

Prerequisites

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

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate

The examination is offered for the last time in winter semester 20/21 for first-time writers and then again for second attempts. The assessment consists of a written exam (75 min).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Depending on further pandemic developments, the examination will be offered as an open-book examination (alternative exam assessment).

Prerequisites
None

Recommendation
None

Annotation
The lecture is currently not offered.

T 7.43 Course: Bond Markets [T-WIWI-110995]

Responsible:	Prof. Dr. Marliese Uhrig-Homburg
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2530560	Bond Markets	3 SWS	Lecture / Practice (/ ⚙	Uhrig-Homburg, Müller
Exams					
WT 21/22	7900311	Bond Markets			Uhrig-Homburg
ST 2022	7900280	Bond Markets			Uhrig-Homburg

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (75min.)

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Depending on further pandemic developments, the examination will be offered as an open-book examination (alternative exam assessment).

Annotation

This course will be held in English.

Below you will find excerpts from events related to this course:

V	**Bond Markets**	**Lecture / Practice (VÜ)**
	2530560, WS 21/22, 3 SWS, Language: English, Open in study portal	**Blended (On-Site/Online)**

Content

The lecture "Bond Markets" deals with the national and international bond markets, which are an important source of financing for companies, as well as for the public sector. After an overview of the most important bond markets, different yield definitions are discussed. Based on this, the concept of the yield curve is presented. In addition, the theoretical and empirical relationships between ratings, default probabilities and spreads are analyzed. The focus will then be on questions regarding the valuation, measurement, management and control of credit risks.

The total workload for this course is approximately 135 hours (4.5 credits).

The assessment consists of a written exam (75min.) (according to §4(2), 1 SPO). A bonus can be earned by correctly solving at least 50% of the posed bonus exercices. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Students deepen their knowledge of national and international bond markets. They gain knowledge of the traded instruments and their key figures for describing default risk such as ratings, default probabilities or credit spreads.

Organizational issues

Blockveranstaltung: Einführungsveranstaltung Do 21.10. 10-11:30 Uhr im Geb. 05.20, Raum 1C-04, 04.11. und 18.11. 10-15 Uhr im Seminarraum Blücherstraße

T 7.44 Course: Bond Markets - Models & Derivatives [T-WIWI-110997]

Responsible:	Prof. Dr. Marliese Uhrig-Homburg
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2530565	Bond Markets - Models & Derivatives	2 SWS	Lecture / Practice (/ 🗣	Grauer, Uhrig-Homburg
Exams					
WT 21/22	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg

Legend: 📱 Online, ⚝ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment of success consists in equal parts of a written thesis and an oral exam including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.

Recommendation
Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V	Bond Markets - Models & Derivatives	Lecture / Practice (VÜ)
	2530565, WS 21/22, 2 SWS, Language: English, Open in study portal	On-Site

Content

- **Competence Certificate:** The assessment of success consists in equal parts of a written thesis and an oral exam (according to §4(2), 3 SPO) including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** Students deepen their knowledge of national and international bond markets. They are able to apply the knowledge they have gained about traded instruments and common valuation models for pricing derivative financial instruments.
- **Prerequisites:**
- **Content:** The lecture "Bond Markets – Models & Derivatives" deepens the content of the lecture "Bond Markets". The modelling of the dynamics of yield curves and the management of credit risks forms the theoretical foundation for the valuation of interest rate and credit derivatives to be discussed. In this course, students deal intensively with selected topics and acquire the relevant knowledge on their own.
- **Recommendation:** Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.
- **Workload:** The total workload for this course is approximately 90 hours (3.0 credits).

Organizational issues
Blockveranstaltung, Kickoff am 03.12.21, Präsentation am 11.02.22 Seminarraum 320 Geb. 09.21 (Blücherstraße)

T 7.45 Course: Bond Markets - Tools & Applications [T-WIWI-110996]

Responsible:	Prof. Dr. Marliese Uhrig-Homburg
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

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

Events					
WT 21/22	2530562	Bond Markets - Tools & Applications	1 SWS	Block / 🗣	Uhrig-Homburg, Grauer
Exams					
WT 21/22	7900317	Bond Markets - Tools & Applications			Uhrig-Homburg

Legend: 📱 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✖ Cancelled

Competence Certificate
The assessment consists of an empirical case study with written elaboration and presentation. The main examination is offered once a year, re-examinations every semester.

Recommendation
Knowledge of the "Bond Markets" course is very helpful.

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V Bond Markets - Tools & Applications
2530562, WS 21/22, 1 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content

- **Competence Certificate:** The assessment consists of an empirical case study with written elaboration and presentation (according to $4(2), 3 SPO). The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** The students apply various methods in practice within the framework of a project-related case study. They are able to deal with empirical data and analyze them in a targeted manner.
- **Content:** The course "Bond Markets – Tools & Applications" includes a hands-on project in the field of national and international bond markets. Using empirical datasets, the students have to apply practical methods in order to analyze the data in a targeted manner.
- **Recommendation:** Knowledge of the "Bond Markets" course is very helpful.
- **Workload:** The total workload for this course is approximately 45 hours (1.5 credits).

Organizational issues
Blockveranstaltung, Kickoff am 21./22.10.21 in der Blockveranstaltung Bond Markets (Geb. 05.20, 1C-04), Präsentation am 03.12.21 im Seminarraum 320 Geb. 09.21

T   7.46 Course: Boosting of Combustion Engines [T-MACH-105649]

Responsible:	Dr.-Ing. Johannes Kech
	Dr.-Ing. Heiko Kubach
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
WT 21/22	2134153	Boosting of Combustion Engines	2 SWS	/ 🗣	Kech
ST 2022	2134153	Boosting of Combustion Engines	2 SWS	/ ⟡	Kech

Legend: ▯ Online, ⟡ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam, 20 min

Prerequisites

T 7.47 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

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2540466	Business Data Analytics: Application and Tools	2 SWS	Lecture	Staudt
ST 2022	2540467	Excercise Business Data Analytics: Application and Tools	1 SWS	Practice / 🗣	Badewitz, Grote, Sterk, Bezzaoui, Nikolajevic

Legend: 📱 Online, 🕸 Blended (On-Site/Online), 🗣 On-Site, ✖ Cancelled

Competence Certificate
Success is monitored through ongoing elaborations and presentations of tasks and a written exam (60 minutes) at the end of the lecture period. Successful participation in the exercises is a prerequisite for admission to the written examination. The scoring scheme for the overall evaluation will be announced at the beginning of the course.
The number of participants is limited to 50, as this is the only way to ensure conscientious support for the case study. The selection of participants is based on a short letter of motivation (max. 2000 characters including spaces) in the faculty's portal.

Prerequisites
None

Recommendation
Knowledge of (object-oriented) programming and statistics is helpful.

Below you will find excerpts from events related to this course:

V	**Business Data Analytics: Application and Tools**	**Lecture (V)**
	2540466, SS 2022, 2 SWS, Language: German, Open in study portal	

T   7.48 Course: Business Data Strategy [T-WIWI-106187]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2540484	Business Data Strategy	2 SWS	Lecture / ✿	Weinhardt, Dinther
WT 21/22	2540485	Übung zu Business Data Strategy	1 SWS	Practice	Weinhardt, Badewitz
Exams					
WT 21/22	7900226	Business data strategy			Weinhardt
WT 21/22	7900234	Business Data Strategy			Weinhardt

Legend: 🗎 Online, ✿ Blended (On-Site/Online), 🌑 On-Site, ✘ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulationand an alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. The grade isdetermined by 2/3 through the written exam and by 1/3 through the alternative exam assessment (e.g., presentation).

Prerequisites

None

Recommendation

Students should be familiar with basic concepts of business organisations, information systems, and programming. However, all material will be introduced, so no formal pre-conditions are applied.

Annotation

Limited number of participants.

Below you will find excerpts from events related to this course:

V	**Business Data Strategy**	**Lecture (V)**
	2540484, WS 21/22, 2 SWS, Language: English, Open in study portal	**Blended (On-Site/Online)**

Content

With new methods for capturing and using different types of data and industry's recognition that society's use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making all add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense–making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications.

Organizational issues
Application/Registration

Attendance will be limited to 20-25 participants. Application/registration is therefore preliminary. After the application deadline has passed, positions will be allocated, based on evaluation of the previous study records. Applications are accepted only through the Wiwi-Portal: https://portal.wiwi.kit.edu/ys/5254

Anmeldung

Die Teilnehmeranzahl ist begrenzt (ca. 20-25 Plätze). Eine Anmeldung erfolgt deshalb zunächst unter Vorbehalt. Nach Ablauf der Anmeldefrist werden die Plätze zur Teilnahme, nach Einsicht der Vorleistungen im Studium vergeben. Die Anmeldung/Bewerbung erfolgt ausschließlich über das Wiwi-Portal: https://portal.wiwi.kit.edu/ys/5254

T 7.49 Course: Business Dynamics [T-WIWI-102762]

Responsible:	Prof. Dr. Andreas Geyer-Schulz
	Dr Paul Glenn
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101409 - Electronic Markets
	M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2540531	Business Dynamics	2 SWS	Lecture / 🗣	Geyer-Schulz, Glenn
WT 21/22	2540532	Exercise Business Dynamics	1 SWS	Practice / 🗣	Geyer-Schulz, Glenn
Exams					
WT 21/22	7979777	Business Dynamics			Geyer-Schulz
ST 2022	7900065	Business Dynamics (Nachklausur WS 2021/2022)			Geyer-Schulz

Legend: 🖥 Online, 🗗 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five 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**	Lecture (V)
	2540531, WS 21/22, 2 SWS, Language: German, Open in study portal	On-Site

Literature

John D. Sterman. Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, 2000.

## T 7.50 Course: Business Intelligence Systems [T-WIWI-105777]

Responsible:	Prof. Dr. Alexander Mädche Mario Nadj Dr. Peyman Toreini
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101506 - Service Analytics M-WIWI-101510 - Cross-Functional Management Accounting M-WIWI-103117 - Data Science: Data-Driven Information Systems M-WIWI-104068 - Information Systems in Organizations

Type Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 21/22	2540422	Business Intelligence Systems	3 SWS	Lecture / ✿	Mädche, Nadj
Exams					
WT 21/22	7900224	Business Intelligence Systems			Mädche
ST 2022	7900149	Business Intelligence Systems			Mädche

Legend: 🢒 Online, ✿ Blended (On-Site/Online), ☙ On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
Basic knowledge on database systems is helpful.

Below you will find excerpts from events related to this course:

V Business Intelligence Systems
2540422, WS 21/22, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

In most modern enterprises, Business Intelligence & Analytics (BI&A) Systems represent a core enabler of decision-making in that they are supplying up-to-date and accurate information about all relevant aspects of a company's planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance. Modern BI&A systems leverage beyond reporting and dashboards also advanced analytical functions. Thus, today they also play a major role in enabling data-driven products and services. The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of BI&A Systems from a managerial and technical perspective.

The course is complemented with an engineering capstone project, where students work in a team with real-world use cases and data in order to create running Business intelligence & Analytics system prototypes.

Learning objectives

- Understand the theoretical foundations of key Business Intelligence & Analytics concepts supporting decision-making
- Explore key capabilities of state-of-the-art Business Intelligence & Analytics Systems
- Learn how to successfully implement and run Business Intelligence & Analytics Systems from multiple perspectives, e.g. architecture, data management, consumption, analytics
- Get hands-on experience by working with Business Intelligence & Analytics Systems with real-world use cases and data

Prerequisites

This course is limited to a capacity of 50 places. The capacity limitation is due to the attractive format of the accompanying engineering capstone project. Strong analytical abilities and profound skills in SQL as wells as Python and/or R are required. Students have to apply with their CV and transcript of records. All organizational details and the underlying registration process of the lecture and the capstone project will be presented in the first lecture. The teaching language is English.

Literature

- Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. "Decision Support and Business Intelligence Systems".
- Watson, H. J. 2014. "Tutorial: Big Data Analytics: Concepts, Technologies, and Applications," Communications of the Association for Information Systems (34), p. 24.
- Arnott, D., and Pervan, G. 2014. "A critical analysis of decision support systems research revisited: The rise of design science," Journal of Information Technology (29:4), Nature Publishing Group, pp. 269–293 (doi: 10.1057/jit.2014.16).
- Carlo, V. (2009). "Business intelligence: data mining and optimization for decision making". Editorial John Wiley and Sons, 308-317.
- Chen, H., Chiang, R. H. L, and Storey, V. C. 2012. „Business Intelligence and Analytics: From Big Data to Big Impact," MIS Quarterly (36:4), pp. 1165-1188.
- Davenport, T. 2014. Big Data @ Work, Boston, MA: Harvard Business Review.
- Economist Intelligence Unit. 2015 "Big data evolution: Forging new corporate capabilities for the long term"
- Power, D. J. 2008. "Decision Support Systems: A Historical Overview," Handbook on Decision Support Systems, pp. 121–140 (doi: 10.1007/978-3-540-48713-5_7).
- Sharma, R., Mithras, S., and Kankanhalli, A. 2014. „Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations," European Journal of Information Systems (23:4), pp. 433-441.
- Silver, M. S. 1991. "Decisional Guidance for Computer-Based Decision Support," MIS Quarterly (15:1), pp. 105-122.

Further literature will be made available in the lecture.

T 7.51 Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102806 - Service Innovation, Design & Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2540456	Internet Business Models	2 SWS	Lecture	Peukert
ST 2022	2540457	Übungen zu Geschäftsmodelle im Internet: Planung und Umsetzung	1 SWS	Practice	Peukert

Competence Certificate
As of summer semester 2022, the course "Business Models in the Internet: Planning and Implementation" can no longer be taken. The exam will be offered in summer semester 2022 and winter semester 2022/23 for repeaters.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Internet Business Models
2540456, SS 2022, 2 SWS, Language: German, Open in study portal   **Lecture (V)**

Organizational issues
Im SoSem. 22 wird nur die Prüfung angeboten.

Literature
Wird in der Vorlesung bekannt gegeben.

T   7.52 Course: Business Planning [T-WIWI-102865]

Responsible:	Prof. Dr. Orestis Terzidis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2545007	Business Planning for Founders	2 SWS	Seminar / ▯	Wohlfeil, Bauman
ST 2022	2545109	Business Planning for Founders in the field of IT-Security (KASTEL)	2 SWS	Seminar / 🗣	Terzidis, Martjan

Exams				
WT 21/22	7900023	Business Planning for Founders		Terzidis
ST 2022	7900236	Business Planning for Founders in the field of IT-Security		Terzidis

Legend: ▯ Online, ⬡ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V	**Business Planning for Founders** 2545007, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

The seminar introduces students to basic concepts of business planning based on technological innovations. On the one hand, this involves concepts for the concretization of business ideas (business modeling, market potential assessment, resource planning, etc.) and, on the other hand, the creation of a feasible business plan (with or without VC financing).

During the seminar, students are familiarized with methods to develop technological inventions and initial business ideas into a more concrete business plan. After completing this seminar, students will have learned and actually practiced the whole business model development process.

V	**Business Planning for Founders in the field of IT-Security (KASTEL)** 2545109, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Content

The seminar introduces students to basic concepts of business planning based on technological innovations. On the one hand, this involves concepts for the concretization of business ideas (business modeling, market potential assessment, resource planning, etc.) and, on the other hand, the creation of a feasible business plan (with or without VC financing).

Learning Objectives

During the seminar, students are familiarized with methods to develop technological inventions and initial business ideas into a more concrete business plan. After completing this seminar, students will have learned and actually practiced the whole business model development process.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues
Block event in the framework of the KASTEL project.

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

T   7.53 Course: Business Process Modelling [T-WIWI-102697]

Responsible:	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 2

Events					
WT 21/22	2511210	Business Process Modelling	2 SWS	Lecture / 🗣	Oberweis
WT 21/22	2511211	Exercise Business Process Modelling	1 SWS	Practice / 🧩	Oberweis, Schüler
Exams					
WT 21/22	7900015	Business Process Modelling			Oberweis
ST 2022	79AIFB_MvG_B4	Business Process Modelling (Registration until 18 July 2022)			Oberweis

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Business Process Modelling** 2511210, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content
The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

Learning objectives:
Students

- describe goals of business process modeling and aplly different modeling languages,
- choose the appropriate modeling language according to a given context,
- use suitable tools for modeling business processes,
- apply methods for analysing and assessing process modells to evaluate specific quality characteristics of the process model.

Recommendations:
Knowledge of course Applied Informatics I - Modelling is expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karl: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T   7.54 Course: Business Strategies of Banks [T-WIWI-102626]

Responsible:	Prof. Dr. Wolfgang Müller
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Events					
WT 21/22	2530299	Business Strategies of Banks	2 SWS	Lecture / 🗣	Müller
Exams					
WT 21/22	7900064	Business Strategies of Banks			Müller, Ruckes
ST 2022	7900079	Business Strategies of Banks			Müller

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The lecture will be offered for the last time in the winter semester 2021/22. The exam will take place for the last time in the summer semester 2022 (only for repeaters).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be offered for the last time in the winter semester 2021/22.

Below you will find excerpts from events related to this course:

V   Business Strategies of Banks
2530299, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Die Veranstaltung findet nur statt, wenn sie in Präsenz stattfinden kann.

Termine und Räume laut Ankündigung am Institut.

Literature
Weiterführende Literatur:

- Ein Skript wird im Verlauf der Veranstaltung kapitelweise ausgeteilt.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2014, Bankbetriebslehre, 6. Auflage, Springer

T	**7.55 Course: Case Studies Seminar: Innovation Management [T-WIWI-102852]**

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2545105	Case studies seminar: Innovation management	2 SWS	Seminar / ✿	Weissenberger-Eibl
Exams					
WT 21/22	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl

Legend: 📱 Online, ✿ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Below you will find excerpts from events related to this course:

V	**Case studies seminar: Innovation management**	**Seminar (S)**
	2545105, WS 21/22, 2 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

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.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 7.56 Course: CATIA Advanced [T-MACH-105312]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
              M-MACH-101283 - Virtual Engineering A

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

Events					
WT 21/22	2123380	Advanced CATIA	3 SWS	Project (P / ⚙)	Ovtcharova, Mitarbeiter
ST 2022	2123380	CATIA advanced	3 SWS	Project (P / ⚙)	Ovtcharova, Mitarbeiter
Exams					
WT 21/22	76-T-MACH-105312	CATIA Advanced			Ovtcharova

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Assessment of another type. Design project and written documentation in team work and final presentation. Grading: Project work 3/5, documentation 1/5 and presentation 1/5.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Advanced CATIA   Project (PRO)
2123380, WS 21/22, 3 SWS, Language: German/English, Open in study portal   Blended (On-Site/Online)

Content
In this design project, students develop a product in small groups according to an agile approach using the 3DEXPERIENCE platform (CATIA V6) from Dassault Systèmes. The extended functionalities of the platform are addressed and model-based work is carried out.

The development process is traced from the idea to the finished model. The main focus is on independent solution finding, teamwork, function fulfillment, production and design. The project results are presented at the end of the semester.

Organizational issues
Siehe ILIAS zur Lehrveranstaltung

Literature
Keine / None

V CATIA advanced   Project (PRO)
2123380, SS 2022, 3 SWS, Language: German/English, Open in study portal   Blended (On-Site/Online)

Content
In this design project, students develop a product in small groups according to an agile approach using the 3DEXPERIENCE platform (CATIA V6) from Dassault Systèmes. The extended functionalities of the platform are addressed and model-based work is carried out.

The development process is traced from the idea to the finished model. The main focus is on independent solution finding, teamwork, function fulfillment, production and design. The project results are presented at the end of the semester.

**Organizational issues**
Siehe ILIAS-Kurs.

Literature
Keine / None

T   7.57 Course: CATIA CAD Training Course [T-MACH-102185]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type Completed coursework (practical)	Credits 2	Grading scale pass/fail	Recurrence Each term	Version 2

Events					
WT 21/22	2123358	CATIA CAD training course	2 SWS	Practical course / 🧩	Ovtcharova, Mitarbeiter
ST 2022	2123358	CATIA CAD training course	3 SWS	Practical course / 🧩	Ovtcharova, Mitarbeiter
Exams					
WT 21/22	76-T-MACH-102185	CATIA CAD Training Course			Ovtcharova
ST 2022	76-T-MACH-102185	CATIA CAD Training Course			Ovtcharova

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
Practical examination on CAD computer, duration: 60 min.

Prerequisites
None

Recommendation
Dealing with technical drawings is required.

Annotation
For the practical course attendance is compulsory.

Below you will find excerpts from events related to this course:

V   CATIA CAD training course
2123358, WS 21/22, 2 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

Students are able to:

- create their own 3D geometric models in the CAD system CATIA and generate drawings due to the created geometry
- carry out FE-studies and kinematic simulations using the integrated CAE tools
- use advanced, knowledge-based functionalities of CATIA to automate the creation of geometry and thus to ensure the reusability of the models.

Organizational issues
Siehe ILIAS zur Lehrveranstaltung

Literature
Praktikumskript

V	**CATIA CAD training course** 2123358, SS 2022, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

Students are able to:

- create their own 3D geometric models in the CAD system CATIA and generate drawings due to the created geometry
- carry out FE-studies and kinematic simulations using the integrated CAE tools
- use advanced, knowledge-based functionalities of CATIA to automate the creation of geometry and thus to ensure the reusability of the models.

Organizational issues
Das Praktikum wird einerseits vorlesungsbegleitend sowie andererseits als einwöchige Blockveranstaltung in der vorlesungsfreien Zeit angeboten. Weitere Informationen siehe ILIAS.

Literature
Praktikumskript

T 7.58 Course: Challenges in Supply Chain Management [T-WIWI-102872]

Responsible:	Esther Mohr
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102805 - Service Operations
	M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2550494	Challenges in Supply Chain Management	3 SWS	Lecture / ⚙	Mohr

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written paper and an oral exam of ca. 30-40 min.

Prerequisites

None

Recommendation

Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation

The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Challenges in Supply Chain Management
2550494, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / "Internet of Everything in production", supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

Organizational issues

Bewerbung bis 31.03.22 über das WiWi-Portal möglich:

http://go.wiwi.kit.edu/ChallengesSCM

Literature

Wird in Abhängigkeit vom Thema in den Projektteams bekanntgegeben.

T   7.59 Course: Characteristics of Transportation Systems [T-BGU-106609]

Responsible:	Prof. Dr.-Ing. Peter Vortisch
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101064 - Fundamentals of Transportation

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	6232806	Eigenschaften von Verkehrsmitteln	2 SWS	Lecture / ✿	Vortisch
Exams					
WT 21/22	8240106609	Characteristics of Transportation Systems			Vortisch

Legend: 🗖 Online, ✿ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.60 Course: Civil Engineering Structures and Regenerative Energies [T-BGU-111922]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each term	Expansion 1 terms	Version 1

Events					
ST 2022	6241810	Civil Engineering Structures and Regenerative Energies	2 SWS	Lecture / Practice (/ ⚙	Haghsheno, Mitarbeiter/innen

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.61 Course: CO2-Neutral Combustion Engines and their Fuels I [T-MACH-111550]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type Oral examination	Credits 5	Grading scale Grade to a third	Recurrence Each winter term	Expansion 1 terms	Version 1

Events					
WT 21/22	2133113	CO2-neutral combustion engines and their fuels I	4 SWS	Lecture / Practice (/ 🗣	Koch
Exams					
WT 21/22	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Kubach, Koch

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V CO2-neutral combustion engines and their fuels I
2133113, WS 21/22, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Introduction, Presentation of IFKM

Working Principle

Characteristic Parameters

Engine Parts

Drive Train

Fuels

Gasoline Engines

Diesel Engines

Hydrogen Engines

Exhaust Gas Emissions

Organizational issues
Übungstermine Donnerstags nach Bekanntgabe in der Vorlesung

T 7.62 Course: CO2-Neutral Combustion Engines and their Fuels II [T-MACH-111560]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	2134151	CO2-neutral combustion engines and their fuels II	3 SWS	Lecture / Practice (/ ⚙	Koch
Exams					
WT 21/22	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Kubach, Koch

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
oral examination, duration: 25 minutes, no auxiliary means

Prerequisites
none

Recommendation
Fundamentals of Combustion Engines II helpful

Below you will find excerpts from events related to this course:

V	**CO2-neutral combustion engines and their fuels II** 2134151, SS 2022, 3 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **Blended (On-Site/Online)**

T 7.63 Course: Cognitive Modeling [T-WIWI-111392]

Responsible:	Prof. Dr. Benjamin Scheibehenne
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105714 - Consumer Research

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

Events					
WT 21/22	2540601	Cognitive Modeling	2 SWS	Lecture	Scheibehenne, Liu
Exams					
WT 21/22	7900372	Cognitive Modeling			Scheibehenne

Competence Certificate

There will be 4 assignments during the course of the semester. Each will count 25% towards the final grade.

Prerequisites

Calculus, probability theory

Annotation

The goal of this course is to help students develop a basic understanding of computational models in the study of human cognition and behavior.

In the first half of the semester, we will go over the following contents to prepare for the learning of cognitive modeling: basics of the R software, foundations of probability, and parameter estimation. In the second half, we will discuss the general ideas of modeling in behavioral science as well as some specific cognitive models. The class will take a biweekly lecture form. All lectures, materials, and assignments are in English.

The number of participants is limited. The registration will take place via the Wiwi-Portal.

T 7.64 Course: Communication Systems and Protocols [T-ETIT-101938]

Responsible:	Dr.-Ing. Jens Becker
	Prof. Dr.-Ing. Jürgen Becker
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2022	2311616	Communication Systems and Protocols	2 SWS	Lecture / 🗣	Becker, Becker
ST 2022	2311618	Tutorial for 2311616 Communication Systems and Protocols	1 SWS	Practice / 🗣	Stammler
Exams					
WT 21/22	7311616	Communication Systems and Protocols			Becker, Becker
ST 2022	7311616	Communication Systems and Protocols			Becker, Becker

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites

T   7.65 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 3

Events					
WT 21/22	2561204	Competition in Networks	2 SWS	Lecture / 🧩	Mitusch
WT 21/22	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice / 🧩	Wisotzky, Mitusch, Corbo
Exams					
WT 21/22	7900221	Competition in Networks			Mitusch

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🔵 On-Site, ✗ Cancelled

Competence Certificate
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None.

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

Below you will find excerpts from events related to this course:

V	**Competition in Networks** 2561204, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content
Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

<div style="background:#bfe0db">

T   **7.66 Course: Computational Economics [T-WIWI-102680]**

</div>

Responsible:	PD Dr. Pradyumn Kumar Shukla
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 3

Events					
WT 21/22	2590458	Computational Economics	2 SWS	Lecture / 🖥	Shukla
WT 21/22	2590459	Excercises to Computational Economics	1 SWS	Practice / 🖥	Shukla
Exams					
WT 21/22	7900005	Computational Economics			Shukla
ST 2022	79AIFB_CE_C5	Computational Economics (Registration until 18 July 2022)			Shukla

Legend: 🖥 Online, ⬙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). 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). The bonus only applies to the first and second exam of the semester in which it was obtained.

Prerequisites

None

Annotation

The credits have been changed to 5 starting summer term 2016.

Below you will find excerpts from events related to this course:

<div style="background:#e5f0d5">

V   **Computational Economics**
2590458, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

</div>

Content

Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

Learning objectives:

The student

- understands the methods of Computational Economics and applies them on practical issues,
- evaluates agent models considering bounded rational behaviour and learning algorithms,
- analyses agent models based on mathematical basics,
- knows the benefits and disadvantages of the different models and how to use them,
- examines and argues the results of a simulation with adequate statistical methods,
- is able to support the chosen solutions with arguments and can explain them.

Literature

- R. Axelrod: "Advancing the art of simulation in social sciences". R. Conte u.a., Simulating Social Phenomena, Springer, S. 21-40, 1997.
- R. Axtel: "Why agents? On the varied motivations for agent computing in the social sciences". CSED Working Paper No. 17, The Brookings Institution, 2000.
- K. Judd: "Numerical Methods in Economics". MIT Press, 1998, Kapitel 6-7.
- A. M. Law and W. D. Kelton: "Simulation Modeling and Analysis", McGraw-Hill, 2000.
- R. Sargent: "Simulation model verification and validation". Winter Simulation Conference, 1991.
- L. Tesfation: "Notes on Learning", Technical Report, 2004.
- L. Tesfatsion: "Agent-based computational economics". ISU Technical Report, 2003.

Weiterführende Literatur:

- Amman, H., Kendrick, D., Rust, J.: "Handbook of Computational Economics". Volume 1, Elsevier North-Holland, 1996.
- Tesfatsion, L., Judd, K.L.: "Handbook of Computational Economics". Volume 2: Agent-Based Computational Economics, Elsevier North-Holland, 2006.
- Marimon, R., Scott, A.: "Computational Methods for the Study of Dynamic Economies". Oxford University Press, 1999.
- Gilbert, N., Troitzsch, K.: "Simulation for the Social Scientist". Open University Press, 1999.

T   7.67 Course: Computer Aided Data Analysis [T-GEISTSOZ-104565]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101169 - Sociology

Type Completed coursework	Credits 0	Grading scale pass/fail	Version 1

Events					
WT 21/22	5011009	Decomposition and regression analysis	2 SWS	Course (/ 🗔	Nollmann
Exams					
WT 21/22	7400353	Computer Aided Data Analysis			Nollmann
ST 2022	7400369	Computer Aided Data Analysis			Nollmann

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T 7.68 Course: Computer Contract Law [T-INFO-102036]

Responsible: Michael Bartsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 21/22	2411604	Computer Contract Law	2 SWS	Lecture / 🗣	Menk
Exams					
WT 21/22	7500065	Computer Contract Law			Dreier, Matz
ST 2022	7500066	Computer Contract Law			Dreier, Matz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Below you will find excerpts from events related to this course:

V Computer Contract Law
2411604, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

Literature

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H.Beck, II. Aufl. 2002
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

Weiterführende Literatur

Ergänzende Literatur wird in den Vorlesungsfolien angegeben.

T   7.69 Course: Construction Equipment [T-BGU-101845]

Responsible:	Prof. Dr.-Ing. Sascha Gentes
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	6243701	Maschinentechnik	2 SWS	Lecture / ⚃	Gentes, Dörfler
Exams					
WT 21/22	8240101845	Construction Equipment			Gentes

Legend: 🗎 Online, ⚃ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

| T | **7.70 Course: Control of Linear Multivariable Systems [T-ETIT-100666]** |

Responsible: Dr.-Ing. Mathias Kluwe
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101157 - Control Engineering II

| **Type** Written examination | **Credits** 6 | **Grading scale** Grade to a third | **Recurrence** Each winter term | **Version** 1 |

Events					
WT 21/22	2303177	Control of Linear Multivariable Systems	3 SWS	Lecture / ⚙	Kluwe
WT 21/22	2303179	Control of Linear Multivariable Systems (Tutorial to 2303177)	1 SWS	Practice / ⚙	Jané Soneira
Exams					
WT 21/22	7303177	Control of Linear Multivariable Systems			Kluwe
ST 2022	7303177	Control of Linear Multivariable Systems			Kluwe

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Success is checked as part of a written overall test (120 minutes) of the course.

Prerequisites
none

Recommendation
For a deeper understanding, basic knowledge of system dynamics and control technology is absolutely necessary, as taught in the ETIT Bachelor module "System Dynamics and Control Technology" M-ETIT-102181.

T 7.71 Course: Control Technology [T-MACH-105185]

Responsible: Hon.-Prof. Dr. Christoph Gönnheimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	2150683	Control Technology	2 SWS	Lecture / ⚙	Gönnheimer
Exams					
WT 21/22	76-T-MACH-105185	Control Technology			Gönnheimer
ST 2022	76-T-MACH-105185	Control Technology			Gönnheimer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Control Technology** 2150683, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Content

The lecture control technology gives an integral overview of available control components within the field of industrial production systems.

The first part of the lecture deals with the fundamentals of signal processing and with control peripherals in the form of sensors and actors which are used in production systems for the detection and manipulation of process states.

The second part handles with the function of electric control systems in the production environment. The main focus in this chapter is laid on programmable logic controls, computerized numerical controls and robot controls. Finally the course ends with the topic of cross-linking and decentralization with the help of bus systems.

The lecture is very practice-oriented and illustrated with numerous examples from different branches.

The following topics will be covered:

- Signal processing
- Control peripherals
- Programmable logic controls
- Numerical controls
- Controls for industrial robots
- Distributed control systems
- Field bus
- Trends in the area of control technology

Learning Outcomes:

The students ...

- are able to name the electrical controls which occur in the industrial environment and explain their function.
- can explain fundamental methods of signal processing. This involves in particular several coding methods, error protection methods and analog to digital conversion.
- are able to choose and to dimension control components, including sensors and actors, for an industrial application, particularly in the field of plant engineering and machine tools. Thereby, they can consider both, technical and economical issues.
- can describe the approach for projecting and writing software programs for a programmable logic control named Simatic S7 from Siemens. Thereby they can name several programming languages of the IEC 1131.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.72 Course: Convex Analysis [T-WIWI-102856]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Exams			
WT 21/22	7900008_WS2122_NK	Convex Analysis	Stein

Competence Certificate

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites

None

Recommendation

It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation

The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 7.73 Course: Conveying Technology and Logistics [T-MACH-102135]

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

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
WT 21/22	2119100	Fördertechnik und Logistiksysteme		Seminar / ❖	Furmans, Pagani
ST 2022	2119100	Fördertechnik und Logistiksysteme		Seminar / ❖	Furmans, Padhy
Exams					
WT 21/22	76-T-MACH-102135	Conveying Technology and Logistics			Furmans

Legend: 📱 Online, ❖ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fördertechnik und Logistiksysteme
2119100, SS 2022, SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues
Ort: Gebäude 50.38, Raum 0.22, Termine siehe homepage

T 7.74 Course: Copyright [T-INFO-101308]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	24121	Copyright	2 SWS	Lecture / 📱	Dreier
Exams					
WT 21/22	7500064	Copyright			Dreier, Matz
ST 2022	7500064	Copyright			Dreier, Matz

Legend: 📱 Online, ✦ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T	**7.75 Course: Corporate Compliance [T-INFO-101288]**

Responsible: Andreas Herzig
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 21/22	2400087	Corporate Compliance	2 SWS	Lecture / ⚙	Herzig
Exams					
WT 21/22	7500063	Corporate Compliance			Dreier, Matz
ST 2022	7500063	Corporate Compliance			Dreier, Matz

Legend: 🔲 Online, ⚙ Blended (On-Site/Online), ⬤ On-Site, ✗ Cancelled

T	**7.76 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2022	2530214	Corporate Financial Policy	2 SWS	Lecture	Ruckes
ST 2022	2530215	Übungen zu Corporate Financial Policy	1 SWS	Practice	Ruckes, Hoang
Exams					
WT 21/22	7900058	Corporate Financial Policy			Ruckes
ST 2022	7900073	Corporate Financial Policy			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

Below you will find excerpts from events related to this course:

V	**Corporate Financial Policy** 2530214, SS 2022, 2 SWS, Language: English, Open in study portal	**Lecture (V)**

Content
The course develops the foundations for the management and financing of firms in imperfect markets.

The course covers the following topics:

- Measures of good corporate governance
- Corporate finance
- Liquidity management
- Executive compensation and incentives
- Corporate takeovers

Learning outcomes: The students

- are able to explain the importance of information asymmetry for the contract design of firms,
- are capable to evaluate measures for the reduction of information asymmetry,
- are in the position to analyze contracts with regard to their incentive and communication effects.

T   7.77 Course: Corporate Risk Management [T-WIWI-109050]

Responsible:	Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2
	M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Exams				
WT 21/22	7900136	Corporate Risk Management		Ruckes

Competence Certificate

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

Please note that the exam is only offered in the semester of the lecture as well as in the following semester.

Prerequisites

None

Recommendation

None

Annotation

The course will be held again in the summer term 2023 at the earliest. Please pay attention to the announcements on our website.

T 7.78 Course: Critical Information Infrastructures [T-WIWI-109248]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

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

Events					
WT 21/22	2511400	Critical Information Infrastructures	2 SWS	Lecture	Sunyaev, Dehling, Lins
WT 21/22	2511401	Exercises to Critical Information Infrastructures	1 SWS	Practice	Sunyaev, Dehling, Lins
Exams					
WT 21/22	7900067	Critical Information Infrastructures			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.

The examination is only offered to first-time students in the winter semester, but can be repeated in the following summer semester.

Prerequisites
None.

Annotation
New lecture from winter semester 2018/2019.

Below you will find excerpts from events related to this course:

V	**Critical Information Infrastructures** 2511400, WS 21/22, 2 SWS, Language: English, Open in study portal	**Lecture (V)**

Content

The course critical information infrastructures (CII) introduces students to the world of 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 course, 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 of 4) on a selected topic and have to write a course paper. Students can choose a topic from a variety of topics. To answer the research questions, students can use literature reviews but also interviews, surveys, programming tasks, and other research methods.

There will be a short introduction to the topics for the course paper in the following topic areas. In addition, it will be possible to propose your own topics as a group in the topic areas:

- Distributed Ledger Technology
- Critical Cloud Services
- Health Information Infrastructures
- Vehicluar Fog Computing
- Information Privacy
- Trustworthy Artificial Intelligence

Since we offer topics in this course that also correspond to the research interests in our research group, there may be the opportunity to work on the topics in more depth in the course of a final thesis.

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:

The number of participants is limited to 24 students. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/5035

The registration will be opened from August 17, 2021 until October 1, 2021.

Please make sure that you are available at the following dates if you want to take the course:

- 21.10.2021, Noon–01:30 pm: 1. Introduction & Topic Area Presentations
- 28.10.2021, Noon–01:30 pm: 2. Foundations to Critical Information Infrastructures
- 04.11.2021, Noon–01:30 pm: 3. Critical Information Infrastructure Landscape
- 11.11.2021, Noon–01:30 pm: 4. Research on Information Systems & Group Assignment
- 10.12.2021, 10:00 am–06:00 pm: Interim Presentation (estimated)
- 28.01.2022, 10:00 am–06:00 pm: Final Presentation (estimated)

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 online via MS Teams, as currently planned. We will provide a link to join the team if your registration was approved. Interim and final presentation may take a hybrid or real-life form.

If you have any questions regarding course registration, please contact lins@kit.edu or dehling@kit.edu

T 7.79 Course: Current Directions in Consumer Psychology [T-WIWI-111100]

Responsible:	Prof. Dr. Benjamin Scheibehenne
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105714 - Consumer Research

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	3	Grade to a third	Each term	1 terms	1

Events					
WT 21/22	2540441	Current Directions in Consumer Psychology	2 SWS	Others (sons / ✲	Scheibehenne
Exams					
WT 21/22	7900376	Current Directions in Consumer Psychology			Scheibehenne

Legend: ▯ Online, ✲ Blended (On-Site/Online), ◆ On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment. Grading will be based on a continuous basis throughout the semester.

Annotation
This class covers current research topics at the intersection between Psychology, Consumer Behavior, and Behavioral Economics. Based on weekly reading assignments of current scientific journal publications, students will get a first-hand experience of the ongoing topics and discussions at this exciting and dynamic area of research. The reading list will be announced at the first day of class and will be updated throughout the semester. Grades will be based on weekly participation throughout the semester including short oral presentation of papers in class, active engagement in discussions, and homework assignments. Due to the highly interactive format of this class the number of participants is limited.

Below you will find excerpts from events related to this course:

V	**Current Directions in Consumer Psychology** 2540441, WS 21/22, 2 SWS, Language: English, Open in study portal	**Others (sonst.)** **Blended (On-Site/Online)**

Content
This class covers current research topics at the intersection between Psychology, Consumer Behavior, and Behavioral Economics. Based on weekly reading assignments of current scientific journal publications, students will get a first-hand experience of the ongoing topics and discussions at this exciting and dynamic area of research. The reading list will be announced at the first day of class. Grades will be based on continuous participation throughout the semester including short oral presentation of papers in class, active engagement in discussions and homework assignments. This class will be taught in English.

T 7.80 Course: Current Topics on BioMEMS [T-MACH-102176]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type Examination of another type	Credits 4	Grading scale Grade to a third	Recurrence Each term	Version 2

Events					
WT 21/22	2143873	Actual topics of BioMEMS	2 SWS	Seminar / 🔀	Guber, Ahrens
ST 2022	2143873	Actual topics of BioMEMS	2 SWS	Seminar / 🔀	Guber, Ahrens
Exams					
WT 21/22	76-T-MACH-102176	Current Topics on BioMEMS			Guber
ST 2022	76-T-MACH-102176	Current Topics on BioMEMS			Guber

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
active participation and own presentation (30 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Actual topics of BioMEMS** 2143873, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Organizational issues
Wird bekannt gegeben

V	**Actual topics of BioMEMS** 2143873, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

- Short introduction to the basics of BioMEMS
- Selected aspects of biomedical engineering and life sciences
- Possible micro technical manufacturing processes
- Selected application examples from research and industry

The seminar includes (bio)medical engineering as well as biological and biotechnological topics in the context of engineering sciences

- Use of microtechnical components and systems in innovative medical products
- Use of microfluidic chip systems in applied biology and biotechnology

Organizational issues
Siehe Aushang

T	7.81 Course: Data Protection Law [T-INFO-111406]

Responsible: Dr. Johannes Eichenhofer
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2400238	Bereichsdatenschutz	2 SWS	Lecture / 🖥	Boehm
Exams					
WT 21/22	7500237	Bereichsdatenschutz			Boehm
ST 2022	7500168	Data Protection Law			Boehm

Legend: 🖥 Online, ✨ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T 7.82 Course: Database Systems and XML [T-WIWI-102661]

Responsible:	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 21/22	2511202	Database Systems and XML	2 SWS	Lecture	Oberweis
WT 21/22	2511203	Exercises Database Systems and XML	1 SWS	Practice / 🧩	Oberweis, Fritsch
Exams					
WT 21/22	7900007	Database Systems and XML			Oberweis
ST 2022	79AIFB_DBX_A3	Database Systems and XML (Registration until 18 July 2022)			Oberweis

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🔵 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Database Systems and XML   Lecture (V)
2511202, WS 21/22, 2 SWS, Language: German, Open in study portal

Content
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

Learning objectives:
Students

- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- M. Klettke, H. Meyer: XML & Datenbanken: Konzepte, Sprachen und Systeme. dpunkt.verlag 2003
- H. Schöning: XML und Datenbanken: Konzepte und Systeme. Carl Hanser Verlag 2003
- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- R. Elmasri, S. B. Navathe: Grundlagen der Datenbanksysteme. 2009
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T   7.83 Course: Decentrally Controlled Intralogistic Systems [T-MACH-105230]

Responsible: Prof. Dr.-Ing. Kai Furmans
Dr.-Ing. Maximilian Hochstein

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type Completed coursework	Credits 4	Grading scale pass/fail	Recurrence Each term	Version 3

Events					
WT 21/22	2117084	Decentrally controlled intralogistic systems	2 SWS	Practical course / 🎤	Furmans, Sperling, Ries
ST 2022	2117084	Decentrally controlled intralogistic systems	2 SWS	Practical course / 🎤	Furmans, Sperling, Ries
Exams					
WT 21/22	76-T-MACH-105230	Decentrally Controlled Intralogistic Systems			Furmans
ST 2022	76-T-MACH-105230	Decentrally Controlled Intralogistic Systems			Furmans

Legend: 📱 Online, ❀ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Certificate by colloquium with presentation

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Decentrally controlled intralogistic systems** 2117084, WS 21/22, 2 SWS, Language: German, Open in study portal	**Practical course (P) On-Site**

Content
Proof:

- Certificate by colloquium with presentation

Note:

- Number of participants limited
- Participants will be selected
- Compulsory attendance

Media:

- Lego Mindstorms, PC

Teaching content:

- Introduction to material handling systems
- Construction of a model for decentralized logistic systems
- Object-oriented programming with LabView (or Python* with reservation)
- Implementation of the model with Mindstorms
- Presentation of the results

Learning objectives:

Students are able to:

- Model complex cinematic systems and use object-oriented programming for this purpose,
- Built experimental setups in a team for decentralized controlled intralogistic systems, choose appropriate system components and models and finally proof the function by using experiments.

Effort:

- Regular attendance: 90 hours (workplace is provided)
- Self-study: 30 hours

Dates and further information see homepage

Organizational issues
Termine im WS21/22:

Gruppe 1 (Maximilian Ries) 07.02.- 25.02.2022, davon Präsenz: 07.02., 14.02. - 25.02.2022

Gruppe 2 (Marvin Sperling) 21.02.- 11.03.2022, davon Präsenz: 21.02., 28.02. - 11.03.2022

Anmeldezeitraum:

01.11.2021 8:00 Uhr - 30.11.2021 18:00 Uhr (via Ilias-Kurs)

*Corona-bedingte Änderungen vorbehalten**

Literature
keine

| V | **Decentrally controlled intralogistic systems**
2117084, SS 2022, 2 SWS, Language: German, Open in study portal | **Practical course (P)**
On-Site |

Content
Proof:

- Certificate by colloquium with presentation

Note:

- Number of participants limited
- Participants will be selected
- Compulsory attendance

Media:

- Lego Mindstorms, PC

Teaching content:

- Introduction to material handling systems
- Construction of a model for decentralized logistic systems
- Object-oriented programming with LabView (or Python* with reservation)
- Implementation of the model with Mindstorms
- Presentation of the results

Learning objectives:

Students are able to:

- Model complex cinematic systems and use object-oriented programming for this purpose,
- Built experimental setups in a team for decentralized controlled intralogistic systems, choose appropriate system components and models and finally proof the function by using experiments.

Effort:

- Regular attendance: 90 hours (workplace is provided)
- Self-study: 30 hours

Dates and further information see homepage

Organizational issues
Termine im SS22:

Gruppe 1 15.08.- 02.09.2022, davon Präsenz: 15.08., 22.08. - 02.09.2022

Gruppe 2 29.08.- 16.09.2022, davon Präsenz: 29.08., 05.09. - 16.09.2022

*Corona-bedingte Änderungen vorbehalten**

Anmeldezeitraum:

01.04.2022 8:00 Uhr - 31.05.2022 18:00 Uhr (via Ilias-Kurs)

Literature
keine

T 7.84 Course: Demand-Driven Supply Chain Planning [T-WIWI-110971]

Responsible:	Josef Packowski
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Exams			
WT 21/22	7900291	Demand-Driven Supply Chain Planning	Packowski

Competence Certificate

The assessment consists of a written exam.

Annotation

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

T 7.85 Course: Derivatives [T-WIWI-102643]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2530550	Derivatives	2 SWS	Lecture / 🗣	Thimme, Uhrig-Homburg
ST 2022	2530551	Übung zu Derivate	1 SWS	Practice / 🗣	Thimme, Eska, Uhrig-Homburg
Exams					
WT 21/22	7900051	Derivatives			Uhrig-Homburg
ST 2022	7900111	Derivatives			Uhrig-Homburg

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Derivatives
2530550, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Weiterführende Literatur:

Cox/Rubinstein (1985): Option Markets, Prentice Hall

T 7.86 Course: Design Thinking [T-WIWI-102866]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 21/22	2545008	Design Thinking (Track 1)	2 SWS	Seminar / 🖳	Abraham, Csernalabics
ST 2022	2545008	Design Thinking (Track 1)	2 SWS	Seminar / 🗣	Jochem, Terzidis
Exams					
WT 21/22	7900084	Design Thinking (Track 1)			Terzidis
ST 2022	7900053	Design Thinking (Track 1)			Terzidis

Legend: 🖳 Online, ⬥ Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
None

Annotation
The seminar content will be published on the website of the institute.

Below you will find excerpts from events related to this course:

V Design Thinking (Track 1)
2545008, WS 21/22, 2 SWS, Language: English, Open in study portal
Seminar (S)
Online

Content
Course Content:

Design Thinking is a user-centric innovation management method. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes are created and tested by the user group. The result is a proven and validated product.

During the seminar, the students learn basic procedures for achieving user-centric innovations. These are concrete methods that start with the potential user of certain products and services. The method is problem-oriented and emphasizes the specific customer situation. After attending the seminar, the students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

V Design Thinking (Track 1)
2545008, SS 2022, 2 SWS, Language: English, Open in study portal
Seminar (S)
On-Site

Content
Content

Design Thinking is a user-centric innovation management method. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes are created and tested by the user group. The result is a proven and validated product.

Learning Objectives

During the seminar, the students learn basic procedures for achieving user-centric innovations. These are concrete methods that start with the potential user of certain products and services. The method is problem-oriented and emphasizes the specific customer situation. After attending the seminar, the students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

T 7.87 Course: Designing Interactive Systems [T-WIWI-110851]

Responsible:	Prof. Dr. Alexander Mädche
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-104068 - Information Systems in Organizations
	M-WIWI-104080 - Designing Interactive Information Systems
	M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Events					
ST 2022	2540558	Designing Interactive Systems	3 SWS	Lecture / 🧩	Mädche, Gnewuch
Exams					
WT 21/22	7900205	Designing Interactive Systems			Mädche
ST 2022	00009	Designing Interactive Systems			Mädche

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-WIWI-108461 - Interactive Information Systems must not have been started.

Annotation

The course is held in english.

Below you will find excerpts from events related to this course:

V	**Designing Interactive Systems**	Lecture (V)
	2540558, SS 2022, 3 SWS, Language: English, Open in study portal	**Blended (On-Site/Online)**

Content
Description

Computers have evolved from batch processors towards highly interactive systems. This offers new possibilities but also challenges for the successful design of the interaction between human and computer. Interactive system are socio-technical systems in which users perform tasks by interacting with technology in a specific context in order to achieve specified goals and outcomes.

The aim of this course is to introduce advanced concepts and theories, interaction technologies as well as current practice of contemporary interactive systems.

The course is complemented with a design capstone project, where students in a team select and apply design methods & techniques in order to create an interactive prototype

Learning objectives

- Get an advanced understanding of conceptual foundations of interactive systems from a human and computer perspective

- explore the theoretical grounding of Interactive Systems leveraging theories from reference disciplines such as psychology

- know specific design principles for the design of advanced interactive systems

- get hands-on experience in conceptualizing and designing advanced Interactive Systems to solve a real-world challenge from an industry partner by applying the lecture contents.

Prerequisites

No specific prerequisites are required for the lecture

Literature

Die Vorlesung basiert zu einem großen Teil auf

· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.

Weiterführende Literatur wird in der Vorlesung bereitgestellt.

T 7.88 Course: Development of hybrid drivetrains [T-MACH-110817]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	2134155	Development of Hybrid Powertrains	2 SWS	Lecture / ⚙	Koch, Doppelbauer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
written exam, 1 hour

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Development of Hybrid Powertrains** 2134155, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content

1. Introduction and Goal
2. Alternative Powertrains
3. Fundamentals of Hybrid Powertrains
4. Fundamentals of Electric Components of Hybrid Powertrains
5. Interactions in Hybrid Powertrain Development
6. Overall System Optimization

T 7.89 Course: Digital Health [T-WIWI-109246]

Responsible:	Prof. Dr. Ali Sunyaev
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	3

Events					
WT 21/22	2511402	Digital Health	2 SWS	Lecture	Sunyaev, Thiebes, Schmidt-Kraepelin
Exams					
WT 21/22	7900068	Digital Health			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. The examination is only offered to first-time writers in the winter semester, but can be repeated in the following summer semester.

Prerequisites

None.

Below you will find excerpts from events related to this course:

V	**Digital Health**	**Lecture (V)**
	2511402, WS 21/22, 2 SWS, Language: English, Open in study portal	

Content

The master course Digital Health introduces master students to the subject of digitization in health care. Students will learn about the theoretical foundations and practical implications of various topics surrounding the digitization in health care, including health information systems, telematics, big health care data, and patient-centered health care.

After an introduction to the challenge of digitization in health care, 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 of 3-4) on a selected topic and have to write a course paper. Students can choose a topic from a variety of topics. To answer the research questions, students can use literature reviews but also interviews, surveys, programming tasks, and other research methods are possible.

There will be a short introduction to the topics for the course paper in the following topic areas. In addition, it will be possible to propose your own topics as a group in the topic areas:

- Mobile Health (mHealth) / Gamification
- Distributed Ledger Technology / Blockchain
- Artificial Intelligence / Machine Learning
- Genomics / Biomedical Data

Since we offer topics in this course that also correspond to the research interests in our research group, there may be the opportunity to work on the topics in more depth in the course of a final thesis.

Learning objectives:

Students know about the challenges of digitization in health care and can leverage relevant concepts and technologies to address these challenges. Students learn to work in teams and critically discuss digital health topics with fellow students, researchers, and practitioners.

Notes:

The number of participants is limited to 30 students. Please register at the Wiwi-Portal here. The registration will be opened from September 7, 2021 until October 12, 2021.

Please make sure that you are available at the following dates if you want to take the course:

- 21.10.2021, 16:00–17:30 - 1. Introduction to Digital Health
- 28.10.2021, 16:00–17:30 - 2. Topic Area Presentation #1
- 04.11.2021, 16:00–17:30 - 3. Topic Area Presentation #2
- 11.11.2021, 16:00–17:30 - 4. Guest Lecture
- 10.02.2022, 10:00–17:00 - Final Presentation

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 online via MS Teams. We will provide a link to join the team if your registration was approved.

If you have any questions regarding course registration, please contact scott.thiebes@kit.edu or manuel.schmidt-kraepelin@kit.edu

T 7.90 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsible:	Prof. Dr. Martin Klarmann
	Anja Konhäuser
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105312 - Marketing and Sales Management

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

Events					
ST 2022	2571156	Digital Marketing and Sales in B2B	1 SWS	Others (sons / 🎤	Konhäuser

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✘ Cancelled

Competence Certificate
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

Prerequisites
None.

Annotation
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).Please note that only one of the 1.5-ECTS courses can be attended in this module.

Below you will find excerpts from events related to this course:

V	**Digital Marketing and Sales in B2B** 2571156, SS 2022, 1 SWS, Language: English, Open in study portal	Others (sonst.) On-Site

Content
Learning Sessions:

The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.

Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g. product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:

After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

- Understand digital marketing and sales approaches for the B2B sector
- Recognise important elements and understand how-to-setup of digital strategies
- Become familiar with the effectiveness and usage of different digital marketing channels
- Understand the effect of digital sales on sales management, customer support and value chain
- Be able to measure and interpret digital KPIs
- Calculate the Return on Investment (RoI) for digital marketing by combining online data with company performance data

time of presentness = 15 hrs.

private study = 30 hrs.

Organizational issues
Blockveranstaltung, Raum 115, Geb. 20.21, Termine werden noch bekannt gegeben

Literature
-

T 7.91 Course: Digital Transformation and Business Models [T-WIWI-108875]

Responsible:	Dr. Daniel Jeffrey Koch
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	2545103	Digital Transformation and Business Models	2 SWS	Seminar / 🗣	Koch
Exams					
ST 2022	7900284	Digital Transformation and Business Models			Weissenberger-Eibl

Legend: 📱 Online, 🕸 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation). The final grade is composed 75% of the grade of the written paper and 25% of the presentation.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Below you will find excerpts from events related to this course:

V	**Digital Transformation and Business Models**	**Seminar (S)**
	2545103, SS 2022, 2 SWS, Language: German, Open in study portal	**On-Site**

Content
The seminar "Digital Transformation and Business Models" aims at the development of thematic aspects of digital transformation with simultaneous application of different business model methodologies. Established companies face the challenge of digital transformation. The digital transformation is particularly relevant for the business models of industrial enterprises. As part of innovation management, the examination of business model changes against the background of digital transformation is one of the main challenges facing the German economy. At the beginning, seminar topics will be assigned. These will be presented and discussed at the end of the seminar. In the first seminar date impulses to business model methodologies and the digital transformation take place, which are to be discussed then, in order to provide an understanding for the topic complex and to ensure the purposeful development of the seminar topics.

T   7.92 Course: Digitalization from Production to the Customer in the Optical Industry [T-MACH-110176]

Responsible:	Dr.-Ing. Marc Wawerla
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering
               M-MACH-105455 - Strategic Design of Modern Production Systems

Type Examination of another type	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 3

Events					
WT 21/22	2149701	Digitalization from Production to the Customer in the Optical Industry	2 SWS	Lecture / 🧩	Wawerla
Exams					
WT 21/22	76-T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry			Wawerla
ST 2022	76-T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry			Wawerla

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative test achievement (graded):
- Written processing of a case study (weighting 50%) and
- Presentation of the results (ca. 10 min.) followed by a colloquium (ca. 30 min.), (weighting 50%)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Digitalization from Production to the Customer in the Optical Industry** 2149701, WS 21/22, 2 SWS, Language: English, Open in study portal	Lecture (V) Blended (On-Site/Online)

Content

The lecture deals with Digitalization along the entire value chain end-to-end, with a focus on production and supply chain. Within this context, concepts, tools, methods, technologies and concrete applications in the industry are presented. Furthermore, the students get the opportunity to get first-hand insights into the digitalization journey of a German technology company.

Main topics of the lecture:

- Concepts and methods such as disruptive innovation and agile project management
- Overview on technologies at disposal
- Practical approaches in innovation
- Applications in industry
- Field trip to ZEISS

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are able to analyze and evaluate the suitability of digitalization technologies in the optical industry.
- are able to assess the applicability of methods such as disruptive innovation and agile project management.
- are able to appreciate the practical challenges to digitalization in industry.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 22.10.2021

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php)

Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.

For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/studium-und-lehre.php).

Due to the limited number of participants, advance registration is required.

T 7.93 Course: Digitalization in Facility and Real Estate Management [T-BGU-108941]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105592 - Digitalization in Facility Management

Type Examination of another type	Credits 6	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	6242907	Digitization in Facility- and Real Estate Management	4 SWS	Lecture / Practice (	Lennerts, Mitarbeiter/innen
Exams					
WT 21/22	8246108941	Digitalization in Facility and Real Estate Management			Lennerts

Competence Certificate
project work incl. report, appr. 15 pages, and presentation/colloquium, appr. 15 min

Prerequisites
none

Recommendation
none

Annotation

T 7.94 Course: Digitalization of Products, Services & Production [T-MACH-108491]

Responsible: Dr.-Ing. Bernd Pätzold
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

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

Events					
WT 21/22	2122310	Digitalization of Products, Services & Production	2 SWS	Seminar / 🗣	Pätzold

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

Competence Certificate
Assessment of another type. Two presentations in team work and two written compositions. Grading: each composition 1/6 and each presentation 2/3.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Digitalization of Products, Services & Production
2122310, WS 21/22, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content

- Digitalization of products, services and production in the context of Industry 4.0 .
- Key drivers for ongoing digitalization and their impact on future product development and manufacturing.
- Methods and procedures to design the according transformation process.
- Intensive group discussions of use-case scenarios using practical examples from the industry.

Students are able to

- describe the fundamental challenges and objectives of the progressive digitalization of products, service and production. In context of these challenges, students can name and explain the essential terms.
- illustrate the key drivers and fundamental technologies behind the digitalization of products, services and processes.
- describe the challenges of the ongoing digitalization and the corresponding changes in business processes and distinguish between them in regards to time and place. Furthermore, students are able to assign the IT-Architecture and systems to the corresponding process steps.
- highlight the requirement for future information management in networks of product development and production institutions and can clarify how to validated and safeguard the corresponding IT processes.
- to analyze the challenges of digitalization and present potential solution approaches via self-created scenarios for future developments.

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Vorlesungsfolien / lecture slides

T 7.95 Course: Disassembly Process Engineering [T-BGU-101850]

Responsible:	Prof. Dr.-Ing. Sascha Gentes
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	6243803	Verfahrenstechniken der Demontage	2 SWS	Lecture / Practice (/ ⚙	Gentes
Exams					
WT 21/22	8240101850	Disassembly Process Engineering			Gentes

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T   7.96 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	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2550488	Ereignisdiskrete Simulation in Produktion und Logistik	3 SWS	Lecture / 👤	Spieckermann

Legend: 📱 Online, ⚯ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written paper and an oral exam of about 30-40 min (alternative exam assessment).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is planned to be held every summer term.

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

Below you will find excerpts from events related to this course:

V   Ereignisdiskrete Simulation in Produktion und Logistik
2550488, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

Organizational issues
Bewerbung im Zeitraum 11.03.-31.03. unter https://portal.wiwi.kit.edu/ys/5668

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 7.97 Course: Drying of Dispersions [T-CIWVT-111433]

Responsible: Prof. Dr.-Ing. Heike Karbstein
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each summer term	2

Events					
ST 2022	22226	Trocknen von Dispersionen	1 SWS	Lecture / 🗣	Karbstein

Legend: 🗍 Online, ✿ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 7.98 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
M-WIWI-101497 - Agglomeration and Innovation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each winter term	3

Events					
WT 21/22	2560402	Dynamic Macroeconomics	2 SWS	Lecture / 📱	Brumm
WT 21/22	2560403	Übung zu Dynamic Macroeconomics	1 SWS	Practice / 📱	Krause
Exams					
WT 21/22	7900261	Dynamic Macroeconomics			Brumm
ST 2022	7900026	Dynamic Macroeconomics			Brumm

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a oral exam (30 min.).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V	**Dynamic Macroeconomics** 2560402, WS 21/22, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **Online**

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T   7.99 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Responsible: PD Dr. Patrick Jochem
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581006	Efficient Energy Systems and Electric Mobility	2 SWS	Lecture / 🗣	Jochem
Exams					
WT 21/22	7981006	Efficient Energy Systems and Electric Mobility			Fichtner

Legend: 📱 Online, ✿ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V   Efficient Energy Systems and Electric Mobility
2581006, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

- Understand the concept of energy efficiency as applied to specific systems

- Obtain an overview of the current trends in energy efficiency

- Be able to determine and evaluate alternative methods of energy efficiency improvement

- Overview of technical and economical stylized facts on electric mobility

- Judging economical, ecological and social impacts through electric mobility

Organizational issues
s. Institutsaushang

Literature
Wird in der Vorlesung bekanntgegeben.

T 7.100 Course: eFinance: Information Systems for Securities Trading [T-WIWI-110797]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101446 - Market Engineering
	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture / 📱	Weinhardt, Notheisen
WT 21/22	2540455	Übungen zu eFinance: Informationssysteme für den Wertpapierhandel	1 SWS	Practice / 🧩	Jaquart
Exams					
WT 21/22	7900182	eFinance: Information Engineering and Management for Securities Trading			Weinhardt
WT 21/22	7900309	eFinance: Information Systems for Securities Trading			Weinhardt

Legend: 📱 Online, 🧩 Blended (On-Site/Online), ♣ On-Site, ✗ Cancelled

Competence Certificate
Success is monitored by means of ongoing elaborations and presentations of tasks and an examination (60 minutes) at the end of the lecture period. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102600 - eFinance: Information Engineering and Management for Securities Trading must not have been started.

Annotation
The course"eFinance: Information Systems for Securities Trading" covers different actors and their function in the securities industry in-depth, highlighting key trends in modern financial markets, such as Distributed Ledger Technology, Sustainable Finance, and Artificial Intelligence. Security prices evolve through a large number of bilateral trades, performed by market participants that have specific, well-regulated and institutionalized roles. Market microstructure is the subfield of financial economics that studies the price formation process. This process is significantly impacted by regulation and driven by technological innovation. Using the lens of theoretical economic models, this course reviews insights concerning the strategic trading behaviour of individual market participants, and models are brought market data. Analytical tools and empirical methods of market microstructure help to understand many puzzling phenomena in securities markets.

Below you will find excerpts from events related to this course:

V	**eFinance: Information Systems for Securities Trading**	Lecture (V)
	2540454, WS 21/22, 2 SWS, Language: English, Open in study portal	**Online**

Literature

- Picot, Arnold, Christine Bortenländer, Heiner Röhrl (1996): "Börsen im Wandel". Knapp, Frankfurt
- Harris, Larry (2003): "Trading and Exchanges - Market Microstructure for Practitioners"". Oxford University Press, New York

Weiterführende Literatur:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

T	7.101 Course: Electronics and EMC [T-ETIT-100723]

Responsible: Dr. Martin Sack
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101163 - High-Voltage Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2307378	Electronics and EMC	2 SWS	Lecture / 🗣	Sack
Exams					
WT 21/22	7307378	Electronics and EMC			Sack
ST 2022	7307378	Electronics and EMC			Sack

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T	**7.102 Course: Elements and Systems of Technical Logistics [T-MACH-102159]**

Responsible:	Georg Fischer
	Dr.-Ing. Martin Mittwollen
Organisation:	KIT Department of Mechanical Engineering

Part of:	M-MACH-104888 - Advanced Module Logistics

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2117096	Elements and systems of Technical Logistics	3 SWS	Lecture / Practice (/ ✗	Mittwollen
Exams					
WT 21/22	76-T-MACH-102159	Elements and Systems of Technical Logistics			Mittwollen

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral exam (20min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites

Recommendation

Knowledge out of "Basics of Technical Logistics I" (T-MACH-109919) preconditioned.

Below you will find excerpts from events related to this course:

V	**Elements and systems of Technical Logistics**	**Lecture / Practice (VÜ)**
	2117096, WS 21/22, 3 SWS, Language: German, Open in study portal	**Cancelled**

Organizational issues

Die Vorlesung wird ab SS 2022 in stark überarbeiteter Form angeboten werden.

Für die bisherige Veranstaltung werden weiterhin Prüfungen zu den üblichen Terminen angeboten.

Die Erfolgskontrolle erfolgt in Form einer mündlichen (20min.) Prüfung (nach §4 (2), 2 SPO). Die Prüfung wird in jedem Semester angeboten und kann zu jedem ordentlichen Prüfungstermin wiederholt werden.

siehe auch Homepage / ILIAS

This lecture will be offered in a deeply restructured form in SS 2022

Assessment for the former lecture is provided also in the future at the regular times

The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulations.

look also at our homepage / ILIAS

T   7.103 Course: Elements and Systems of Technical Logistics - Project [T-MACH-108946]

Responsible:	Georg Fischer Dr.-Ing. Martin Mittwollen
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-104888 - Advanced Module Logistics

Type Examination of another type	Credits 2	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2117097	Elements and systems of Technical Logistics - project		Project (P / ✗	Mittwollen

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation

Prerequisites

T-MACH-102159 (Elements and Systems of Technical Logistics) must have been started

Recommendation

Knowledge out of "Basics of Technical Logistics I" (T-MACH-109919) preconditioned.

Below you will find excerpts from events related to this course:

V   Elements and systems of Technical Logistics - project
2117097, WS 21/22, SWS, Language: German, Open in study portal

Project (PRO)
Cancelled

Organizational issues

Das Projekt (als Ergänzung zur Vorlesung) wird ab SS 2022 in stark überarbeiteter Form angeboten werden.

Für die bisherige Veranstaltung werden weiterhin Prüfungen zu den üblichen Terminen angeboten.

Die Erfolgskontrolle erfolgt in Form einer mündlichen (20min.) Prüfung (nach §4 (2), 2 SPO). Die Prüfung wird in jedem Semester angeboten und kann zu jedem ordentlichen Prüfungstermin wiederholt werden.

siehe auch Homepage / ILIAS

This project (as complement to the lecture) will be offered in a deeply restructured form in SS 2022

Assessment for the former lecture is provided also in the future at the regular times

The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulations.

look also at our homepage / ILIAS

T   7.104 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-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2513404	Seminar Emerging Trends in Digital Health (Bachelor)	2 SWS	Seminar / 🖥	Lins, Sunyaev, Thiebes
ST 2022	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar / 🖥	Lins, Sunyaev, Thiebes
Exams					
ST 2022	7900146	Seminar Emerging Trends in Digital Health (Master)			Sunyaev

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The alternative exam assessment consists of a final thesis.

Prerequisites

None.

Annotation

The course is usually held as a block course.

T	**7.105 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-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type Examination of another type	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 2

Events					
ST 2022	2513402	Seminar Emerging Trends in Internet Technologies (Bachelor)	2 SWS	Seminar / 🖳	Sunyaev, Thiebes, Lins
ST 2022	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar / 🖳	Lins, Sunyaev, Thiebes
Exams					
ST 2022	7900128	Seminar Emerging Trends in Internet Technologies (Master)			Sunyaev

Legend: 🖳 Online, ✪ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 7.106 Course: Emissions into the Environment [T-WIWI-102634]

Responsible:	Ute Karl
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101412 - Industrial Production III
	M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2581962	Emissions into the Environment	2 SWS	Lecture / 📱	Karl
Exams					
WT 21/22	7981962	Emissions into the Environment			Schultmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Recommendation

None

Below you will find excerpts from events related to this course:

V Emissions into the Environment
2581962, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

Emission sources/emission monitoring/emission reduction: The lecture gives an overview of relevant emissions of air pollutants and greenhouse gases, emission monitoring and pollutant abatement options together with relevant legal regulations at national and international level. In addition, the fundamentals of circular economy, waste management and recycling are explained.

Structure:

Air pollution control

- Introduction, terms and definitions
- Sources of air pollutants
- Legal framework of air quality control
- Technical measures to reduce air pollutant emissions

Circular economy, recycling and waste management

- Waste collection and logistics
- Dual systems for packaging waste
- Recycling
- Thermal and biological waste treatment
- Final waste disposal

Literature
Wird in der Veranstaltung bekannt gegeben.

T	**7.107 Course: Employment Law [T-INFO-111436]**

Responsible: Dr. Alexander Hoff
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 2

Events					
ST 2022	24668	Employment Law	2 SWS	Lecture / 🗣	Hoff
Exams					
ST 2022	7500082	Employment Law			Dreier, Matz

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.108 Course: Energetic Refurbishment [T-BGU-111211]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
                     Dr.-Ing. Harald Schneider

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101884 - Lean Management in Construction
                     M-BGU-101888 - Project Management in Construction
                     M-BGU-105592 - Digitalization in Facility Management
                     M-BGU-105597 - Facility Management in Hospitals

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	1,5	Grade to a third	Each term	1 terms	1

Events					
WT 21/22	6240903	Energetische Sanierung	1 SWS	Lecture	Kropp, Schneider, Münzl
Exams					
WT 21/22	8240111211	Energetic Refurbishment			Lennerts, Schneider

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.109 Course: Energy and Environment [T-WIWI-102650]

Responsible:	Ute Karl
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101452 - Energy Economics and Technology
	M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581003	Energy and Environment	2 SWS	Lecture / 🎤	Karl
ST 2022	2581004	Übungen zu Energie und Umwelt	1 SWS	Practice / 🎤	Langenmayr, Fichtner, Kraft
Exams					
WT 21/22	7981003	Energy and Environment			Fichtner

Legend: 📱 Online, ✨ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy and Environment
2581003, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture focuses on the environmental impacts arising from fossil fuels use and on the methods for the evaluation of such impacts. The first part of the lecture describes the environmental impacts of air pollutants and greenhouse gases as well as technical measures for emission control. The second part covers methods of impact assessment and their use in environmental communication as well as methods for the scientific support of emission control strategies.

The topics include:

- Fundamentals of energy conversion
- Formation of air pollutants during combustion
- Technical measures to control emissions from fossil-fuel combustion processes
- External effects of energy supply (life cycle analyses of selected energy systems)
- Environmental communication on energy services (e.g. electricity labelling, carbon footprint)
- Integrated Assessment Modelling to support the European Clean Air Strategy
- Cost-effectiveness analyses and cost-benefit analyses for emission control strategies
- Monetary valuation of external effects (external costs)

Literature
Die Literaturhinweise sind in den Vorlesungsunterlagen enthalten (vgl. ILIAS)

T 7.110 Course: Energy and Process Technology I [T-MACH-102211]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Prof. Dr. Ulrich Maas
Dr.-Ing. Corina Schwitzke
Dr. Amin Velji

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101296 - Energy and Process Technology I

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	1

Events					
WT 21/22	2157961	Energy and Process Technology I	6 SWS	Lecture / Practice (/ 🔊	Bauer, Mitarbeiter, Wagner, Maas, Schwitzke, Wirbser
Exams					
WT 21/22	76-T-MACH-102211	Energy and Process Technology I			Bauer, Wirbser, Schwitzke
ST 2022	76-T-MACH-102211	Energy and Process Technology I			Bauer, Wirbser, Schwitzke, Pritz

Legend: 📱 Online, ⚇ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

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

Prerequisites
none

Below you will find excerpts from events related to this course:

V Energy and Process Technology I
2157961, WS 21/22, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The last thrid of the lecture deals with the topic **Thermal Turbomachinery**. The basic principles, the functionality and the scope of application of gas and steam tubrines for the generation of electrical power and propulsion technology are addressed.

The students are able to:

- describe and calculate the basic physical-technical processes
- apply the mathematical and thermodynamical description
- reflect on and explain the diagrams and schematics
- comment on diagrams
- explain the functionality of gas and steam turbines and their components
- name the applications of thermal turbomachinery and their role in the field of electricity generation and propulsion technology

Organizational issues
Vorlesung findet in Präsenz statt, sofern die COVID-Inzidenzwerte es zulassen.

T 7.111 Course: Energy and Process Technology II [T-MACH-102212]

Responsible: Prof. Dr. Ulrich Maas
                   Dr.-Ing. Corina Schwitzke
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101297 - Energy and Process Technology II

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2022	2170832	Energy and Process Technology II	6 SWS	Lecture / Practice (/ 🗣	Schwitzke, Pritz, Maas
Exams					
WT 21/22	76-T-MACH-102212	Energy and Process Technology II			Schwitzke, Wirbser, Bauer
ST 2022	76-T-MACH-102212	Energy and Process Technology II			Wirbser, Schwitzke, Bauer, Pritz

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

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

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Energy and Process Technology II** 2170832, SS 2022, 6 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **On-Site**

Content
Thermal Turbomaschinery - In the first part of the lecture deals with energy systems. Questions regarding global energy resources and their use, especially for the generation and provision of electrical energy, are addressed. Common fossil and nuclear power plants for the centralized supply with electrical power as well as concepts of power-heat cogeneration for the decentralized electrical power supply by means of block-unit heat and power plants, etc. are discussed. Moreover, the characteristics and the potential of renewable energy conversion concepts, such as wind and hydro-power, photovoltaics, solar heat, geothermal energy and fuel cells are compare and evaluated. The focus is on the description of the potentials, the risks and the economic feasibility of the different strategies aimed to protect resources and reduce CO_2 emissions.

The students are able to:

- discuss and evaluate energy resources and reserves and their utility
- review the use of energy carriers for electrical power generation
- explain the concepts and properties of power-heat cogeneration, renewable energy conversion and fuel cells and their fields of application
- comment on and compare centralized and decentralized supply concepts
- calculate the potentials, riskis and economic feasibility of different strategies aiming at the protection of resources and the reduction of CO_2 emissions
- name and judge on the options for solar energy utilization
- discuss the potential of geothermal energy and its utilization

T   7.112 Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

Responsible:	Dr.-Ing. Meike Kramer
	Dr. Frank Schönung
Organisation:	KIT Department of Mechanical Engineering

| **Part of:** | M-MACH-101278 - Material Flow in Networked Logistic Systems |
| | M-MACH-104888 - Advanced Module Logistics |

Type Oral examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 21/22	2117500	Energy efficient intralogistic systems	2 SWS	Lecture / 📱	Kramer, Schönung
Exams					
WT 21/22	76-T-MACH-105151	Energy Efficient Intralogistic Systems			Kramer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Oral, 30 min. examination dates after the end of each lesson period.

Prerequisites
none

Recommendation
The content of course "Basics of Technical Logistics I" (T-MACH-109919) should be known.

Annotation
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.

Below you will find excerpts from events related to this course:

V	**Energy efficient intralogistic systems** 2117500, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content
The content of course "Basics of Technical Logistics" should be knownn.

Organizational issues
Blockveranstaltung 2021/2022. Die Veranstaltung wird im Januar als Online Veranstaltung (Link wird im ILIAS Kurs bereitgestellt) stattfinden. Termine

12.01.2022: 16:00 - 18:00 Uhr

14.01.2022: 16:00 - 18:00 Uhr

17.01.2022: 16:00 - 19:00 Uhr

18.01.2022: 16:00 - 19:00 Uhr

21.01.2022: 16:00 - 19:00 Uhr

24.01.2022: 16:00 - 19:00 Uhr

26.01.2022: 16:00 - 19:00 Uhr

28.01.2022: 16:00 - 18:00 Uhr

31.01.2022: 16:00 - 18:00 Uhr (als Fragestunde)

Literature
Keine.

T 7.113 Course: Energy Market Engineering [T-WIWI-107501]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101411 - Information Engineering
	M-WIWI-101446 - Market Engineering
	M-WIWI-101451 - Energy Economics and Energy Markets
	M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540464	Energy Market Engineering	2 SWS	Lecture / 🗣	Henni, Weinhardt
ST 2022	2540465	Übung zu Energy Market Engineering	1 SWS	Practice	Semmelmann

Legend: 🗐 Online, ⚒ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites

None

Recommendation

None

Annotation

Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".

The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

Below you will find excerpts from events related to this course:

V Energy Market Engineering

2540464, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.
- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

| **T** | **7.114 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** Written examination | **Credits** 4,5 | **Grading scale** Grade to a third | **Recurrence** Each winter term | **Version** 1 |

Events					
WT 21/22	2540494	Energy Networks and Regulation	2 SWS	Lecture / 🗣	Rogat
WT 21/22	2540495	Übung zu Energy Networks and Regulation	1 SWS	Practice	Rogat
Exams					
WT 21/22	7900198	Energy Networks and Regulation			Weinhardt
WT 21/22	7900236	Energy Networks and Regulation			Weinhardt

Legend: 📱 Online, ⚔ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation.

The exam is offered every semester. Re-examinations are offered on every ordinary examination date.

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

Below you will find excerpts from events related to this course:

| **V** | **Energy Networks and Regulation** 2540494, WS 21/22, 2 SWS, Open in study portal | **Lecture (V)** **On-Site** |

Content
Learning Goals

The student,

- understands the business model of a network operator and knows its central tasks in the energy supply system,
- has a holistic overview of the interrelationships in the network economy,
- understands the regulatory and business interactions,
- is in particular familiar with the current model of incentive regulation with its essential components and understands its implications for the decisions of a network operator
- is able to analyse and assess controversial issues from the perspective of different stakeholders.

Content of teaching

The lecture "Energy Networks and Regulation" provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator's abilities to deal with the massive challenges lying ahead ("Energiewende", redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO
- Objectives of regulation: Fair price calculation and high standard access conditions
- The functioning of incentive regulation
- First major amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily?) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Literature

Averch, H.; Johnson, L.L (1962). Behavior of the firm under regulatory constraint, in: American Economic Review, 52 (5), S. 1052 – 1069.

Bundesnetzagentur (2006): Bericht der Bundesnetzagentur nach § 112a EnWG zur Einführung der Anreizregulierung nach § 21a EnWG, http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/Netzentgelte/Anreizregulierung/BerichtEinfuehrgAnreizregulierung.pdf?__blob=publicationFile&v=3.

Bundesnetzagentur (2015): Evaluierungsbericht nach § 33 Anreizregulierungsverordnung, https://www.bmwi.de/Redaktion/DE/Downloads/A/anreizregulierungsverordnung-evaluierungsbericht.pdf?__blob=publicationFile&v=1.

Filippini, M.; Wild, J.; Luchsinger, C. (2001) : Regulierung der Verteilnetzpreise zu Beginn der Marktöffnung. Erfahrungen in Norwegen und Schweden, Bundesamt für Energie, Bern, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/34/066/34066585.pdf.

Gómez, T. (2013): Monopoly Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 151 – 198, Springer-Verlag, London.

Gómez, T. (2013): Electricity Distribution, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 199 – 250, Springer-Verlag, London.

Pérez-Arriaga, I.J. (2013): Challenges in Power Sector Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 647 – 678, Springer-Verlag, London.

Rivier, M.; Pérez-Arriaga, I.J.; Olmos, L. (2013): Electricity Transmission, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 251 – 340, Springer-Verlag, London.

| T | **7.115 Course: Energy Systems Analysis [T-WIWI-102830]** |

Responsible: Dr. Armin Ardone
Prof. Dr. Wolf Fichtner

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2581002	Energy Systems Analysis	2 SWS	Lecture / ✿	Fichtner, Ardone, Dengiz, Yilmaz
Exams					
WT 21/22	7981002	Energy Systems Analysis			Fichtner

Legend: 🖥 Online, ✿ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Below you will find excerpts from events related to this course:

| V | **Energy Systems Analysis**
2581002, WS 21/22, 2 SWS, Language: English, Open in study portal | **Lecture (V)**
Blended (On-Site/Online) |

Content
1. Overview and classification of energy systems modelling approaches

2. Usage of scenario techniques for energy systems analysis

3. Unit commitment of power plants

4. Interdependencies in energy economics

5. Scenario-based decision making in the energy sector

6. Visualisation and GIS techniques for decision support in the energy sector

Learning goals:

The student

- has the ability to understand and critically reflect the methods of energy system analysis, the possibilities of its application in the energy industry and the limits and weaknesses of this approach
- can use select methods of the energy system analysis by her-/himself

Organizational issues
Bitte Institutsaushang beachten.

Literature
Weiterführende Literatur:

- Möst, D. und Fichtner, W.: **Einführung zur Energiesystemanalyse**, in: Möst, D., Fichtner, W. und Grunwald, A. (Hrsg.): Energiesystemanalyse, Universitätsverlag Karlsruhe, 2009
- Möst, D.; Fichtner, W.; Grunwald, A. (Hrsg.): **Energiesystemanalyse** - Tagungsband des Workshops "Energiesystemanalyse" vom 27. November 2008 am KIT Zentrum Energie, Karlsruhe, Universitätsverlag Karlsruhe, 2009 [PDF: http://digbib.ubka.uni-karlsruhe.de/volltexte/documents/928852]

T   7.116 Course: Energy Trade and Risk Management [T-WIWI-102691]

Responsible: N.N.
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	2581020	Energy Trading and Risk Management	2 SWS	Lecture / 🗣	Fraunholz, Kraft, Fichtner
Exams					
WT 21/22	7981020	Energy Trade and Risk Management			Fichtner

Legend: 🗔 Online, 🕸 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The lecture "Energiehandel und Risikomanagement" will be held in English under the title "Energy Trading and Risk Management" from the summer semester 2022. The examination for the English-language lecture will be offered in English from the summer semester 2022.

Examination offer for the previous German-language lecture: Last first attempt in winter semester 21/22; last examination offer for repeaters in summer semester 2022.

The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V   Energy Trading and Risk Management
2581020, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction to Markets, Mechanisms and Interaction
2. Electricity Trading (platforms, products, mechanisms)
3. Balancing Energy Markets and Congestion Management
4. Coal Markets (reserves, supply, demand, and transport)
5. Investments and Capacity Markets
6. Oil and Gas Markets (supply, demand, trade, and players)
7. Trading Game
8. Risk Management in Energy Trading

Literature
Weiterführende Literatur:

Burger, M., Graeber, B., Schindlmayr, G. (2007): *Managing energy risk: An integrated view on power and other energy markets*, Wiley&Sons, Chichester, England

EEX (2010): *Einführung in den Börsenhandel an der EEX auf Xetra und Eurex*, www.eex.de

Erdmann, G., Zweifel, P. (2008), Energieökonomik, Theorie und Anwendungen, Springer, ISBN: 978-3-540-71698-3

Hull, J.C. (2006): *Options, Futures and other Derivatives*, 6. Edition, Pearson Prentice Hall, New Jersey, USA

Borchert, J., Schlemm, R., Korth, S. (2006): *Stromhandel: Institutionen, Marktmodelle, Pricing und Risikomanagement (Gebundene Ausgabe)*, Schäffer-Poeschel Verlag

www.riskglossary.com

T 7.117 Course: Engine Measurement Techniques [T-MACH-105169]

Responsible: Dr.-Ing. Sören Bernhardt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2134137	Engine measurement techniques	2 SWS	Lecture / ⚙	Bernhardt
Exams					
WT 21/22	76-T-MACH-105169	Engine Measurement Techniques			Koch

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
oral examination, Duration: 0,5 hours, no auxiliary means

Prerequisites
none

Recommendation
T-MACH-102194 Combustion Engines I

Below you will find excerpts from events related to this course:

V	**Engine measurement techniques**	Lecture (V)
	2134137, SS 2022, 2 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Literature

1. Grohe, H.:Messen an Verbrennungsmotoren
2. Bosch: Handbuch Kraftfahrzeugtechnik
3. Veröffentlichungen von Firmen aus der Meßtechnik
4. Hoffmann, Handbuch der Meßtechnik
5. Klingenberg, Automobil-Meßtechnik, Band C

T 7.118 Course: Engineering Hydrology [T-BGU-108943]

Responsible: Dr.-Ing. Uwe Ehret
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	6200617	Ingenieurhydrologie	2 SWS	Lecture / Practice (/ ⬤	Ehret
Exams					
WT 21/22	8236108943	Engineering Hydrology			Ehret

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ⬤ On-Site, ✗ Cancelled

Competence Certificate
See German version.

Prerequisites
None

T 7.119 Course: Engineering Interactive Systems [T-WIWI-110877]

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104080 - Designing Interactive Information Systems

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

Exams			
WT 21/22	7900195	Engineering Interactive Systems	Mädche
ST 2022	00006	Engineering Interactive Systems	Mädche

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The course is held in English.

T 7.120 Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	3

Competence Certificate
Please note: The seminar cannot be offered in the winter semester 2019/2020 due to organizational reasons.
Alternative exam assessment.

Prerequisites
None

Recommendation
None

T   7.121 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
	M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
ST 2022	2545001	Entrepreneurship	2 SWS	Lecture / ⚙	Terzidis, Kuschel
Exams					
WT 21/22	7900045	Entrepreneurship			Terzidis
WT 21/22	7900229	Entrepreneurship			Terzidis
ST 2022	7900002	Entrepreneurship			Terzidis

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Students are offered the opportunity to earn a grade bonus through separate assignments. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V	**Entrepreneurship**	Lecture (V)
	2545001, SS 2022, 2 SWS, Language: English, Open in study portal	**Blended (On-Site/Online)**

Content

The lecture as a compulsory part of the module "Entrepreneurship" introduces the basic concepts of entrepreneurship. Important concepts and empirical facts are introduced, which relate to the conception and implementation of newly founded companies.

The focus here is on introducing methods for generating innovative business ideas, translating patents into business concepts, and general principles of business modeling and business planning. In particular, approaches such as Lean-Startup and Effectuation as well as concepts for financing young companies are covered.

A "KIT Entrepreneurship Talk" is part of each session (from 16.15-17.15), in which experienced founder and entrepreneur personalities report on their experiences in the practice of the establishment of an enterprise. Dates and speakers will be announced on the EnTechnon homepage.

Learning objectives:

The students will be introduced to the topic of entrepreneurship. After successful attendance of the course they should have an overview of the sub-areas of entrepreneurship and be able to understand basic concepts of entrepreneurship and apply key concepts.

Workload:

The total effort with 3 credit points: approx. 90 hours
Presence time: 30 hours
Pre- and postprocessing of the LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Examination:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation)

A grade bonus can be earned by successfully participating in a case study as part of the Entrepreneurship lecture. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to 0.3 or 0.4. The bonus only applies if you have passed the exam with at least a 4.0. More details will be provided in the lecture. Participation in the case study is voluntary.

Examdates: 24.06.2022, 6pm - 7.10pm, 30.46 Chemie, Neuer Hörsaal

            24.06.2022, 6pm - 7.10pm, 30.95 Forum auditorium (Audimax)

Literature

Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship

Ries, Eric (2011): The Lean Startup

Osterwalder, Alexander (2010): Business Model Generation

Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

R.C. Dorf, T.H. Byers: Technology Ventures – From Idea to Enterprise., (McGraw Hill 2008)

Hisrich, Robert D.; Ramadani, Veland (2017): Effective entrepreneurial management. Strategy, planning, risk management, and organization. Cham, Switzerland: Springer.

T   7.122 Course: Entrepreneurship Research [T-WIWI-102894]

Responsible:	Prof. Dr. Orestis Terzidis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	2545002	Entrepreneurship Research	2 SWS	Seminar / 🎤	Terzidis, Dang, Kuschel
Exams					
ST 2022	7900052	Entrepreneurship Research			Terzidis

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The performance review is done via a so called other methods of performance review (term paper) (alternative exam assessment). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

Prerequisites

None

Recommendation

None

Annotation

The topics will be prepared in groups. The presentation of the results is done during a a block period seminar at the end of the semester. Students have to be present all day long during the seminar.

Below you will find excerpts from events related to this course:

V   Entrepreneurship Research
2545002, SS 2022, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

The students independently develop a topic from entrepreneurship research in an international setting as a tandem with a partner. At first, there will be an introduction to the methodologies used such as systematic literature review, design science, qualitative and quantitative data analysis and more. As part of a written elaboration, the seminar topic must be presented scientifically on 15-20 pages. The results of the seminar paper will be presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

As part of the written elaboration, the basics of independent scientific work (literature research, argumentation + discussion, citing literature sources, application of qualitative, quantitative and simulative methods) are trained. The skills acquired in the seminar are used to prepare for a potential master thesis. The course is therefore particularly aimed at students who want to write their thesis at the Chair for Entrepreneurship and Technology Management.

Registration:

Registration is via the Wiwi portal.

Organizational issues

Termine werden noch bekannt gegeben.

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

Literature

Wird im Seminar bekannt gegeben.

T   7.123 Course: Environmental and Resource Policy [T-WIWI-102616]

Responsible:	Rainer Walz
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2560548	Environmental and Ressource Policy	2 SWS	Lecture / Practice (	Walz
Exams					
WT 21/22	7900252	Environmental and Resource Policy			Walz

Competence Certificate
See German version

Recommendation
It is recommended to already have knowledge in the area of industrial organization and economic policy. This knowledge may be acquired in the courses*Introduction to Industrial Organization* [2520371] and*Economic Policy*[2560280].

Below you will find excerpts from events related to this course:

V   Environmental and Ressource Policy
2560548, SS 2022, 2 SWS, Language: German, Open in study portal   **Lecture / Practice (VÜ)**

Literature
Weiterführende Literatur:

Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg
OECD: Environmental Performance Review Germany, Paris

T 7.124 Course: Environmental Communication [T-BGU-101676]

Responsible:	Dr. rer. nat. Charlotte Kämpf
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-WIWI-104837 - Natural Hazards and Risk Management

Type Examination of another type	Credits 4	Grading scale Grade to a third	Recurrence Each term	Version 2

Events					
WT 21/22	6224905	Umweltkommunikation / Environmental Communication	2 SWS	Seminar	Kämpf
ST 2022	6224905	Environmental Communication	2 SWS	Seminar / ⚙	Kämpf

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Non exam assessment (following §4(2), 3 of the examination regulation).

Prerequisites
Examination Prerequisite Environmental Communication must be passend.

Recommendation
None

Annotation

T 7.125 Course: Environmental Economics and Sustainability [T-WIWI-102615]

Responsible:	Prof. Dr. Rainer Walz
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101468 - Environmental Economics

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 21/22	2521547	Umweltökonomik und Nachhaltigkeit (mit Übung)	2 SWS	Lecture / Practice (	Walz
Exams					
WT 21/22	7900250	Environmental Economics and Sustainability			Walz

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 7.126 Course: Environmental Law [T-BGU-111102]

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each winter term	1 terms	1

Exams			
WT 21/22	8262111102_1	Environmental Law	Smeddinck
WT 21/22	8262111102_2	Environmental Law	Smeddinck

Competence Certificate
Written exam with 120 min

Prerequisites
None

Annotation
None

T	**7.127 Course: European and International Law [T-INFO-101312]**

Responsible:	Ulf Brühann
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101217 - Public Business Law

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2022	24666	Europäisches und Internationales Recht	2 SWS	Lecture / 🗣	Brühann
Exams					
WT 21/22	7500048	European and International Law			Dreier
ST 2022	7500084	European and International Law			Dreier

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 7.128 Course: Examination Prerequisite Environmental Communication [T-BGU-106620]

Responsible:	Dr. rer. nat. Charlotte Kämpf
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-WIWI-104837 - Natural Hazards and Risk Management

Type Completed coursework	**Credits** 0	**Grading scale** pass/fail	**Recurrence** Each summer term	**Version** 1

Events					
WT 21/22	6224905	Umweltkommunikation / Environmental Communication	2 SWS	Seminar	Kämpf
ST 2022	6224905	Environmental Communication	2 SWS	Seminar / 🧩	Kämpf

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
2 literature annotations, appr. 150 words each, and
short presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.129 Course: Excursions: Membrane Technologies [T-CIWVT-110864]

Responsible:	Prof. Dr. Harald Horn
	Dr.-Ing. Florencia Saravia
Organisation:	KIT Department of Chemical and Process Engineering
Part of:	M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	1

Events					
ST 2022	22606	Practical in Membrane Technologies in Water Treatment	1 SWS	Practice / 🗣	Horn, Saravia, und Mitarbeiter
Exams					
ST 2022	7232609	Excursions for Membrane Technologies			Horn, Saravia

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

T   7.130 Course: Experimental Design [T-WIWI-111395]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105714 - Consumer Research

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

Events					
WT 21/22	2540603	Experimentelles Design	2 SWS	Others (sons	Scheibehenne, Seidler
Exams					
WT 21/22	7900334	Experimental Design			Scheibehenne

Competence Certificate
Alternative exam assessment. Details will be announced at the beginning of the course.

Annotation
The course provides an overview of important methods of empirical research. Students learn basic theories and methods that are relevant in planning, conducting and evaluating experiments. They learn to analyze, critique, and independently develop experimental designs. The course covers, for example, the development of a research question, formulation of scientific hypotheses, sample selection, calculation of statistical power, the difference between correlative and causal relationships, and the relevance of experimental research to test the latter.

Exemplary studies from decision research are analyzed and discussed with respect to experimental design.

The workload of the course is 4.5 ECTS. This consists of exercises, smaller presentations by the students during the semester, as well as the preparation of the examination at the end of the semester.

The number of participants is limited. Places are allocated via the Wiwi-Portal. Course language is German.

T   7.131 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-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2540489	Experimental Economics	2 SWS	Lecture / 🖥	Peukert, Knierim
WT 21/22	2540493	Übung zu Experimentelle Wirtschaftsforschung	1 SWS	Practice	Greif-Winzrieth, Knierim
Exams					
WT 21/22	7900096	Experimental Economics			Weinhardt
WT 21/22	7900194	Experimental Economics			Weinhardt

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min).

By successful completion of 70% of the maximum number of points in the exercise(s) a bonus can be obtained.

If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The exact criteria for the award of a bonus will be announced at the beginning of the lecture.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Experimental Economics** 2540489, WS 21/22, 2 SWS, Language: German, Open in study portal	Lecture (V) Online

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2. Aufl. 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

T   7.132 Course: Extraordinary additional course in the module Cross-Functional Management Accounting [T-WIWI-108651]

Responsible:	Prof. Dr. Marcus Wouters
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate

The assessment depends on which extraordinary course becomes part of the module "Cross-Functional Management Accounting".

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Prerequisites

None

Annotation

The pupose of this placeholder is to make it possible zu include an extraordinary course in the module "Cross-Functional Management Accounting". Proposals for specific courses have to be approved in advance by the module coordinator.

T 7.133 Course: Fabrication Processes in Microsystem Technology [T-MACH-102166]

Responsible: Dr. Klaus Bade
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Events					
WT 21/22	2143882	Fabrication Processes in Microsystem Technology	2 SWS	Lecture / 🧩	Bade
ST 2022	2143882	Fabrication Processes in Microsystem Technology	2 SWS	Lecture / ▊	Bade
Exams					
WT 21/22	76-T-MACH-102166	Fabrication Processes in Microsystem Technology			Bade

Legend: ▊ Online, 🧩 Blended (On-Site/Online), ◕ On-Site, ✗ Cancelled

Competence Certificate
Oral examination, 20 minutes

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fabrication Processes in Microsystem Technology
2143882, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
M. Madou
Fundamentals of Microfabrication

CRC Press, Boca Raton, 1997

W. Menz, J. Mohr, O. Paul

Mikrosystemtechnik für Ingenieure

Dritte Auflage, Wiley-VCH, Weinheim 2005

L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
2nd Edition, ACS, Washington DC, 1994

V Fabrication Processes in Microsystem Technology
2143882, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The lecture offers an advanced understanding of manufacturing processes in microsystem technology. Basic aspects of microtechnological processing will be introduced. With examples from semiconductor microfabrication and microsystem technology the base processing steps for conditioning and finishing, patterning, removal are imparted. Nano-patterning is covered is also included and the micro-nano interface is discussed. By the help of typical processing steps elementary mechanisms, process execution, and equipment are explained. Additionally quality control, process control and environmental topics are included

Literature
M. Madou
Fundamentals of Microfabrication

CRC Press, Boca Raton, 1997

W. Menz, J. Mohr, O. Paul

Mikrosystemtechnik für Ingenieure

Dritte Auflage, Wiley-VCH, Weinheim 2005

L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
2nd Edition, ACS, Washington DC, 1994

T 7.134 Course: Facility and Real Estate Management II [T-BGU-111212]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105592 - Digitalization in Facility Management
M-BGU-105597 - Facility Management in Hospitals

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	1,5	Grade to a third	Each term	1 terms	1

Events					
ST 2022	6242804	Facility and Real Estate Management 2	1 SWS	Lecture / 🗣	Lennerts
Exams					
WT 21/22	8240111212	Facility and Real Estate Management II			Lennerts

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.135 Course: Facility Management in Hospitals [T-BGU-108004]

Responsible:	Prof. Dr.-Ing. Kunibert Lennerts
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-105597 - Facility Management in Hospitals

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

Competence Certificate
term paper appr. 10 pages, with final presentation appr. 10 min.

Prerequisites
none

**Recommendation**
none

Annotation

T	**7.136 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2022	2530205	Financial Analysis	2 SWS	Lecture / 🗣	Luedecke
ST 2022	2530206	Übungen zu Financial Analysis	2 SWS	Practice / 🗣	Luedecke
Exams					
WT 21/22	7900059	Financial Analysis			Ruckes, Luedecke
ST 2022	7900075	Financial Analysis			Luedecke

Legend: 📱 Online, ⚗ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
See German version.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance, accounting, and valuation is required.

Below you will find excerpts from events related to this course:

V	**Financial Analysis** 2530205, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V) On-Site**

Literature

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

T 7.137 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	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Competence Certificate

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites

None

Recommendation

Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Annotation

The next lecture will take place in the winter semester 2022/23.

T 7.138 Course: Financial Econometrics II [T-WIWI-110939]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Competence Certificate
Alternative exam assessment (Takehome Exam). Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Financial Econometrics"

Annotation
Course language is English
The next lecture will take place in the summer semester of 2023.

T   7.139 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2530232	Financial Intermediation	2 SWS	Lecture / 🖥	Ruckes
WT 21/22	2530233	Übung zu Finanzintermediation	1 SWS	Practice / 🖥	Ruckes, Benz
Exams					
WT 21/22	7900063	Financial Intermediation			Ruckes
ST 2022	7900078	Financial Intermediation			Ruckes

Legend: 🖥 Online, ⬡ Blended (On-Site/Online), 🌓 On-Site, ✗ Cancelled

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V	**Financial Intermediation** 2530232, WS 21/22, 2 SWS, Language: German, Open in study portal	Lecture (V) Online

Literature
Weiterführende Literatur:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

T   7.140 Course: Firm creation in IT security [T-WIWI-110374]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Competence Certificate
Alternative exam assessment. The grade consists of the presentation and the written elaboration.

Prerequisites
None

T 7.141 Course: Food Chemistry Basics [T-CHEMBIO-109442]

Responsible:	Prof. Dr. Mirko Bunzel
Organisation:	KIT Department of Chemistry and Biosciences
Part of:	M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	6601	Grundlagen der Lebensmittelchemie I	2 SWS	Lecture / 🗣	Bunzel
Exams					
WT 21/22	71109442	Food Chemistry Basics			Bunzel
ST 2022	71109442	Food Chemistry Basics			Bunzel

Legend: 📱 Online, ✳ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

T 7.142 Course: Food Science and Functionality [T-CIWVT-111535]

Responsible:	Prof. Dr. Bernhard Watzl
Organisation:	KIT Department of Chemical and Process Engineering
Part of:	M-CIWVT-101119 - Specialization in Food Process Engineering
	M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	22207	Lebensmittelkunde und -funktionalität	2 SWS	Lecture / 🗣	Watzl
Exams					
WT 21/22	7220019	Food Science and Functionality			Watzl

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The examination is an oral examination with a duration of about 30 minutes (section 4 subsection 2 number 2 SPO).

Prerequisites

None

T 7.143 Course: Freight Transport [T-BGU-106611]

Responsible:	Bastian Chlond
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101064 - Fundamentals of Transportation
	M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	2

Events					
ST 2022	6232809	Güterverkehr	2 SWS	Lecture / Practice (/ 🗣	Chlond
Exams					
WT 21/22	8245106611	Freight Transport			Chlond

Legend: 🗎 Online, ⚯ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.144 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Responsible: Hon.-Prof. Dr. Bernhard Ulrich Kehrwald
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2133108	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture / 🎤	Kehrwald
Exams					
WT 21/22	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
oral examination, Duration: ca. 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fuels and Lubricants for Combustion Engines
2133108, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
electric drives and fuel cell drives with the associated operating materials will also be presented

- Introduction, basics, primary energy and energy chains
- Illustrative chemistry of hydrocarbons
- Fossil fuels, exploration, processing, standards
- Operating materials not fossil, renewable, alternative
- Fuels, lubricants, coolants, AdBlue
- Laboratory analysis, testing, test benches and measurement technology
- Excursion to test fields for motorized drives from 0.5 to 3,500 kW

Literature
Skript

T   7.145 Course: Fundamentals for Financial -Quant and -Machine Learning Research [T-WIWI-111846]

Responsible:	Prof. Dr. Maxim Ulrich
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105894 - Foundations for Advanced Financial -Quant and -Machine Learning Research

Type Examination of another type	Credits 9	Grading scale Grade to a third	Recurrence see Annotations	Version 1

Events					
ST 2022	2500375	Fundamentals for Financial -Quant and -Machine Learning Research	4 SWS	Lecture / 🎙	Ulrich
ST 2022	2500377	Übung zu Fundamentals for Financial -Quant and -Machine Learning Research	2 SWS	Practice / 🎙	Ulrich, Seehuber, Zimmer

Legend: 📱 Online, ⚃ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

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

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

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

Recommendation

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

Annotation

The course is offered every second year.

T 7.146 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsible:	Prof. Dr. Olaf Deutschmann
	Prof. Dr. Jan-Dierk Grunwaldt
	Dr.-Ing. Heiko Kubach
	Hon.-Prof. Dr. Egbert Lox
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture / ⚙	Lox, Grunwaldt, Deutschmann
Exams					
WT 21/22	76-T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment			Lox

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌓 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fundamentals of catalytic exhaust gas aftertreatment
2134138, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Organizational issues
Blockvorlesung, Termin und Ort werden auf der Homepage des IFKM und ITCP bekannt gegeben.

Literature
Skript, erhältlich in der Vorlesung

1. ''Environmental Catalysis'' Edited by G.Ertl, H. Knötzinger, J. Weitkamp Wiley-VCH Verlag GmbH, Weinheim, 1999 ISBN 3-527-29827-4
2. ''Cleaner Cars- the history and technology of emission control since the 1960s'' J. R. Mondt Society of Automotive Engineers, Inc., USA, 2000 Publication R-226, ISBN 0-7680-0222-2
3. ''Catalytic Air Pollution Control - commercial technology'' R. M. Heck, R. J. Farrauto John Wiley & Sons, Inc., USA, 1995 ISBN 0-471-28614-1
4. ''Automobiles and Pollution'' P. Degobert Editions Technic, Paris, 1995 ISBN 2-7108-0676-2
5. ''Reduced Emissions and Fuel Consumption in Automobile Engines'' F. Schaeder, R. van Basshuysen, Springer Verlag Wien New York, 1995 ISBN 3-211-82718-8
6. ''Autoabgaskatalysatoren : Grudlagen - Herstellung - Entwicklung - Recycling - Ökologie'' Ch. Hagelüken und 11 Mitautoren, Expert Verlag, Renningen, 2001 ISBN 3-8169-1932-4

T 7.147 Course: Fundamentals of National and International Group Taxation [T-WIWI-111304]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2560133	Fundamentals of National and International Group Taxation	3 SWS	Lecture / 🎙	Wigger, Gutekunst
Exams					
WT 21/22	790kobe	Fundamentals of National and International Group Taxation			Wigger
ST 2022	790kobe	Fundamentals of National and International Group Taxation			Wigger

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
It is recommended to attend the course "Basics of German Company Tax Law and Tax Planning" beforehand.

T 7.148 Course: Gear Cutting Technology [T-MACH-102148]

Responsible: Dr.-Ing. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2149655	Gear Technology	2 SWS	Lecture / ✿	Klaiber
Exams					
WT 21/22	76-T-MACH-102148	Gear Technology			Klaiber
ST 2022	76-T-MACH-102148	Gear Cutting Technology			Klaiber

Legend: 🗎 Online, ✿ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Gear Technology
2149655, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Based on the gearing theory, manufacturing processes and machine technologies for producing gearings, the needs of modern gear manufacturing will be discussed in the lecture. For this purpose, various processes for various gear types are taught which represent the state of the art in practice today. A classification in soft and hard machining and furthermore in cutting and non-cutting technologies will be made. For comprehensive understanding the processes, machine technologies, tools and applications of the manufacturing of gearings will be introduced and the current developments presented. For assessment and classification of the applications and the performance of the technologies, the methods of mass production and manufacturing defects will be discussed. Sample parts, reports from current developments in the field of research and an excursion to a gear manufacturing company round out the lecture.

Learning Outcomes:

The students ...

- can describe the basic terms of gearings and are able to explain the imparted basics of the gearwheel and gearing theory.
- are able to specify the different manufacturing processes and machine technologies for producing gearings. Furthermore they are able to explain the functional principles and the dis-/advantages of these manufacturing processes.
- can apply the basics of the gearing theory and manufacturing processes on new problems.
- are able to read and interpret measuring records for gearings. are able to make an appropriate selection of a process based on a given application
- can describe the entire process chain for the production of toothed components and their respective influence on the resulting workpiece properties.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 21.10.2021

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.
Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.149 Course: Global Logistics [T-MACH-111003]

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

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-101282 - Global Production and Logistics
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2149600	Global Logistics	2 SWS	Lecture / ❖	Furmans
Exams					
ST 2022	76-T-MACH-105159	Global Production and Logistics - Part 2: Global Logistics / New: Global Logistics			Furmans

Legend: 📱 Online, ❖ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites

Below you will find excerpts from events related to this course:

V	**Global Logistics**	**Lecture (V)**
	2149600, SS 2022, 2 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

Content
Content:

Characteristics of global trade

- Incoterms
- Customs clearance, documents and export control

Global transport and shipping

- Maritime transport, esp. container handling
- Air transport

Modeling of supply chains

- SCOR model
- Value stream analysis

Location planning in cross-border-networks

- Application of the Warehouse Location Problem
- Transport Planning

Inventory Management in global supply chains

- Stock keeping policies
- Inventory management considering lead time and shipping costs

Media:

presentations, black board

Workload:

regular attendance: 21 hours
self-study: 99 hours

Students are able to:

- assign basic problems of planning and operation of global supply chains and plan them with apropriate methods,
- describe requirements and characteristics of global trade and transport, and
- evaluate characteristics of the design from logistic chains regarding their suitability.

Exam:

The exam consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The main exam is offered every summer semester. A second date for the exam is offered in winter semester only for students that did not pass the main exam.

Literature
Weiterführende Literatur:

- Arnold/Isermann/Kuhn/Tempelmeier. HandbuchLogistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren,Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, OldenbourgVerlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Neumann-Morlock. Operations-Research,Hanser-Verlag, 1993
- Tempelmeier. Bestandsmanagement in SupplyChains, Books on Demand 2006
- Schönsleben. IntegralesLogistikmanagement, Springer, 1998

| T | **7.150 Course: Global Manufacturing [T-WIWI-112103]** |

Responsible: Dr. Henning Sasse
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

T **7.151 Course: Global Optimization I [T-WIWI-102726]**

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
Exams					
WT 21/22	7900004_WS2122_NK	Global Optimization I			Stein
ST 2022	7900270_SS2022_HK	Global Optimization I			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO). The successful completion of the exercises is required for admission to the written exam.

The exam is offered in the lecture of semester and the following semester.

The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

Prerequisites
None

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V	**Global Optimization I** 2550134, SS 2022, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

| T | **7.152 Course: Global Optimization I and II [T-WIWI-103638]** |

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2022	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
ST 2022	2550135	Exercise to Global Optimization I and II	2 SWS	Practice / 🗣	Stein, Beck
ST 2022	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 21/22	7900006_WS2122_NK	Global Optimization I and II			Stein
ST 2022	7900272_SS2022_HK	Global Optimization I and II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

| V | **Global Optimization I**
2550134, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)**
On-Site |

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

V	**Global Optimization II** 2550136, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.153 Course: Global Optimization II [T-WIWI-102727]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 21/22	7900005_WS2122_NK	Global Optimization II			Stein
ST 2022	7900271_SS2022_HK	Global Optimization II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V	**Global Optimization II**	**Lecture (V)**
	2550136, SS 2022, 2 SWS, Language: German, Open in study portal	**On-Site**

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.154 Course: Global Production [T-MACH-110991]

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

Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-101284 - Specialization in Production Engineering
M-MACH-105455 - Strategic Design of Modern Production Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 21/22	2149613	Global Production	2 SWS	Lecture / �֎	Lanza
Exams					
WT 21/22	76-T-MACH-110991	Global Production			Lanza
ST 2022	76-T-MACH-110991	Global Production			Lanza

Legend: 🗎 Online, ✻ Blended (On-Site/Online), ✹ On-Site, ✗ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
T-MACH-108848 - Globale Produktion und Logistik - Teil 1: Globale Produktion must not be commenced.
T-MACH-105158 - Globale Produktion und Logistik - Teil 1: Globale Produktion must not be commenced.
T-MACH-110337 - Globale Produktion und Logistik must not be commenced.

Recommendation
Participation in "T-MACH-110981 - Tutorial Global Production" is recommended, but not mandatory.

Below you will find excerpts from events related to this course:

V	**Global Production** 2149613, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content

The lecture examines the management of global production networks of manufacturing companies. It gives an overview of the influencing factors and challenges of global production. In-depth knowledge of common methods and procedures for planning, designing and managing global production networks is imparted.

Therefore, the lecture first of all discusses the connections and interdependencies between the business strategy and the production strategy and illustrates necessary tasks for the definition of a production strategy. Methods for site selection, for the site-specific adaptation of product design and production technology as well as for the establishment of new production sites and for the adaptation of existing production networks to changing framework conditions are subsequently taught within the context of the design of the network footprint. With regard to the management of global production networks, the lecture addresses challenges associated with coordination, procurement and order management in global networks. The lecture is complemented by a discussion on the use of industry 4.0 applications in global production and current trends in planning, designing and managing global production networks.

The topics include:

- Basic conditions and influencing factors of global production (historical development, targets, chances and threats)
- Framework for planning, designing and managing global production networks
- Production strategies for global production networks
    - From business strategy to production strategy
    - Tasks of the production strategy (product portfolio management, circular economy, planning of production depth, production-related research and development)
- Design of global production networks
    - Basic types of network structures
    - Planning process for the design of the network footprint
    - Adaptation of the network footprint
    - Site selection
    - Location-specific adaptation of production technology and product design
- Management of global production networks
    - Network coordination
    - Procurement process
    - Order management

- Trends in planning, designing and managing global production networks

Learning Outcomes:

The students …

- can explain the general conditions and influencing factors of global production
- are capable to apply defined procedures for site selection and to evaluate site decisions with the help of different methods
- are able to select the adequate scope of design for siteappropriate production and product construction casespecifically
- can state the central elements in the planning process of establishing a new production site.
- are capable to make use of the methods to design and scale global production networks for company-individual problems

- are able to show up the challenges and potentials of the departments sales, procurement as well as research and development on global basis.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Recommendations:
Combination with Global Production and Logistics – Part 2

Organizational issues
Start: 18.10.2021

Vorlesungstermine montags 14:00 - 15:30 Uhr
Lectures on Mondays 14:00 - 15:30

Literature
Medien
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt

empfohlene Sekundärliteratur:
Abele, E. et al: Handbuch Globale Produktion, Hanser Fachbuchverlag, 2006 (deutsch)

Media
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

recommended secondary literature:
Abele, E. et al: Global Production – A Handbook for Strategy and Implementation, Springer 2008 (english)

T 7.155 Course: Globalization of Innovation – Innovation for Globalization: Methods and Analyses [T-WIWI-111822]

Responsible:	Sophie Schneider
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Exams			
ST 2022	7900018	Globalization of Innovation – Innovation for Globalization: Methods and Analyses	Weissenberger-Eibl

Competence Certificate

Alternative exam assessment. The grade consists of a presentation of the results (30%), participation in the discussions (10%) and a seminar paper (60%).

Recommendation

Prior attendance of the course Innovation Management [2545015] is recommended.

T 7.156 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Irregular	**Version** 2

Exams				
ST 2022	7900001	Graph Theory and Advanced Location Models		Nickel

Competence Certificate

The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites

None

Recommendation

Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation

The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 7.157 Course: Großdiesel- und -gasmotoren für Schiffsantriebe [T-MACH-110816]

Responsible: Dr.-Ing. Heiko Kubach
Organisation:
Part of: M-MACH-101303 - Combustion Engines II

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Expansion 1 terms	Version 1

Events

ST 2022	2134154	Large Diesel and Gas Engines for Ship Propulsions	2 SWS	Lecture / ⚃	Weisser

Legend: 🗍 Online, ⚃ Blended (On-Site/Online), ◕ On-Site, ✗ Cancelled

Competence Certificate
oral exam, 20 minutes

Prerequisites
None

Below you will find excerpts from events related to this course:

V Large Diesel and Gas Engines for Ship Propulsions
2134154, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

- Introduction and History
- Types of Ships amd Propulsion Systems
- Thermodynamic
- Boosting
- Design
- Fuels
- Lubricants
- Injection of liquid Fuels
- Combustions Processes for liquid Fuels
- Injection of Gaseous Fuels
- Combustion Processes for Gaseous Fuels
- Emissions
- Integration of Engines in Ships
- Large Engines in other Applications

T	**7.158 Course: Growth and Development [T-WIWI-111318]**

Responsible:	Prof. Dr. Ingrid Ott
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101478 - Innovation and Growth
	M-WIWI-101496 - Growth and Agglomeration

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Exams			
WT 21/22	7900078	Growth and Development	Ott

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as an open-book examination or as a 60-minute written examination.

Prerequisites
None

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

Annotation
Due to the research semester of Prof. Dr. Ingrid Ott, the course will not be offered in the winter semester 2021/22. The exam will take place. Preparation materials can be found in ILIAS.

T 7.159 Course: Heat Economy [T-WIWI-102695]

Responsible:	Prof. Dr. Wolf Fichtner
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2581001	Heat Economy	2 SWS	Lecture / 🗣	Fichtner
Exams					
WT 21/22	7981001	Heat Economy			Fichtner

Legend: 🗎 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Competence Certificate
The lecture will be suspended in summer semester 2021.
The assessment consists of a written (60 minutes) or oral exam (30 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Recommendation
None

Annotation
See German version.

Below you will find excerpts from events related to this course:

V	**Heat Economy** 2581001, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Organizational issues
Block, Seminarraum Standort West - siehe Institutsaushang

T 7.160 Course: High-Voltage Technology [T-ETIT-110266]

Responsible:	Dr.-Ing. Rainer Badent
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-ETIT-101163 - High-Voltage Technology

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each winter term	1 terms	1

Events					
WT 21/22	2307360	High-Voltage Technology	2 SWS	Lecture / ⚙	Badent
WT 21/22	2307362	Tutorial for 2307362High-Voltage Technology	1 SWS	Practice / ⚙	Badent
Exams					
WT 21/22	73730360	High-Voltage Technology			Badent
ST 2022	73730360	High-Voltage Technology			Badent

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

T 7.161 Course: High-Voltage Test Technique [T-ETIT-101915]

Responsible: Dr.-Ing. Rainer Badent
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101164 - Generation and Transmission of Renewable Power

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2307392	High-Voltage Test Technique	2 SWS	Lecture / ✿	Badent
WT 21/22	2307394	Tutorial for 2307392 High-Voltage Test Technique	2 SWS	Practice / ✿	Gielnik

Exams			
WT 21/22	7307392	High-Voltage Test Technique	Badent
ST 2022	7307392	High-Voltage Test Technique	Badent

Legend: ▯ Online, ✿ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

Prerequisites

T 7.162 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-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence see Annotations	Version 3

Events					
WT 21/22	2511554	Human Factors in Security and Privacy	2 SWS	Lecture / 🗣	Volkamer
WT 21/22	2511555	Übungen zu Human Factors in Security and Privacy	1 SWS	Practice / 🗣	Volkamer, Berens
Exams					
WT 21/22	7900113	Human Factors in Security and Privacy			Volkamer
ST 2022	7900084	Human Factors in Security and Privacy (Registration until 18 July 2022)			Volkamer

Legend: 🗎 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation. Only those who have successfully participated in the exercises and the lecture will be admitted to the examination.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
Both need to be done:

- Pass Quiz on Paper for Graphical Passwords
- Presentation of Results Exercise 2

+ 9 of the following 11 need to be done:

- Submit ILIAS certificate until Oct 24
- Pass Quiz on InfoSec Lecture
- Active participation exercise 1 Part 1 - Evaluation and analyses methods
- Pass Quiz Paper Discussion 1 - User Behaviour and motivation theories
- Active participation exercise 1 Part 2
- Pass Quiz Paper Discussion 2 - User Behaviour and motivation theories
- Pass Quiz Paper Discussion 3 - Security Awareness
- Active participation exercise 1 Part 3
- Pass Quiz Paper Discussion 4 - Graphical Authentication
- Pass Quiz Paper Discussion 5 - Shoulder Surfing Authentication
- Active participation exercise 2

Recommendation
The prior attendance of the lecture "Information Security" is strongly recommended.

Annotation
The lecture will not be offered in winter semester 2020/21.

Some lectures are in English, some in German.

Below you will find excerpts from events related to this course:

V	**Human Factors in Security and Privacy** 2511554, WS 21/22, 2 SWS, Language: German/English, Open in study portal	**Lecture (V)** **On-Site**

Content

Please take a look at all the information provided before the first event (e.g. first slides)!

The event will be conducted with 3G. Accordingly, either a one-time proof of vaccination or an official proof of a negative test is required for each event.

Some lectures are in English, some in German.

To participate in the quizzes at the beginning of the event a charged device is needed e.g. laptop or cell phone.

To successfully pass the course, the following requirements must be met:

Both need to be done:

- Reading Paper, Active Participation & Pass Quiz on Paper for Graphical Passwords
- Presentation of Results Exercise 2

+ 9 of the following 11 need to be done:

- Submit ILIAS certificate until Oct 24
- Pass Quiz on InfoSec Lecture
- Active participation exercise 1 – Part 1
- Reading Paper, Active Participation & Pass Quiz "Users are not the enemy"Active participation exercise 1 – Part 2
- Reading Paper, Active Participation & Pass Quiz "Why Johnny can't encrypt"
- Reading Paper, Active Participation & Pass Quiz "Put Your Warning Where Your Link Is: Improving and Evaluating Email Phishing Warnings"
- Active participation exercise 1 – Part 3
- Active participation exercise 1 – Part 4 Results
- Reading Paper, Active Participation & Pass Quiz "User-centered security"Active participation exercise 2 – Part 1

Here is a first preview of the topics planned for the lecture:

1. General Introduction
2. Self-Study: Knowlege of Information Security Lecture
3. Terminology + Basics
4. Evaluation and analyses methods
5. Risk Communication
6. Security Awareness
7. Security Indicators
8. Graphical Authentication
9. Shoulder Surfing Authentication
10. Usable Verifiable Electronic Voting
11. Q&A + Exam preparation

Literature

- Usable Security: History, Themes, and Challenges (Synthesis Lectures on Information Security, Privacy, and Trust): Simson Garfinkel und Heather Richter Lipford. 2014
- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
- Melanie Volkamer, Karen Renaud: Mental Models - General Introduction and Review of Their Application to Human-Centred Security. In Number Theory and Cryptography (2013): 255-280: https://link.springer.com/chapter/10.1007/978-3-642-42001-6_18
- Paul Gerber, Marco Ghiglierie, Birgit Henhapl, Oksana Kulyk, Karola Marky, Peter Mayer, Benjamin Reinheimer, Melanie Volkamer: Human Factors in Security. In: Reuter C. (eds) Sicherheitskritische Mensch-Computer-Interaktion. Springer (2018) https://link.springer.com/chapter/10.1007/978-3-658-19523-6_5
- Bruce Schneier: Psychology of Security (2018): https://www.schneier.com/essays/archives/2008/01/the_psychology_of_se.html
- Ross Anderson: security /usability and psychology. In Security Engineering. http://www.cl.cam.ac.uk/~rja14/Papers/SEv2-c02.pdf
- Andrew Odlyzko: Economics, Psychology and Sociology of Security: http://www.dtc.umn.edu/~odlyzko/doc/econ.psych.security.pdf

T 7.163 Course: Hydrogen and reFuels - Energy Conversion in Combustion Engines [T-MACH-111585]

Responsible: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Expansion 1 terms	Version 1

Events					
WT 21/22	2134155	Hydrogen and reFuels - Energy Conversion in Combustion Engines	2 SWS	Lecture / 🗣	Koch
Exams					
WT 21/22	76T-MACH-111585	Hydrogen and reFuels - Energy Conversion in Combustion Engines			Koch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam, appr. 25 minutes, no auxillary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Hydrogen and reFuels - Energy Conversion in Combustion Engines
2134155, WS 21/22, 2 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Content
New types of CO2-neutral fuels such as gaseous hydrogen but also liquid synthetic fuels often place specific requirements on engine systems that differ significantly from operation with conventional fuels. These special aspects of engine energy conversion are dealt with in this lecture.

Introduction

Thermodynamics of combustion engines

Fundamentals

gas exchange

Flow field

Wall heat losses

Combustion in gasoline engines

Pressure Trace Analysis

Combustion in Diesel engines

Specific Topics of Hydrogen Combsution

Waste heat recovery

T 7.164 Course: Ignition Systems [T-MACH-105985]

Responsible: Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Version
Oral examination	4	Grade to a third	1

Events						
WT 21/22	2133125	Ignition systems		2 SWS	Lecture / 🗣	Toedter
Exams						
WT 21/22	76-T-MACH-105985	Ignition systems				Koch

Legend: ▯ Online, ✿ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam, 20 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V Ignition systems
2133125, WS 21/22, 2 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Content

- Ignition Process
- Spark Ignition
- Principle of Spark Ignition Systems
- Limits of Spark Ignition
- New Develpoments of Spark Ignition Systems
- New an Alternative Ignition Systems

T   7.165 Course: Incentives in Organizations [T-WIWI-105781]

Responsible:	Prof. Dr. Petra Nieken
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101453 - Applied Strategic Decisions
	M-WIWI-101500 - Microeconomic Theory
	M-WIWI-101505 - Experimental Economics
	M-WIWI-101510 - Cross-Functional Management Accounting
	M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2573003	Incentives in Organizations	2 SWS	Lecture / 🎤	Nieken
ST 2022	2573004	Übung zu Incentives in Organizations	2 SWS	Practice / 🎤	Nieken, Mitarbeiter
Exams					
WT 21/22	7900201	Incentives in Organizations			Nieken

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is a written examination (60 min). The exam takesplace in every semester. Re-examinations are offered at every ordinaryexamination date. In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites

None

Recommendation

Knowledge of microeconomics, game theory, and statistics is assumed.

Below you will find excerpts from events related to this course:

V	**Incentives in Organizations**	**Lecture (V)**
	2573003, SS 2022, 2 SWS, Language: English, Open in study portal	**On-Site**

Content

The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Aim

The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics.
- understands how econometric methods can be used to analyze performance and compensation data.
- knows incentive schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical data from companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Workload

The total workload for this course is: approximately 135 hours.

Lecture: 32 hours

Preparation of lecture: 52 hours

Exam preparation: 51 hours

Literature

Slides, Additional case studies and research papers will be announced in the lecture.

Literature (complementary):

Managerial Economics and Organizantional Architecture, Brickley / Smith / Zimmerman, McGraw-Hill Education, 2015

Behavioral Game Theory, Camerer, Russel Sage Foundation, 2003

Personnel Economics in Practice, Lazear / Gibbs, Wiley, 2014

Introduction to Econometrics, Wooldridge, Andover, 2014

Econometric Analysis of Cross Section and Panel Data, Wooldridge, MIT Press, 2010

T   7.166 Course: Information Engineering [T-MACH-102209]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 2

Events					
ST 2022	2122014	Information Engineering	2 SWS	Seminar / 🧩	Ovtcharova, Mitarbeiter
Exams					
WT 21/22	76-T-MACH-102209	Information Engineering			Ovtcharova

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (written composition and speech)

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Information Engineering** 2122014, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
Seminar papers on current research topics of the Institute for Information Management in Engineering. The respective topics are presented at the beginning of each semester.

Organizational issues
Siehe ILIAS-Kurs

Literature
Themenspezifische Literatur

T 7.167 Course: Information Management for Public Mobility Services [T-BGU-106608]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
                    M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
WT 21/22	6232905	Informationsmanagement für öffentliche Mobilitätsangebote	2 SWS	Block / 📱	Vortisch
Exams					
WT 21/22	8245106608	Information Management for Public Mobility Services			Vortisch

Legend: 📱 Online, ⚄ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate
lecture accompanying exercises, appr. 5 pieces

Prerequisites
none

Recommendation
none

Annotation

T   7.168 Course: Information Service Engineering [T-WIWI-106423]

Responsible:	Prof. Dr. Harald Sack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2511606	Information Service Engineering	2 SWS	Lecture / 🖥	Sack
ST 2022	2511607	Exercises to Information Service Engineering	1 SWS	Practice / 🖥	Sack

Exams				
WT 21/22	7900071	Information Service Engineering		Sack
ST 2022	79AIFB_ISE_B3	Information Service Engineering (Registration until 18 July 2022)		Sack

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Information Service Engineering**	Lecture (V)
	2511606, SS 2022, 2 SWS, Language: English, Open in study portal	Online

Content

- Information, Natural Language and the Web

- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques & Challenges
- Evaluation, Precision and Recall
- Regular Expressions and Automata
- Tokenization
- Language Model and N-Grams
- Part-of-Speech Tagging
- Distributional Semantics & Word Embeddings

- Knowledge Graphs

- Knowledge Representations and Ontologies
- Resource Description Framework (RDF)
  as simple Data Model
- Creating new Models with RDFS
- Querying RDF(S) with SPARQL
- More Expressivity via Web Ontology Language (OWL)
- From Linked Data to Knowledge Graphs
- Wikipedia, DBpedia, and Wikidata
- Knowledge Graph Programming

- Basic Machine Learning

- Machine Learning Fundamentals
- Evaluation and Generalization Problems
- Linear Regression
- Decision Trees
- Unsupervised Learning
- Neural Networks and Deep Learning

- ISE Applications

- From Data to Knowledge
- Data Mining, Information Visualization and Knowledge Discovery
- Semantic Search
- Exploratory Search
- Semantic Recommender Systems

Learning objectives:

- The students know the fundamentals and measures of information theory and are able to apply those in the context of Information Service Engineering.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students have fundamental skills of information retrieval and are enabled to conduct and to evaluate simple information retrieval tasks.
- The students apply their skills of natural language processing, Linked Data engineering, and Information Retrieval to conduct and evaluate simple knowledge mining tasks.
- The students know the fundamentals of recommender systems as well as of semantic and exploratory search.

Literature

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- A. Hogan, The Web of Data, Springer, 2020.
- G. Rebala, A. Ravi, S. Churiwala, An Introduction to Machine Learning, Springer, 2019.

T   7.169 Course: Information Systems and Supply Chain Management [T-MACH-102128]

Responsible: Dr.-Ing. Christoph Kilger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
             M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Events					
ST 2022	2118094	Information Systems in Logistics and Supply Chain Management	2 SWS	Lecture / 📱	Kilger
Exams					
WT 21/22	76T-MACH-102128	Information Systems and Supply Chain Management			Mittwollen

Legend: 📱 Online, ✿ Blended (On-Site/Online), ☘ On-Site, ✗ Cancelled

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites
none

Below you will find excerpts from events related to this course:

V   **Information Systems in Logistics and Supply Chain Management**
2118094, SS 2022, 2 SWS, Language: German, Open in study portal   Lecture (V) Online

Literature
Stadtler, Kilger: Supply Chain Management and Advanced Planning, Springer, 4. Auflage 2008

T   7.170 Course: Innovation Lab [T-ETIT-110291]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr. Werner Nahm
Prof. Dr.-Ing. Eric Sax
Prof. Dr. Wilhelm Stork
Prof. Dr.-Ing. Thomas Zwick

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-WIWI-105011 - Student Innovation Lab (SIL) 2

Type Examination of another type	Credits 9	Grading scale Grade to a third	Recurrence Each winter term	Expansion 2 terms	Version 1

Events						
WT 21/22	2303192	Innovation Lab		2 SWS	Project (P / 🗣)	Hohmann, Zwick, Sax, Stork, Nahm
ST 2022	2303192	Innovation Lab		2 SWS	Project (P / 🗣)	Hohmann, Zwick, Sax, Stork, Nahm
Exams						
WT 21/22	7303192	Innovation Lab				Hohmann, Zwick, Stork, Sax, Nahm

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
see module description

T   7.171 Course: Innovation Management: Concepts, Strategies and Methods [T-WIWI-102893]

Responsible:	Prof. Dr. Marion Weissenberger-Eibl
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101488 - Entrepreneurship (EnTechnon)
	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2545100	Innovation Management: Concepts, Strategies and Methods	2 SWS	Lecture / ✥	Weissenberger-Eibl
Exams					
ST 2022	7900144	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl
ST 2022	7900145	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl

Legend: 🢐 Online, ✥ Blended (On-Site/Online), 🢐 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V	Innovation Management: Concepts, Strategies and Methods	Lecture (V)
	2545100, SS 2022, 2 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Content
The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application. The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particularly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addition to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of integrated knowledge.

Aim: Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

Organizational issues
Wichtig! Bitte treten Sie dem **ILIAS-Kurs zur Vorlesung** bei, damit wir Ihnen weitere Informationen mitteilen können.

Literature
Eine ausführliche Literaturliste wird mit den Vorlesungsunterlagen zur Verfügung gestellt.

Eine Einführung bei: Vahs,D./Brem,A. (2013): Innovationsmanagement. Von der Idee zur erfolgreichen Vermarktung, 4. Auflage, Stuttgart 2013.

T 7.172 Course: Innovation Processes Live [T-WIWI-110234]

Responsible:	Dr. Daniela Beyer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO). The grade consists of an exposé (15%), a guideline interview or an analysis tool (25%), a group presentation of the results (20%) and a seminar paper (40%).

Prerequisites
None.

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

T 7.173 Course: Innovation Theory and Policy [T-WIWI-102840]

Responsible:	Prof. Dr. Ingrid Ott
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101478 - Innovation and Growth
	M-WIWI-101497 - Agglomeration and Innovation
	M-WIWI-101514 - Innovation Economics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2022	2560236	Innovationtheory and -policy	2 SWS	Lecture / 🗣	Ott
ST 2022	2560237		1 SWS	Practice / 🗣	Ott
Exams					
WT 21/22	7900077	Innovationtheory and -Policy			Ott
ST 2022	7900107	Innovationtheory and -Policy			Ott

Legend: 🖥 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

Recommendation

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

Below you will find excerpts from events related to this course:

V	**Innovationtheory and -policy** 2560236, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Lecture (V)** **On-Site**

Content
Learning objectives:

Students shall be given the ability to

- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- understand the relationships between market structure and the development of innovation
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Course content:

The course covers the following topics:

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

Recommendations:

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

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Exam description:

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Literature
Auszug:

- Aghion, P., Howitt, P. (2009), The Economics of Growth, MIT Press, Cambridge MA.
- de la Fuente, A. (2000), Mathematical Methods and Models for Economists. Cambridge University Press, Cambridge, UK.
- Klodt, H. (1995), Grundlagen der Forschungs- und Technologiepolitik. Vahlen, München.
- Linde, R. (2000), Allokation, Wettbewerb, Verteilung - Theorie, UNIBUCH Verlag, Lüneburg.
- Ruttan, V. W. (2001), Technology, Growth, and Development. Oxford University Press, Oxford.
- Scotchmer, S. (2004), Incentives and Innovation, MIT Press.
- Tirole, Jean (1988), The Theory of Industrial Organization, MIT Press, Cambridge MA.

T 7.174 Course: Integrated Design Project in Water Resources Management [T-BGU-111275]

Responsible:	Dr.-Ing. Uwe Ehret
	Dr.-Ing. Frank Seidel
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-WIWI-104837 - Natural Hazards and Risk Management

Type Examination of another type	**Credits** 6	**Grading scale** Grade to a third	**Recurrence** Each term	**Expansion** 1 terms	**Version** 1

Events					
ST 2022	6224801	Integrated Design Project in Water Resources Management	4 SWS	Lecture / Practice (/ 🗣	Ehret, Seidel

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
project work, report approx. 15 pages with presentation approx. 15 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.175 Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-109054]

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

Part of: M-MACH-101272 - Integrated Production Planning

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2022	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (/ ⚙	Lanza
Exams					
WT 21/22	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza
ST 2022	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (120 min)

Prerequisites
"T-MACH-108849 - Integrierte Produktionsplanung im Zeitalter von Industrie 4.0" as well as "T-MACH-102106 Integrierte Produktionsplanung" must not be commenced.

Below you will find excerpts from events related to this course:

V	**Integrated Production Planning in the Age of Industry 4.0** 2150660, SS 2022, 6 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **Blended (On-Site/Online)**

Content

Integrated production planning in the age of industry 4.0 will be taught in the context of this engineering science lecture. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the lecture:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (production planning and control, fine layout, IT systems in an industry 4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The lecture contents are rounded off by numerous current practical examples with a strong industry 4.0 reference. Within the exercises the lecture contents are deepened and applied to specific problems and tasks.

Learning Outcomes:

The students ...

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

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine dienstags 14.00 Uhr und donnerstags 14.00 Uhr, Übungstermine donnerstags 15.45 Uhr. Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.176 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Responsible: Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering
M-MACH-105455 - Strategic Design of Modern Production Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / 🧩	Schlichtenmayer
Exams					
WT 21/22	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer
ST 2022	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Integrative Strategies in Production and Development of High Performance Cars**	Lecture (V)
	2150601, SS 2022, 2 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Content

The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:

- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrative R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Learning Outcomes:

The students …

- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.177 Course: Intelligent Agent Architectures [T-WIWI-111267]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2540525	Intelligent Agent Architectures	2 SWS	Lecture / 🎤	Geyer-Schulz
WT 21/22	2540526	Übung zu Intelligent Agent Architectures	1 SWS	Practice / 🎤	Geyer-Schulz, Schweizer
Exams					
WT 21/22	79011480	Intelligent Agent Architectures			Geyer-Schulz
ST 2022	7900069	Intelligent Agent Architectures (Nachklausur WS 2021/2022)			Geyer-Schulz

Legend: 🖥 Online, 🗗 Blended (On-Site/Online), 🎤 On-Site, ✕ Cancelled

Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five 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 Agent Architectures**	Lecture (V)
	2540525, WS 21/22, 2 SWS, Language: English, Open in study portal	On-Site

Content
Course content:

The lecture is structured in three parts:

In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload:

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Learning Goals:

Students have special knowledge of software architectures and of the methods which are used in their development (Systems analysis, formal methods for the specification of interfaces and algebraic semantic, UML, and, last but not least, the mapping of conceptual architectures to IT architectures.

Students know important architectural patterns and they can – based on their CRM knowledge – combine these patterns for innovative CRM applications.

Assessment:

The assessment consists of a written exam of 1-hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from exercise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: 0

Literature

- P. Clements *u. a.*, *Documenting Software Architectures. Views and Beyond*. Upper Saddle River: Addison-Wesley, 2011.
- Fowler, *Patterns of Enterprise Application Architecture*. Amsterdam: Addison-Wesley Longman, 2002.
- S. Russell und P. Norvig, *Artificial Intelligence: A Modern Approach*, 3. Aufl. Harlow Essex England: Pearson New International Edition, 2014.
- V. N. Vapnik, *The Nature of Statistical Learning Theory*. New York: Springer, 1995.

T 7.178 Course: Intelligent Agents and Decision Theory [T-WIWI-110915]

Responsible:	Prof. Dr. Andreas Geyer-Schulz
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540537	Intelligent Agents and Decision Theory	2 SWS	Lecture	Geyer-Schulz
ST 2022	2540538	Übung zu Intelligent Agents and Decision Theory	1 SWS	Practice	Schweizer
Exams					
WT 21/22	7900294	Intelligent Agents and Decision Theory (Nachklausur SS 2021)			Geyer-Schulz
ST 2022	7900306	Intelligent Agents and Decision Theory			Geyer-Schulz

Competence Certificate
Oral (30 minutes) or written examination (60 minutes). The exam is held in each semester and can be repeated at any regular examination date.Details of the grading system and any exam bonus that may be achieved from the practice are announced in the course.

Prerequisites
None

Recommendation
We assume knowledge in statistics, operations research and microeconomics as taught in the Bachelor program (VWL I, Operations Research I + II, Statistics I + II) and a familiarity with preferably the Python programming language.

Annotation
new lecture starting summer semester 2020

Below you will find excerpts from events related to this course:

V	**Intelligent Agents and Decision Theory** 2540537, SS 2022, 2 SWS, Language: English, Open in study portal	**Lecture (V)**

Content

The key assumption of this lecture is that the concept of artificial intelligence is inseparably linked to the economic concept of rationality of agents. We consider different classes of decision problems - decisions under certainty, risk and uncertainty - from an economic, managerial and AI-engineering perspective:

From an economic point of view, we analyze how to act rationally in these situations based on classic utility theory. In this regard, the course also introduces the relevant parts of decision theory for dealing with

- multiple conflicting objectives,
- incomplete, risky and uncertain information about the world,
- assessing utility functions, and
- quantifying the value of information ...

From an engineering perspective, we discuss how to develop practical solutions for these decision problems, using appropriate AI components. We introduce

- a general, agent-based design framework for AI systems,

as well as AI methods from the fields of

- search (for decisions under certainty),
- inference (for decions under risk) and
- learning (for decisions under uncertainty).

Where applicable, the course highlights the theoretical ties of these methods with decision theory.

We conclude with a discussion of ethical and philosophical issues concerning the development and use of AI.

Learning objectives

Students are able to design, analyze, implement, and evaluate intelligent agents.

Lecture Outline

1. Introduction: Artificial intelligence and the economic concept of rationality
2. Intelligent Agents: A general, agent-based design framework for AI systems
3. Decision under certainty: Assessing utility functions for decisions with multiple objectives
4. Search: Linear programming for decisions under certainty
5. Decisions under risk: The expected utility principle
6. Information systems: Improving economic decisions under risk
7. Inference: Bayesian networks for decisions under risk
8. Information Learning objectives value: When should an agent gather new information?
9. Decisions under uncertainty: Complete lack of information
10. Learning: Statistical learning of bayesian networks
11. Learning: Supervised learning with neural networks
12. Learning: Reinforcement learning
13. Learning: Preference-based reinforcement learning
14. Discussion: Ethical and philosophical issues

Note: This rough outline may be subject to change.

Literature
Basic literature (by lecture):

1. Russell & Norvig (2016, chapter 1), Bamberg et al. (2019, chapters 1 & 2)
2. Russell & Norvig (2016, chapter 2)
3. Keeney & Raiffa (1993, chapter 3)
4. Nickel et al. (2014, chapter 1) [German], Russel & Norvig (2016, chapter 3)
5. Bamberg et al. (2019, chapter 4), Fishburn (1988)
6. Bamberg et al. (2019, chapter 6)
7. Russell & Norvig (2016, chapters 13, 14, 16)
8. Russell & Norvig (2016, chapter 16), Bamberg et al. (2019, chapter 6)
9. Bamberg et al. (2019, chapter 5)
10. Russell & Norvig (2016, chapter 20)
11. Goodfellow et al. (2016, chapter 6)
12. Sutton & Barto (2018, chapter 3)
13. Wirth et al. (2017)
14. Russell & Norvig (2016, chapter 26)

Detailed references:

Bamberg, Coenenberg & Krapp (2019). Betriebswirtschaftliche Entscheidungslehre (16th ed.). Verlag Franz Vahlen GmbH.

Fishburn (1988). Nonlinear preference and utility theory. Baltimore: Johns Hopkins University Press.

Goodfellow, Bengio & Courville (2016). Deep learning. Cambridge: MIT press.

Keeney & Raiffa (1993). Decisions with multiple objectives: preferences and value trade-offs. Cambridge University Press.

Nickel, S., Stein, O., & Waldmann, K.-H. (2014). Operations Research (2nd ed.). Springer Berlin Heidelberg.

Russell & Norvig (2016). Artificial Intelligence: A Modern Approach (3rd Global Edition). Pearson.

Sutton & Barto (2018). Reinforcement learning: An introduction. Cambridge: MIT press.

Wirth, Akrour, Neumann & Fürnkranz (2017). A Survey of Preference-Based Reinforcement Learning Methods. Journal of Machine Learning Research, 18(1), 1–46.

T	**7.179 Course: International Business Development and Sales [T-WIWI-110985]**

Responsible: Erice Casenave
Prof. Dr. Martin Klarmann
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-105312 - Marketing and Sales Management

Type Examination of another type	**Credits** 6	**Grading scale** Grade to a third	**Recurrence** see Annotations	**Version** 1

Events					
WT 21/22	2572189	International Business Development and Sales	4 SWS	Block / 🗣	Klarmann, Terzidis, Casernave
Exams					
WT 21/22	7900156	International Business Development and Sales			Klarmann, Terzidis

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Non exam assessment. The grade is based on the presentation, the subsequent discussion and the written elaboration.

Annotation
Due to the Corona situation it is currently unclear whether the seminar can be offered in WS20 / 21.

Below you will find excerpts from events related to this course:

V	**International Business Development and Sales** 2572189, WS 21/22, 4 SWS, Language: English, Open in study portal	**Block (B)** **On-Site**

Content
This course is offered as part of the EUCOR programme in cooperation with EM Strasbourg. Max. 10 students of KIT and max. 10 students of EM Strasbourg will develop a sales presentation in tandems (teams of 2). This is based on the value proposition of a business model.

- An application is required to participate in this event. The application phase usually takes place at the beginning of the lecture period. Further information on the application process can be found on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the start of the lecture period.

Total workload for 6 ECTS: about 180 hours.

Organizational issues
At KIT
February 2nd, 2022, 1.00 pm – 6.00 pm
February 3rd, 2022, 8.00 am – 7.00 pm
February 4th, 2022, 10.00 am – 4.00 pm

AT EM Strasbourg
February 23th, 2022, 1.00 pm – 6.00 pm
February 24th, 2022, 8.00 am – 7.00 pm
February 25th, 2022, 10.00 am – 4.00 pm

T   7.180 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Events					
ST 2022	2530570	International Finance	2 SWS	Lecture / 🗣	Walter, Uhrig-Homburg
Exams					
WT 21/22	7900052	International Finance			Uhrig-Homburg
ST 2022	7900097	International Finance			Uhrig-Homburg

Legend: 📱 Online, 🕸 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Recommendation
None

Annotation
The course is offered as a 14-day or block course.

Below you will find excerpts from events related to this course:

V   International Finance
2530570, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Die Veranstaltung wird als Blockveranstaltung angeboten, nach dem Kickoff am 27.04. nach Absprache.

Literature
Weiterführende Literatur:

- Eiteman, D. et al., Multinational Business Finance, 13. Auflage, 2012.
- Solnik, B. und D. McLeavey, Global Investments, 6. Auflage, 2008.

T 7.181 Course: Internet Law [T-INFO-101307]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 21/22	24354	Internet Law	2 SWS	Lecture / ▯	Dreier
Exams					
WT 21/22	7500060	Internet Law			Dreier, Matz
ST 2022	7500057	Internet Law			Dreier, Matz

Legend: ▯ Online, ⚬ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T 7.182 Course: Introduction to Bayesian Statistics for Analyzing Data [T-WIWI-110918]

Responsible:	Prof. Dr. Benjamin Scheibehenne
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Once	**Version** 1

Competence Certificate
Grades will be based on active participation (50%) and homework assignments (50%).

Prerequisites
Participants should already have a basic knowledge of R and standard frequentist statistical tests. Please bring your own Laptop with you as we will be using R for several hands-on examples and exercises during the class. We will mainly work with the book "Statistical Rethinking. A Bayesian Course with Examples in R and Stan" by Richard McElrath. Students are advised to obtain the book before the class starts.

Annotation
Due to its interactive nature, participation will be limited to 10 students. If you want to participate, please send a short email to scheibehenne@kit.edu until Thursday, the 23rd of April in which you outline why you are interested in this class and what your expectations are.

The class will consist of three day-long sessions from 9:00 (s.t.) to 18:00. The first session will be held on Thursday, the 7th of May 2020. The second session will be on Thursday, the 28th of May. The third session will be on Thursday, the 18th of June. The classroom will be communicated to registered students in advance. In case classrooms will be closed due to the Corona virus, the class will be taught online and the schedule will be adapted.

T 7.183 Course: Introduction to Food Law [T-CHEMBIO-108091]

Responsible:	Dr. Thomas Kuballa
Organisation:	KIT Department of Chemistry and Biosciences
Part of:	M-CIWVT-101119 - Specialization in Food Process Engineering

Type Completed coursework	Credits 1,5	Grading scale pass/fail	Recurrence Each winter term	Version 2

Events					
WT 21/22	6627	Einführung in das Lebensmittelrecht	1 SWS	Lecture / 🗣	Kuballa
Exams					
WT 21/22	71B108091	Introduction to Food Law			Kuballa
WT 21/22	71B108091-2	Introduction to Food Law			Kuballa

Legend: 🗎 Online, ⚛ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites

| T | **7.184 Course: Introduction to Hydrogeology [T-BGU-101499]** |

Responsible: Prof. Dr. Nico Goldscheider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type Written examination	**Credits** 5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 2

Events					
WT 21/22	6339050	Einführung in die Hydrogeologie	4 SWS	Lecture / Practice (	Goldscheider
Exams					
WT 21/22	8210_101499	Introduction to Hydrogeology			Goldscheider

Competence Certificate
Written exam with 90 minutes

Prerequisites

T   7.185 Course: Introduction to Microsystem Technology I [T-MACH-105182]

Responsible:	Dr. Vlad Badilita
	Dr. Mazin Jouda
	Prof. Dr. Jan Gerrit Korvink
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2141861	Introduction to Microsystem Technology I	2 SWS	Lecture / ✂	Korvink, Badilita

Exams				
WT 21/22	76-T-MACH-105182	Introduction to Microsystem Technology I		Korvink, Badilita
ST 2022	76-T-MACH-105182	Introduction to Microsystem Technology I		Korvink, Badilita

Legend: 📱 Online, ✂ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
written examination (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V   Introduction to Microsystem Technology I
2141861, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
Mikrosystemtechnik für Ingenieure, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.186 Course: Introduction to Microsystem Technology II [T-MACH-105183]

Responsible: Dr. Mazin Jouda
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2142874	Introduction to Microsystem Technology II	2 SWS	Lecture / 📱	Korvink, Badilita
Exams					
WT 21/22	76-T-MACH-105183	Introduction to Microsystem Technology II			Korvink, Badilita
ST 2022	76-T-MACH-105183	Introduction to Microsystem Technology II			Korvink, Badilita

Legend: 📱 Online, ⚄ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
written examination (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Introduction to Microsystem Technology II
2142874, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

Organizational issues
Topic: Grundlagen der Mikrosystemtechnik II (MST II) SS 21
Time: Thursdays 14:00 - 15:30

Join Zoom Meeting
https://kit-lecture.zoom.us/j/66193228123?pwd=eEpTTFJoNzY5ZktRMG5GTEg3bExmdz09

Meeting ID: 661 9322 8123
Passcode: 424794

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005
M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.187 Course: Introduction to Sensory Analysis with Practice [T-CIWVT-111534]

Responsible: TT-Prof. Dr. Katharina Scherf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

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

Events					
WT 21/22	6630		1 SWS	Lecture / 🖥	Scherf
ST 2022	6630	Einführung in die Sensorik mit Übungen	1 SWS	Lecture / 🔊	Scherf
Exams					
WT 21/22	7220016	Introduction to Sensory Analysis with Practice			Scherf
ST 2022	7220016	Introduction to Sensory Analysis with Practice			Scherf

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

Prerequisites
None

T 7.188 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible:	Prof. Dr. Steffen Rebennack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2550470	Introduction to Stochastic Optimization	2 SWS	Lecture / 📱	Rebennack
ST 2022	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice / ⛓	Rebennack, Sinske
ST 2022	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	2 SWS	Practice	Rebennack, Sinske
Exams					
WT 21/22	7900242	Introduction to Stochastic Optimization			Rebennack
ST 2022	7900311	Introduction to Stochastic Optimization			Rebennack

Legend: 📱 Online, ⛓ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites
None.

T 7.189 Course: IoT Platform for Engineering [T-MACH-106743]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

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

Events					
WT 21/22	2123352	IoT platform for engineering	3 SWS	Project (P / 🧩	Ovtcharova, Maier
ST 2022	2123352	IoT platform for engineering	3 SWS	Project (P / 🗣	Ovtcharova, Maier
Exams					
WT 21/22	76T-MACH-106743	IoT platform for engineering			Ovtcharova

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Competence Certificate
Assessment of another type (graded), procedure see webpage. Number of participants limited to 20 people. There is a participant selection process.

Below you will find excerpts from events related to this course:

V IoT platform for engineering
2123352, WS 21/22, 3 SWS, Language: German, Open in study portal
Project (PRO) Blended (On-Site/Online)

Content
Industry 4.0, IT systems for fabrication and assembly, process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- map and analyze processes in the context of Industry 4.0 with special methods of process modelling
- collaboratively grasp practical I4.0 issues using existing hardware and software and work out solutions for a continuous improvement process in a team
- prototypically implement the self-developed solution proposal with the given IT systems and the existing hardware equipment and finally present the results

Literature
Keine / None

V IoT platform for engineering
2123352, SS 2022, 3 SWS, Language: German, Open in study portal
Project (PRO) On-Site

Content
Industry 4.0, IT systems for fabrication and assembly, process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- map and analyze processes in the context of Industry 4.0 with special methods of process modelling
- collaboratively grasp practical I4.0 issues using existing hardware and software and work out solutions for a continuous improvement process in a team
- prototypically implement the self-developed solution proposal with the given IT systems and the existing hardware equipment and finally present the results

Literature
Keine / None

T   7.190 Course: IT-Fundamentals of Logistics [T-MACH-105187]

Responsible: Prof. Dr.-Ing. Frank Thomas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
ST 2022	2118184	IT-Fundamentals of Logistics: Opportunities for Digital Transformation	2 SWS	Lecture / ⚙	Thomas

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The success control takes place in form of a written examination during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites

Annotation

1) Detailed script can be downloaded online (www.tup.com), updated and enhanced annually.

2) CD-ROM with chapters and exercises at the end of the semester available from the lecturer, also updated and enhanced annually.

Below you will find excerpts from events related to this course:

V	**IT-Fundamentals of Logistics: Opportunities for Digital Transformation** 2118184, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

T   7.191 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 Examination of another type	Credits 6	Grading scale Grade to a third	Recurrence Irregular	Version 1

Events					
ST 2022	2545021	Joint Entrepreneurship School	4 SWS	Seminar / 📱	Kleinn, Terzidis
Exams					
ST 2022	7900346	Joint Entrepreneurship Summer School			Terzidis

Legend: 📱 Online, ✿ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The learning control of the program (Summer School) consists of two parts:
A) **Investor Pitch**:
Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.

B) **Written elaboration:**
The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyzes and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.

The grade consists of 50% presentation performance and 50% written preparation.

Prerequisites
The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

Recommendation
We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

Annotation
The working language during the Summer School is English. A one-week stay in China is part of the Summer School.

Below you will find excerpts from events related to this course:

V	**Joint Entrepreneurship School** 2545021, SS 2022, 4 SWS, Language: English, Open in study portal	**Seminar (S) Online**

Content
During the Summer School in Shanghai and Karlsruhe, students develop a business model of technologies and patents developed at KIT in workshops in German-Chinese tandems over the period of two weeks.

https://etm.entechnon.kit.edu/english/1095.php

Organizational issues
Vorbereitungstermine: tba
JES: 11.07-15.07.2022

T   7.192 Course: Judgement and Decision Making [T-WIWI-111099]

Responsible:	Prof. Dr. Benjamin Scheibehenne
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105312 - Marketing and Sales Management
	M-WIWI-105714 - Consumer Research
	M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each winter term	1 terms	1

Events

WT 21/22	2540440	Judgment and Decision Making	3 SWS	Lecture / ✿	Scheibehenne, Seidler

Exams

WT 21/22	7900333	Judgment and Decision Making			Scheibehenne

Legend: 🖥 Online, ✿ Blended (On-Site/Online), ✇ On-Site, ✘ Cancelled

Competence Certificate
written exam (90min) at the end of the Semester

Annotation
The judgments and decisions that we make can have long ranging and important consequences for our (financial) well-being and individual health. Hence, the goal of this lecture is to gain a better understanding of how people make judgments and decisions and the factors that influences their behavior. We will look into simple heuristics and mental shortcuts that decision makers use to navigate their environment, in particular so in an economic context. Following this the lecture will provide an overview into social and emotional influences on decision making. In the second half of the semester we will look into some more specific topics including self-control, nudging, and food choice. The last part of the lecture will focus on risk communication and risk perception. We will address these questions from an interdisciplinary perspective at the intersection of Psychology, Behavioral Economics, Marketing, Cognitive Science, and Biology. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates.

The workload of the class is 4.5 ECTS. This consists of 3 ETCS for the lecture and 1.5 ETCS for the Übung. Details about the Übung will be communicated at the first day of the class.

Below you will find excerpts from events related to this course:

V   Judgment and Decision Making
2540440, WS 21/22, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this lecture, students will be introduced to fundamental theories and key insights on human judgment and decision making. Topics include decision making under uncertainty, choice biases, simple heuristics, risk perception and -communication, as well as social and emotional influences on decision making, to name but a few. In the Wintersemester 20/21 this class will be held online. The lecture videos will be available for download and there will be regular online meetings to discuss the topics. The lecture will be held in English.

T 7.193 Course: KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics [T-WIWI-111109]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101446 - Market Engineering
	M-WIWI-104080 - Designing Interactive Information Systems
	M-WIWI-105714 - Consumer Research
	M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Competence Certificate

Non exam assessment. Grading will be based on a continuous basis throughout the semester. The assessment consists of:

- A written paper, and
- a group presentation with subsequent discussion and question and answer session of 30 minutes.

For particularly active and constructive participation in the discussions of other papers during the final presentation, a bonus of one grade level (0.3 or 0.4) can be achieved on the passed exam. Details on the grading will be announced at the beginning of the event.

Annotation

Due to the laboratory capacity and in order to ensure an optimal supervision of the project groups, the number of participants is limited. Places are allocated according to preferences and suitability for the topics. In particular, previous knowledge in the field of experimental economics plays a role.

The course will be offered starting in the summer semester 2021.

T 7.194 Course: Knowledge Discovery [T-WIWI-102666]

Responsible:	Dr.-Ing. Michael Färber
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 21/22	2511302	Knowledge Discovery	2 SWS	Lecture / 📱	Färber
WT 21/22	2511303	Exercises to Knowledge Discovery	1 SWS	Practice / ⚙	Färber, Saier
Exams					
WT 21/22	7900013	Knowledge Discovery			Färber
ST 2022	79AIFB_KD_C3	Knowledge Discovery (Registration until 18 July 2022)			Färber

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ⬤ On-Site, ✗ Cancelled

Competence Certificate

The assessment is a written exam (60 minutes).

1. Successful participation in the exercises can earn a grade bonus in two ways:
   By handing in the answers to an exercise sheet and reaching or exceeding 80% correct answers.
2. By handing in the results of an implementation task related to machine learning, which reaches or exceeds a given evaluation value.

If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4).

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Knowledge Discovery** 2511302, WS 21/22, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **Online**

Content

The lecture gives an overview of approaches of machine learning and data mining for knowledge acquisition from large data sets. These are examined especially with respect to algorithms, applicability to different data representations and the use in real application scenarios.

Knowledge Discovery is an established research area with a large community that investigates methods for discovering patterns and regularities in large amounts of data, including unstructured text. A variety of methods exist to extract patterns and provide previously unknown insights. This information can be predictive or descriptive.

The lecture gives an overview of Knowledge Discovery. Specific techniques and methods, challenges and current and future research topics in this research area will be taught.

Contents of the lecture cover the entire machine learning and data mining process with topics on supervised and unsupervised learning and empirical evaluation. Covered learning methods range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

Learning obectives:

Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

V	**Exercises to Knowledge Discovery** 2511303, WS 21/22, 1 SWS, Language: English, Open in study portal	**Practice (Ü)** **Blended (On-Site/Online)**

Content

The exercises are based on the lecture Knowledge Discovery. Several exercises are covered, which take up and discuss in detail the topics covered in the lecture Knowledge Discovery. Practical examples are demonstrated to the students to enable a knowledge transfer of the theoretical aspects learned into practical application.

Contents of the lecture cover the entire machine learning and data mining process with topics on monitored and unsupervised learning processes and empirical evaluation. The learning methods covered range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

Learning objectives:

Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

T   7.195 Course: Laboratory Production Metrology [T-MACH-108878]

Responsible:	Dr.-Ing. Benjamin Häfner
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101284 - Specialization in Production Engineering

Type Examination of another type	Credits 5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	2150550	Laboratory Production Metrology	3 SWS	Practical course / 🗣	Häfner
Exams					
ST 2022	76-T-MACH-108878	Laboratory Production Metrology			Häfner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Alternative Test Achievement: Group presentation of 15 min at the beginning of each experiment and evaluation of the participation during the experiments

and

Oral Exam (15 min)

Prerequisites
none

Annotation
For organizational reasons the number of participants for the course is limited. Hence al selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

Below you will find excerpts from events related to this course:

V	**Laboratory Production Metrology** 2150550, SS 2022, 3 SWS, Language: German, Open in study portal	Practical course (P) **On-Site**

Content

During this course, students get to know measurement systems that are used in a production system. In the age of Industry 4.0, sensors are becoming more important. Therefore, the application of in-line measurement technology such as machine vision and non-destructive testing is focussed. Additionally, laboratory based measurement technologies such as computed tomography are addressed. The students learn the theoretical background as well as practical applications for industrial examples. The students use sensors by themselves during the course. Additionally, they are trained on how to integrate sensors in production processes and how to analyze measurement data with suitable software.

The following topics are addressed:

- Classification and examples for different measurement technologies in a production environment
- Machine vision with optical sensors
- Information fusion based on optical measurements
- Robot-based optical measurements
- Non-destructive testing by means of acoustic measurements
- Coodinate measurement technology
- Industrial computed tomography
- Measurement uncertainty evaluation
- Analysis of production data by means of data mining

Learning Outcomes:

The students ...

- are able to name, describe and mark out different measurement technologies that are relevant in a production environment.
- are able to conduct measurements with the presented in-line and laboratory based measurement systems.
- are able to analyze measurement results and asses the measurement uncertainty of these.
- are able to deduce whether a work piece fulfills quality relevant specifications by analysing measurement results.
- are able to use the presented measurement technologies for a new task.

Workload:

regular attendance: 31,5 hours
self-study: 88,5 hours

Organizational issues

Die Lehrveranstaltung findet stets dienstags nachmittags statt.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

The course always takes place on Tuesdays in the afternoon.

For organizational reasons the number of participants for the course is limited. Hence al selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

Literature

Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt. Ebenso wird auf gängie Fachliteratur verwiesen.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/). Additional reference to literature will be provided, as well.

T   7.196 Course: Laboratory Work Water Chemistry [T-CIWVT-103351]

Responsible: Dr. Gudrun Abbt-Braun
Prof. Dr. Harald Horn

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101121 - Water Chemistry and Water Technology I

Type	Credits	Grading scale	Version
Examination of another type	4	Grade to a third	1

Events					
WT 21/22	22664	Practical Course: Water Quality and Water Assessment	2 SWS	Practical course / 🧩	Horn, Abbt-Braun, und Mitarbeiter
Exams					
WT 21/22	7232002	Laboratory Work Water Chemistry			Horn, Abbt-Braun
ST 2022	7232002	Laboratory Work Water Chemistry			Horn, Abbt-Braun

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Prerequisites

T   7.197 Course: Large-scale Optimization [T-WIWI-106549]

Responsible:	Prof. Dr. Steffen Rebennack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2550475	Large-Scale Optimization	2 SWS	Lecture / 📱	Rebennack
ST 2022	2550476	Übung zu Large-Scale Optimization	1 SWS	Practice / 🔀	Rebennack, Sinske
ST 2022	2550477	Rechnerübung zu Large-scale Optimization	2 SWS	Practice / 📱	Rebennack, Sinske
Exams					
WT 21/22	7900244	Large-scale Optimization			Rebennack
ST 2022	7900310	Large-scale Optimization			Rebennack

Legend: 📱 Online, 🔀 Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites

None.

T   7.198 Course: Laser Physics [T-ETIT-100741]

Responsible: Prof. Dr. Marc Eichhorn
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Microoptics
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2301480	Laserphysics	2 SWS	Lecture	Eichhorn
WT 21/22	2301481	Exercise for 2301480 Laserphysics	1 SWS	Practice	Eichhorn
Exams					
WT 21/22	7301480	Laser Physics			Eichhorn

Prerequisites

T 7.199 Course: Lean Construction [T-BGU-108000]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Events					
WT 21/22	6241901	Lean Construction	4 SWS	Lecture / Practice (	Haghsheno, Mitarbeiter/innen
Exams					
WT 21/22	8246108000	Lean Construction			Haghsheno

Competence Certificate
written exam, 70 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.200 Course: Learning Factory "Global Production" [T-MACH-105783]

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

Part of: M-MACH-101284 - Specialization in Production Engineering
M-MACH-105455 - Strategic Design of Modern Production Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	4

Events					
WT 21/22	2149612	Learning Factory "Global Production"	4 SWS	/ ✣	Lanza
Exams					
WT 21/22	76-T-MACH-105783	Learning Factory "Global Production"			Lanza

Legend: 📱 Online, ✣ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative test achievement (graded):

- Knowledge acquisition in the context of the seminar (4 achievements 20 min each) with weighting 40%.
- Interaction between participants with weighting 15%.
- Scientific colloquium (in groups of 3 students approx. 45 min each) with weighting 45%.

Prerequisites
none

Annotation
For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/lernfabrik.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Below you will find excerpts from events related to this course:

V Learning Factory "Global Production"
2149612, WS 21/22, 4 SWS, Language: German, Open in study portal   **Blended (On-Site/Online)**

Content

The learning factory "Global Production" serves as a modern teaching environment for the challenges of global production. To make this challenges come alive, students can run a production of electric motors under real production conditions.

The course is divided into e-learning units and presence dates. The e-learning units help to learn essential basics and to immerse themselves in specific topics (e.g. selection of location, supplier selection and planning of production networks). The focus of the presence appointments is the case-specific application of relevant methods for planning and control of production systems that are suitable for the location. In addition to traditional methods and tools to organize lean production systems (e.g. Kanban and JIT/ JIS, Line Balancing) the lecture in particular deals with site-specific quality assurance and scalable automation. Essential methods for quality assurance in complex production systems are taught and brought to practical experience by a Six Sigma project. In the area of scalable automation, it is important to find solutions for the adaption of the level of automation of the production system to the local production conditions (e.g. automated workpiece transport, integration of lightweight robots for process linking) and to implement them physically. At the same time safety concepts should be developed and implemented as enablers for human-robot collaboration.

The course also includes an excursion to the production plant for the manufacturing of electric motors of an industrial partner.

Main focus of the lecture:

- site selection
- site-specific factory planning
- site-specific quality assurance
- scalable automation
- supplier selection

Learning Outcomes:

The students are able to …

- evaluate and select alternative locations using appropriate methods.
- use methods and tools of lean management to plan and manage production systems that are suitable for the location.
- use the Six Sigma method and apply goal-oriented process management.
- select an appropriate level of automation of the production units based on quantitative variables.
- make use of well-established methods for the evaluation and selection of suppliers.
- apply methods for planning a global production network depending on company-specific circumstances to sketch a suitable network and classify and evaluating it according to specific criteria.
- apply the learned methods and approaches with regard to problem solving in a global production environment and able to reflect their effectiveness.

Workload:

e-Learning: ~ 24 h
regular attendence: ~ 36 h
self-study: ~ 60 h

Organizational issues

Termine werden über die Institutshomepage bekanntgegeben.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Teilnehmer begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php)

Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.

Die Studierenden sollten Vorkenntnisse in mindestens einem der folgenden Bereiche haben:

- Integrierte Produktionsplanung
- Globale Produktion und Logistik
- Qualitätsmanagement

For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/studium-und-lehre.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Literature
Medien:
E-Learning Plattform ilias, Powerpoint, Fotoprotokoll. Die Medien werden über ilias (https://ilias.studium.kit.edu/) bereitgestellt.
Media:
E-learning platform ilias, powerpoint, photo protocol. The media are provided through ilias (https://ilias.studium.kit.edu/).

T 7.201 Course: Liberalised Power Markets [T-WIWI-107043]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2581998	Liberalised Power Markets	2 SWS	Lecture / 🗣	Fichtner, Kraft
Exams					
WT 21/22	7900193	Liberalised Power Markets			Fichtner

Legend: 🗄 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V	**Liberalised Power Markets**	Lecture (V)
	2581998, WS 21/22, 2 SWS, Language: English, Open in study portal	**On-Site**

Content

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.1.   Unbundling Dimensions of liberalised power markets

2.2.   Central dispatch versus markets without central dispatch

2.3.   The short-term market model

2.4.   The long-term market model

2.5.   Market flaws and market failure

2.6.   Regulation in liberalised markets

3. The power (sub)markets

3.1   Day-ahead market

3.2   Intraday market

3.3   (Long-term) Forwards and futures markets

3.4   Emission rights market

3.5   Market for ancillary services

3.6   The "market" for renewable energies

3.7   Future market segments

4. Grid operation and congestion management

4.1.   Grid operation

4.2.   Congestion management

5. Market power

5.1.   Defining market power

5.2.   Indicators of market power

5.3.   Reducing market power

6. Future market structures in the electricity value chain

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.2.   Unbundling Dimensions of liberalised power markets

2.3.   Central dispatch versus markets without central dispatch

2.4.   The short-term market model

2.5.   The long-term market model

2.6.   Market flaws and market failure

2.7.   Regulation in liberalised markets

3. The power (sub)markets

3.1   Day-ahead market

3.2   Intraday market

3.3   (Long-term) Forwards and futures markets

3.4   Emission rights market

3.5   Market for ancillary services

3.6   The "market" for renewable energies

3.7   Future market segments

4. Grid operation and congestion management

4.1.   Grid operation

4.2.   Congestion management

5. Market power

5.1.   Defining market power

5.2.   Indicators of market power

5.3.   Reducing market power

6. Future market structures in the electricity value chain

Literature
Weiterführende Literatur:

Power System Economics; Steven Stoft, IEEE Press/Wiley-Interscience Press, 0-471-15040-1

T 7.202 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	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2581995	Life Cycle Assessment	2 SWS	Lecture / 📱	Maier
Exams					
WT 21/22	7981995	Life Cycle Assessment			Schultmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🖥 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites

None.

Recommendation

None

Below you will find excerpts from events related to this course:

V Life Cycle Assessment
2581995, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content

Introduction to life cycle assessment. The lecture describes structure and individual steps of life cycle assessment in detail.

Literature

werden in der Veranstaltung bekannt gegeben

T   7.203 Course: Logistics and Supply Chain Management [T-MACH-110771]

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

Part of:	M-MACH-105298 - Logistics and Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	2

Events					
ST 2022	2118078	Logistics and Supply Chain Management	4 SWS	Lecture / ⚙	Furmans, Alicke
Exams					
WT 21/22	76-T-MACH-110771	Logistics and Supply Chain Management			Furmans, Mittwollen

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites
None

Annotation
The brick cannot be taken if one of the bricks "T-MACH-102089 – Logistics - Organisation, Design and Control of Logistic Systems" and "T-MACH-105181 – Supply Chain Management" has been taken.

Below you will find excerpts from events related to this course:

V   Logistics and Supply Chain Management
2118078, SS 2022, 4 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In the lecture "Logistics and Supply Chain Management", comprehensive and well-founded fundamentals of crucial issues in logistics and supply chain management are presented. Furthermore, the interaction of different design elements of supply chains is emphasized. For this purpose, both qualitative and quantitative models are presented and applied. Additionally, methods for mapping and evaluating logistics systems and supply chains are described. The contents of the lecture are deepened in exercises and case studies and comprehension is partially reviewed in case studies. The contents will be illustrated, among other things, on the basis of supply chains in the automotive industry.

Among others, the following topics are covered:

- Inventory Management
- Forecasting
- Bullwhip Effect
- Supply Chain Segmentation and Collaboration
- Key Performance Indicators
- Supply Chain Risk Management
- Production Logistics
- Location Planning
- Route Planning

It is intended to provide an interactive format in which students can also contribute (and work alone or in groups). Since logistics and supply chain management (also in times during and after Corona) requires working in an international environment and therefore many terms are derived from English, the lecture will be held in English.

T 7.204 Course: Long-Distance and Air Traffic [T-BGU-106301]

Responsible:	Bastian Chlond
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101064 - Fundamentals of Transportation
	M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 21/22	6232904	Fern- und Luftverkehr	2 SWS	Lecture / ✿	Chlond, Dozenten
Exams					
WT 21/22	8245106301	Long-distance and Air Traffic			Chlond

Legend: 📱 Online, ✿ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation

T	7.205 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-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 3

Events					
WT 21/22	2511500	Machine Learning 1 - Fundamental Methods	2 SWS	Lecture / 🧩	Zöllner
WT 21/22	2511501	Exercises to Machine Learning 1 - Fundamental Methods	1 SWS	Practice / 🧩	Zöllner, Daaboul, Polley
Exams					
WT 21/22	7900076	Machine Learning 1 - Basic Methods			Zöllner
ST 2022	79AIFB_ML1_C4	Machine Learning 1 - Basic Methods (Registration until 18 July 2022)			Zöllner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the exam will be offered either as an open-book exam, or as a written exam (60 min):

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites

None.

Below you will find excerpts from events related to this course:

V	**Machine Learning 1 - Fundamental Methods** 2511500, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Content

The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

Learning obectives:

- Students acquire knowledge of the fundamental methods in the field of machine learning.
- Students can classify, formally describe and evaluate methods of machine learning.
- Students can use their knowledge to select suitable models and methods for selected problems in the field of of machine learning.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 7.206 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-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics
M-WIWI-101637 - Analytics and Statistics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 2

Events					
ST 2022	2511502	Machine Learning 2 - Advanced methods	2 SWS	Lecture / 🗣	Zöllner
ST 2022	2511503	Exercises for Machine Learning 2 - Advanced Methods	1 SWS	Practice / 🗣	Zöllner
Exams					
WT 21/22	7900050	Machine Learning 2 – Advanced Methods			Zöllner
ST 2022	79AIFB_ML2_B1	Machine Learning 2 – Advanced Methods (Registration until 18 July 2022)			Zöllner

Legend: 🖥 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the exam will be offered either as an open-book exam, or as a written exam (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Machine Learning 2 - Advanced methods
2511502, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

Learning objectives:

- Students understand extended concepts of machine learning and their possible applications.
- Students can classify, formally describe and evaluate methods of machine learning.
- In detail, methods of machine learning can be embedded and applied in complex decision and inference systems.
- Students can use their knowledge to select suitable models and methods of machine learning for existing problems in the field of machine intelligence.

Recommendations:
Attending the lecture *Machine Learning 1* or a comparable lecture is very helpful in understanding this lecture.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 7.207 Course: Machine Tools and High-Precision Manufacturing Systems [T-MACH-110963]

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

Part of: M-MACH-101286 - Machine Tools and Industrial Handling

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	1

Events					
WT 21/22	2149910	Machine Tools and High-Precision Manufacturing Systems	6 SWS	Lecture / Practice (/ 🔀	Fleischer
Exams					
WT 21/22	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer
ST 2022	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written exam (120 minutes)

Prerequisites
T-MACH-102158 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-109055 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-110962 - Machine Tools and High-Precision Manufacturing Systems must not be commenced.

Below you will find excerpts from events related to this course:

V	**Machine Tools and High-Precision Manufacturing Systems** 2149910, WS 21/22, 6 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **Blended (On-Site/Online)**

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

The individual topics are:

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

Learning Outcomes:

The students …

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

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING/TVWL:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Start: 18.10.2021

Vorlesungstermine montags und mittwochs, Übungstermine donnerstags.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Lectures on Mondays and Wednesdays, tutorial on Thursdays.
The tutorial dates will announced in the first lecture.

Literature
Medien:
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T   7.208 Course: Management Accounting 1 [T-WIWI-102800]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2579900	Management Accounting 1	2 SWS	Lecture / 🎤	Wouters
ST 2022	2579901	Tutorial Management Accounting 1 (Bachelor)	2 SWS	Practice / 🎤	Dickemann
ST 2022	2579902	Tutorial Management Accounting 1 (Master)	2 SWS	Practice / 🎤	Dickemann
Exams					
WT 21/22	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
WT 21/22	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters
ST 2022	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
ST 2022	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

Annotation

Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V	**Management Accounting 1**	**Lecture (V)**
	2579900, SS 2022, 2 SWS, Language: English, Open in study portal	**On-Site**

Content

The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics.
- They can use financial information for various purposes in organizations.

Examination:

- The assessment consists of a written exam (120 minutes) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

V	**Tutorial Management Accounting 1 (Bachelor)** 2579901, SS 2022, 2 SWS, Language: English, Open in study portal	**Practice (Ü)** **On-Site**

Content
see Module Handbook

V	**Tutorial Management Accounting 1 (Master)** 2579902, SS 2022, 2 SWS, Language: English, Open in study portal	**Practice (Ü)** **On-Site**

Content
see Module Handbook

T 7.209 Course: Management Accounting 2 [T-WIWI-102801]

Responsible:	Prof. Dr. Marcus Wouters
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 21/22	2579903	Management Accounting 2	2 SWS	Lecture / 🗣	Wouters
WT 21/22	2579904		2 SWS	Practice / 🗣	Ebinger
WT 21/22	2579905		2 SWS	Practice / 🗣	Ebinger
Exams					
WT 21/22	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
WT 21/22	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters
ST 2022	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
ST 2022	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Recommendation
It is recommended to take part in the course "Management Accounting 1" before this course.

Annotation
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V	**Management Accounting 2**	**Lecture (V)**
	2579903, WS 21/22, 2 SWS, Language: English, Open in study portal	**On-Site**

Content

The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Recommendations:

- It is recommended to take part in the course "Management Accounting 1" before this course.

Examination:

- The assessment consists of a written exam (120 min) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Verlag: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- Zusätzlich werden Artikel auf ILIAS zur Vergügung gestellt.

V	2579904, WS 21/22, 2 SWS, Language: English, Open in study portal	Practice (Ü) On-Site

Content
see ILIAS

V	2579905, WS 21/22, 2 SWS, Language: English, Open in study portal	Practice (Ü) On-Site

Content
see ILIAS

T	**7.210 Course: Management of IT-Projects [T-WIWI-102667]**

Responsible:	Dr. Roland Schätzle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2511214	Management of IT-Projects	2 SWS	Lecture / 🗣	Schätzle
ST 2022	2511215	Übungen zu Management von Informatik-Projekten	1 SWS	Practice / 🗣	Schätzle
Exams					
WT 21/22	7900014	Management of IT-Projects			Oberweis
ST 2022	79AIFB_MvIP_A1	Management of IT-Projects (Registration until 18 July 2022)			Oberweis

Legend: 📱 Online, 🔆 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment takes place in the form of a written examination (exam) in the amount of 60 minutes. The examination is offered every semester and can be repeated at any regular examination date.

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**	Lecture (V)
	2511214, SS 2022, 2 SWS, Language: German, Open in study portal	On-Site

Content

The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Learning objectives:

Students

- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropiate to current project phases and project contexts,
- consider organisational and social impact factors.

Recommendations:

Knowledge from the lecture Software Engineering is helpful.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004
- Project Management Institute Standards Committee. A Guide to the Project Management Body of Knowledge (PMBoK guide). Project Management Institute. Four Campus Boulevard. Newton Square. PA 190733299. U.S.A.

V	**Übungen zu Management von Informatik-Projekten** 2511215, SS 2022, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **On-Site**

Content

The general conditions, influencing factors and methods in the planning, execution and control of IT projects are dealt with. In particular, the following topics will be dealt with: Project environment, project organization, project structure plan, effort estimation, project infrastructure, project control, decision-making processes, negotiation, time management. The lecture is accompanied by exercises in the form of tutorials. The date of the exercise will be announced later.

T 7.211 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 Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	2545003	Managing New Technologies	2 SWS	Lecture / 🗣	Reiß
Exams					
WT 21/22	7900189	Managing New Technologies			Reiß

Legend: 🖥 Online, ❖ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Written exam 100% following §4, Abs. 2.

Prerequisites
None

Recommendation
None

Annotation
The credit points for T-WIWI-102612 "Management of New Technologies" were reduced to 3 credit points in the 2019 summer semester.

Below you will find excerpts from events related to this course:

V	**Managing New Technologies** 2545003, SS 2022, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Literature

- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

T   7.212 Course: Manufacturing Technology [T-MACH-102105]

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

Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	3

Events					
WT 21/22	2149657	Manufacturing Technology	6 SWS	Lecture / Practice (/ 🧩	Schulze, Gerstenmeyer
Exams					
WT 21/22	76-T-MACH-102105	Manufacturing Technology			Schulze
ST 2022	76-T-MACH-102105	Manufacturing Technology			Schulze

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✘ Cancelled

Competence Certificate
Written Exam (180 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Manufacturing Technology**	Lecture / Practice (VÜ)
	2149657, WS 21/22, 6 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Content

The objective of the lecture is to look at manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to impart detailed process knowledge of the common processes. The lecture covers the basic principles of manufacturing technology and deals with the manufacturing processes according to their classification into main groups regarding technical and economic aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Quality control
- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming, plastics engineering)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing

This lucture provides an excursion to an industry company.

Learning Outcomes:

The students ...

- are capable to specify the different manufacturing processes and to explain their functions.
- are able to classify the manufacturing processes by their general structure and functionality according to the specific main groups.
- have the ability to perform a process selection based on their specific characteristics.
- are enabled to identify correlations between different processes and to select a process regarding possible applications.
- are qualified to evaluate different processes regarding specific applications based on technical and economic aspects.
- are experienced to classify manufacturing processes in a process chain and to evaluate their specific influence on surface integrity of workpieces regarding the entire process chain.

Workload:

regular attendance: 63 hours
self-study: 177 hours

Organizational issues
Start: 18.10.2021

Vorlesungstermine montags und dienstags, Übungstermine mittwochs.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.
Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.213 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-101411 - Information Engineering
	M-WIWI-101446 - Market Engineering
	M-WIWI-101453 - Applied Strategic Decisions
	M-WIWI-102754 - Service Economics and Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540460	Market Engineering: Information in Institutions	2 SWS	Lecture / 📱	Fegert, Weinhardt
ST 2022	2540461	Übungen zu Market Engineering: Information in Institutions	1 SWS	Practice / 📱	Jachimowicz, Stein, Bezzaoui, Fegert
Exams					
WT 21/22	7900354	Market Engineering: Information in Institutions			Weinhardt

Legend: 📱 Online, ⚒ Blended (On-Site/Online), 📍 On-Site, ✘ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by max. one grade level (0.3 or 0.4).

Prerequisites

None

Below you will find excerpts from events related to this course:

V Market Engineering: Information in Institutions
2540460, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Literature

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.
- Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
- Smith, V. "Theory, Experiments and Economics", The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

T 7.214 Course: Market Research [T-WIWI-107720]

Responsible: Prof. Dr. Martin Klarmann

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101647 - Data Science: Evidence-based Marketing
M-WIWI-105312 - Marketing and Sales Management
M-WIWI-105714 - Consumer Research

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2022	2571150	Market Research	2 SWS	Lecture / 🔊	Klarmann
ST 2022	2571151	Market Research Tutorial	1 SWS	Practice / 🔊	Pade
Exams					
WT 21/22	7900160	Market Research			Klarmann
ST 2022	7900015	Market Research			Klarmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

The assessment of success takes place through a written exam with additional aids in the sense of an open book exam. The written exam will either take place in the lecture hall or online, depending on further pandemic developments. Further details will be announced during the lecture.

Prerequisites

None

Recommendation

None

Annotation

Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

Below you will find excerpts from events related to this course:

V	**Market Research**	Lecture (V)
	2571150, SS 2022, 2 SWS, Language: English, Open in study portal	On-Site

Content

Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

The aim of this lecture is to give an overview of essential statistical methods. In the lecture students learn the practical use as well as the correct handling of different statistical survey methods and analysis procedures. In addition, emphasis is put on the interpretation of the results after the application of an empirical survey. The derivation of strategic options is an important competence that is required in many companies in order to react optimally to customer needs.

The assessment is carried out (according to §4(2), 3 SPO) in the form of a written open book exam.

The total workload for this course is approximately 135.0 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45.0 hours

Exam and exam preparation: 60.0 hours

Please note that this course has to be completed successfully by students interested in master thesis positions at the chair of marketing.

Literature

Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.215 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 Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 5

Events					
WT 21/22	2572170	Marketing Analytics	2 SWS	Lecture / ⚙	Klarmann
WT 21/22	2572171		1 SWS	Practice / 🍃	Honold
Exams					
WT 21/22	7900082	Marketing Analytics			Klarmann

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🍃 On-Site, ✕ Cancelled

Competence Certificate
Alternative (according to §4(2), 3 of the examination regulation) exam assessment (working on tasks in groups during the lecture).

Prerequisites
The prerequisite for taking the course is the successful completion of the course "Market Research".

Recommendation
It is strongly recommended to complete the course "Market Research" prior to taking the "Marketing Analytics" course.

Annotation
"Marketing Analytics" will be offered as a block course in the winter term 20/21 with an alternative exam assessment.
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 21/22, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling, structural equation modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

Students

- receive based on the course market research an overview of advanced empirical methods
- learn in the course of the lecture to handle advanced data collection and data analysis methods
- are based on the acquired knowledge able to interpret results and derive strategic implications

Total workload for 4.5 ECTS: ca. 135 hours.

In order to attend Marketing Analytics, students are required to have passed the course Market Research.

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

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

Organizational issues

Präsenztermine: 05.11.2021 / 19.11.2021 / 03.12.2021 / 17.12.2021

Die anderen Termine finden online statt.

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   7.216 Course: Marketing Strategy Business Game [T-WIWI-102835]

Responsible:	Prof. Dr. Martin Klarmann
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101510 - Cross-Functional Management Accounting
	M-WIWI-105312 - Marketing and Sales Management

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

Competence Certificate
The assessment (alternative exam assessment) consists of a group presentation and a subsequent round of questions totalling 20 minutes.

Prerequisites
None

Recommendation
None

Annotation
Please note that only one of the courses from the election block can be chosen in the module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS points in the respective module to all students. Participation in a specific course cannot be guaranteed.
In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

T 7.217 Course: Master's Thesis [T-WIWI-103142]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan des KIT-Studienganges

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101659 - Module Master's Thesis

Type	Credits	Grading scale	Version
Final Thesis	30	Grade to a third	1

Competence Certificate
see module description

Prerequisites
see module description

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline	6 months
Maximum extension period	3 months
Correction period	8 weeks

T   7.218 Course: Material Flow in Logistic Systems [T-MACH-102151]

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

Part of:	M-MACH-101277 - Material Flow in Logistic Systems

Type Examination of another type	**Credits** 9	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 3

Events					
WT 21/22	2117051	Material flow in logistic systems	15 SWS	Others (sons	Furmans, Klein, Fleischmann
Exams					
WT 21/22	76-T-MACH-102151	Material Flow in Logistic Systems			Furmans

Competence Certificate

The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
  - ◦ 40% assessment of the result of the case studies as group work,
  - ◦ 20% assessment of the oral examination during the case study colloquiums as individual performance.

A detailed description of the learning control can be found under Annotations.

Prerequisites

Recommendation

Recommended elective subject: Probability Theory and Statistics

Annotation

Students are divided into groups for this course. Five case studies are carried out in these groups. The results of the group work during the lecture period are presented and evaluated in writing. In the oral examination during the case study colloquiums, the understanding of the result of the group work and the models dealt with in the course is tested. The participation in the oral defenses is compulsory and will be controlled. For the written submission the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

Below you will find excerpts from events related to this course:

V	**Material flow in logistic systems** 2117051, WS 21/22, 15 SWS, Language: German, Open in study portal	**Others (sonst.)**

Content
Learning Content:

- Elements of material flow systems (conveyor elements, fork, join elements)
- Models of material flow networks using graph theory and matrices
- Queueing theory, calculation of waiting time, utilization
- Warehouseing and order-picking
- Shuttle systems
- Sorting systems
- Simulation
- Calculation of availability and reliability
- Value stream analysis

After successful completion of the course, you are able (alone and in a team) to:

- Accurately describe a material handling system in a conversation with an expert.
- Model and parameterize the system load and the typical design elements of a material handling system.
- Design a material handling system for a task.
- Assess the performance of a material handling system in terms of the requirements.
- Change the main lever for influencing the performance.
- Expand the boundaries of today's methods and system components conceptually if necessary.

Literature:

Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 7. Auflage 2019

Description:

This course is seperated into 5 topic blocks which are structured in the following parts:

- self-study phase

- exercise

- plenary

- case study (group work)

- colloquium

- review of case study

The groups for the case study will be formed at the beginning of the course (first week). The results of the group work during the lecture period are presented and evaluated in writing. During the colloquiums, the result of the case study is presented and the understanding of the group work and the models dealt with in the course are tested in an oral defense. The participation in the colloquiums is compulsory and will be controlled. For the written submission and the presentation the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

We strongly recommend to attend the introductory session ont 20th of October 2021. In this session, the teaching concept of "Materialfluss in Logistiksysteme" is explained and outstanding issues are clarified.

The course registration including the group allocation with ILIAS is mandatory. The registration will be open for several days after the introductory session (registration duration: 20.10.2021 14:00 Uhr - 26.10.2021 14:00 Uhr)

Workload:

- Regular attendance: 35 h
- Self-study: 135 h
- Group work: 100 h

Competence Certificate:

The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
    - 40% assessment of the result and the presentation of the case studies as group work,
    - 20% assessment of the oral examination during the colloquiums as individual performance.

T 7.219 Course: Mathematical Models and Methods for Production Systems [T-MACH-105189]

Responsible: Dr.-Ing. Marion Baumann
Prof. Dr.-Ing. Kai Furmans

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 21/22	2117059	Mathematical models and methods for Production Systems	4 SWS	Lecture / ❖	Baumann, Furmans
Exams					
WT 21/22	76-T-MACH-105189	Mathematical models and methods for Production Systems		Furmans	

Legend: 📱 Online, ❖ Blended (On-Site/Online), 🌑 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites

Below you will find excerpts from events related to this course:

V Mathematical models and methods for Production Systems
2117059, WS 21/22, 4 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Media:

black board, lecture notes, presentations

Learning Content:

- single server systems: M/M/1, M/G/1: priority rules, model of failures
- networks: open and closed approximations, exact solutions and approximations
- application to flexible manufacturing systems, AGV (automated guided vehicles) - systems
- modeling of control approaches like constant work in process (ConWIP) or kanban
- discrete-time modeling of queuing systems

Learning Goals:

Students are able to:

- Describe queueing systems with analytical solvable stochastic models,
- Derive approches for modeling and controlling material flow and production systems based on models of queueing theory,
- Use simulation and exakt methods.

Recommendations:

- Basic knowledge of statistic
- recommended compusory optional subject: Stochastics
- recommended lecture: Materials flow in logistic systems (also parallel)

Workload:

regular attendance: 42 hours
self-study: 198 hours

Literature

Ronald W. Wolff (1989) Stochastic Modeling and the Theory of Queues, Englewood Cliffs, NJ : Prentice-Hall.

John A. Buzacott, J. George Shanthikumar (1993) Stochastic Models of Manufacturing Systems, Upper Saddle River, NJ : Prentice Hall.

T   7.220 Course: Mathematics for High Dimensional Statistics [T-WIWI-111247]

Responsible:	Prof. Dr. Oliver Grothe
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-101637 - Analytics and Statistics
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Irregular	1

Competence Certificate

The assessment consists of an oral exam (30 min.) taking place in the recess period.

Prerequisites

None

Recommendation

Basic knowledge of mathematics and statistics is assumed.
Knowledge in multivariate statistics is an advantage, but not necessary for the course.

T 7.221 Course: Membrane Technologies in Water Treatment [T-CIWVT-110865]

Responsible:	Prof. Dr. Harald Horn
	Dr.-Ing. Florencia Saravia
Organisation:	KIT Department of Chemical and Process Engineering
Part of:	M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	2

Events					
ST 2022	22605	Membrane Technologies in Water Treatment	2 SWS	Lecture / 🗣	Horn, Saravia
ST 2022	22606	Practical in Membrane Technologies in Water Treatment	1 SWS	Practice / 🗣	Horn, Saravia, und Mitarbeiter
Exams					
WT 21/22	7232605	Membrane Technologies in Water Treatment			Horn, Saravia
ST 2022	7232605	Membrane Technologies in Water Treatment			Horn, Saravia

Legend: 📱 Online, ⚇ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Learning control is an written examination with a duration of 90 minutes (SPO section 4 subsection 2).

Prerequisites
The attendance at the excursions is examination prerequisite.

T 7.222 Course: Metal Forming [T-MACH-105177]

Responsible: Dr.-Ing. Thomas Herlan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2022	2150681	Metal Forming	2 SWS	Lecture / ⚙	Herlan
Exams					
ST 2022	76-T-MACH-105177	Metal Forming			Herlan

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Metal Forming** 2150681, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content

At the beginning of the lecture the basics of metal forming are briefly introduced. The focus of the lecture is on massive forming (forging, extrusion, rolling) and sheet forming (car body forming, deep drawing, stretch drawing). This includes the systematic treatment of the appropriate metal forming Machines and the corresponding tool technology. Aspects of tribology, as well as basics in material science and aspects of production planning are also discussed briefly. The plastic theory is presented to the extent necessary in order to present the numerical simulation method and the FEM computation of forming processes or tool design. The lecture will be completed by product samples from the forming technology.

The topics are as follows:

- Introduction and basics
- Hot forming
- Metal forming machines
- Tools
- Metallographic fundamentals
- Plastic theory
- Tribology
- Sheet forming
- Extrusion
- Numerical simulation

Learning Outcomes:

The students ...

- are able to reflect the basics, forming processes, tools, Machines and equipment of metal forming in an integrated and systematic way.
- are capable to illustrate the differences between the forming processes, tools, machines and equipment with concrete examples and are qualified to analyze and assess them in terms of their suitability for the particular application.
- are also able to transfer and apply the acquired knowledge to other metal forming problems.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues

Vorlesungstermine freitags, wöchentlich.
Die konkreten Termine werden in der ersten Vorlesung bekannt gegeben und auf der Institutshomepage und ILIAS veröffentlicht.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T 7.223 Course: Methods and Models in Transportation Planning [T-BGU-101797]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	6232701	Berechnungsverfahren und Modelle in der Verkehrsplanung	2 SWS	Lecture / Practice (/ 🗣	Vortisch, Mitarbeiter/innen
Exams					
WT 21/22	8240101797	Methods and Models in Transportation Planning			Vortisch
ST 2022	8240101797	Methods and Models in Transportation Planning			Vortisch

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T   7.224 Course: Methods in Economic Dynamics [T-WIWI-102906]

Responsible:	Prof. Dr. Ingrid Ott
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each summer term	2

Events					
ST 2022	2560240	Methods in Economic Dynamics	1 SWS	Lecture / 🗣	Ott
Exams					
ST 2022	7900108	Methods in Economic Dynamics			Ott

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment.

Prerequisites
None

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

Below you will find excerpts from events related to this course:

V   Methods in Economic Dynamics
2560240, SS 2022, 1 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
The economic exploitation of inventions is an important part of innovation economics. Intellectual property rights such as patents or trademarks play a central role. Within this workshop, the recording, processing and analysis of such intellectual property rights will be deepened, e.g. considering specific technologies. Students will learn how to work with relational databases, the econometric evaluation of recorded data, and methods for visualising them.

Learning objectives:

The student

- learns to query data sources.
- is able to analyse data with statistical methods.
- visualises and interprets data evaluations (e.g. using dashboards or methods of network analysis).

Recommendations:

An interest in working with data, basic knowledge on databases as well as basic knowledge in economics and statistics are advantageous.

Workload:

The total workload for this course is approximately 45 hours.

- Classes: ca. 5 h
- Self-study: ca. 40 h

Assessment:

Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

Organizational issues
Die Blockveranstaltungen am 29.04. und 15.07.2022 finden in Geb. 01.87, 5. OG in Raum 25 statt.

Literature
Relevante Literatur wird in der Vorlesung bekanntgegeben.
(Relevant literature will be announced in the lecture.)

T 7.225 Course: Methods in Innovation Management [T-WIWI-110263]

Responsible:	Dr. Daniel Jeffrey Koch
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar / 🖥	Koch
Exams					
WT 21/22	7900359	Methods in Innovation Management			Weissenberger-Eibl

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessments (§4(2), 3 SPO). The final grade is composed 75% of the grade of the written paper and 25% of the grade of the presentation.

Prerequisites

None.

Recommendation

Prior attendance of the course "Innovation Management: Concepts, Strategies and Methods" is recommended.

Below you will find excerpts from events related to this course:

V Methoden im Innovationsmanagement
2545107, WS 21/22, 2 SWS, Language: German, Open in study portal

Seminar (S)
Online

Content

The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature

Werden in der ersten Veranstaltung bekannt gegeben.

T 7.226 Course: Microactuators [T-MACH-101910]

Responsible: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101292 - Microoptics
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	2142881	Microactuators	2 SWS	Lecture / ⚙	Kohl
Exams					
WT 21/22	76-T-MACH-101910	Microactuators			Kohl
ST 2022	76-T-MACH-101910	Microactuators			Kohl

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌓 On-Site, ✗ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Microactuators
2142881, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
- Basic knowledge in the material science of the actuation principles

- Layout and design optimization

- Fabrication technologies

- Selected developments

- Applications

The lecture includes amongst others the following topics:

- Microelectromechical systems: linear actuators, microrelais, micromotors
- Medical technology and life sciences: Microvalves, micropumps, microfluidic systems
- Microrobotics: Microgrippers, polymer actuators (smart muscle)
- Information technology: Optical switches, mirror systems, read/write heads

Literature
- Folienskript "Mikroaktorik"

- D. Jendritza, Technischer Einsatz Neuer Aktoren: Grundlagen, Werkstoffe, Designregeln und Anwendungsbeispiele, Expert-Verlag, 3. Auflage, 2008

- M. Kohl, Shape Memory Microactuators, M. Kohl, Springer-Verlag Berlin, 2004

- N.TR. Nguyen, S.T. Wereley, Fundamentals and applications of Microfluidics, Artech House, Inc. 2002

- H. Zappe, Fundamentals of Micro-Optics, Cambride University Press 2010

T 7.227 Course: Microbiology for Engineers [T-CIWVT-108871]

Responsible: Prof. Dr. Thomas Schwartz
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	22633	Microbiology for Engineers	2 SWS	Lecture / 🗣	Schwartz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Prerequisites
None

T   7.228 Course: Mixed Integer Programming I [T-WIWI-102719]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
WT 21/22	2550138	Mixed-integer Programming I	2 SWS	Lecture / 🎤	Stein
WT 21/22	2550139	Exercises Mixted Integer Programming I		Practice / 🎤	Stein, Beck, Neumann
ST 2022	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🎤	Stein
Exams					
WT 21/22	7900007_WS2122_HK	Mixed Integer Programming I			Stein
ST 2022	7900014_SS2022_NK	Mixed Integer Programming I			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✖ Cancelled

Competence Certificate

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of *Mixed Integer Programming II* [25140]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from events related to this course:

V	**Mixed-integer Programming I** 2550138, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, and portfolio optimization with limitations on the number of securities. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *linear* optimization problems and is structured as follows:

- Introduction, solvability, and basic concepts
- LP relaxation and error bounds for roundings
- Branch-and-bound method
- Gomory's cutting plane method
- Benders decomposition

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *nonlinear* optimization problems forms the contents of the lecture "Mixed-integer Programming II".

Learning objectives:

The student

- knows and understands the fundamentals of linear mixed integer programming,
- is able to choose, design and apply modern techniques of linear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

V | **Mixed-integer Programming II**
2550140, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)** **On-Site**

Content

Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 7.229 Course: Mixed Integer Programming II [T-WIWI-102720]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2022	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🗣	Stein
ST 2022	2550141	Exercise to Mixed-integer Programming II	1 SWS	Practice / 🗣	Stein, Schwarze
Exams					
ST 2022	7900009_SS2022_HK	Mixed Integer Programming II			Stein

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✖ Cancelled

Competence Certificate

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.
The examination is held in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of *Mixed Integer Programming I* [2550138]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites

None

Recommendation

It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation

The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from events related to this course:

V	**Mixed-integer Programming II**	Lecture (V)
	2550140, SS 2022, 2 SWS, Language: German, Open in study portal	**On-Site**

Content

Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T   7.230 Course: Mobility Services and New Forms of Mobility [T-BGU-103425]

Responsible: PD Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	6232811	Mobilitätsservices und neue Formen der Mobilität	2 SWS	Lecture / Practice (/ 🗣	Kagerbauer
Exams					
WT 21/22	8240103425	Mobility Services and new Forms of Mobility			Kagerbauer
ST 2022	8240103425	Mobility Services and new Forms of Mobility			Kagerbauer

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

Prerequisites
None

Recommendation
None

Annotation
None

T 7.231 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

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540470	Modeling and Analyzing Consumer Behavior with R	2 SWS	Lecture	Knierim
ST 2022	2540471	Übung zu Modeling and Analyzing Consumer Behaviour with R	1 SWS	Practice / 🧩	Knierim, Bartholomeyczik

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations).
As of the summer semester 2022, a bonus for the examination can no longer be achieved. For students who have achieved the bonus in the summer semester 2021, it will be taken into account for the main exam in the summer semester 2022 and the post-exam in the winter semester 2022/23.

Prerequisites
None

Recommendation
None

Annotation
Number of participants limited.

Below you will find excerpts from events related to this course:

V Modeling and Analyzing Consumer Behavior with R
2540470, SS 2022, 2 SWS, Language: German, Open in study portal   **Lecture (V)**

Literature
Field, A., Miles, J., Field, Z., Discovering Statistics Using R, SAGE 2014

Jones, O., Maillardet, R., Robinson, A., Scientific Programming and Simulation Using R, Chapmann & Hall / CRC Press 2009

Venables, W.N., Smith, D.M. and the R Core Team, "An Introduction to R", 2012 (Version 2.15.2), http://cran.r-project.org/doc/manuals/R-intro.pdf

Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)

T 7.232 Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102808 - Digital Service Systems in Industry
	M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 21/22	2550490	Modellieren und OR-Software: Fortgeschrittene Themen	3 SWS	Practical course / 🖥	Pomes, Linner
Exams					
WT 21/22	7900293	Modeling and OR-Software: Advanced Topics			Nickel

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment is a written examination. The examination is held in every semester. The prerequisite can only be obtained in semesters in which the course exercises are offered.

Prerequisites

Prerequisite for admission to the exam is the successful participation in the exercises. This includes the processing and presentation of exercises.

Recommendation

Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

Successful completion of the course *Modeling and OR-Software: Introduction*.

Annotation

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Modellieren und OR-Software: Fortgeschrittene Themen
2550490, WS 21/22, 3 SWS, Language: German, Open in study portal

Practical course (P)
Online

Content

The advanced course is designated for Master students that already attended the introductory course or gained equivalent experience elsewhere, e.g. during a seminar or bachelor thesis. We will work on advanced topics and methods in OR, among others cutting planes, column generation and constraint programming. The Software used for the exercises is IBM ILOG CPLEX Optimization Studio. The associated modelling progamming languages are OPL and ILOG Script.

Organizational issues

die genauen Termine werden auf der Homepage bekannt gegeben

Link zur Bewerbung:http://go.wiwi.kit.edu/OR_Bewerbung

01.09.2021 09:00 - 25.09.2021 23:55

T 7.233 Course: Morphodynamics [T-BGU-101859]

Responsible: Prof. Dr. Mario Jorge Rodrigues Pereira da Franca
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading scale	Version
Oral examination	3	Grade to a third	1

Events					
ST 2022	6222805	Landscape and River Morphology	2 SWS	Lecture / Practice (/ 🗣	Rodrigues Pereira da Franca

Legend: 🖥 Online, 🗘 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
See German version.

Prerequisites
None

T   7.234 Course: Multicriteria Optimization [T-WIWI-111587]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites

None

Recommendation

It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation

The course is offered every second winter semester (starting WiSe 22/23). The curriculum of the next three years is available online (www.ior.kit.edu).

Contents:

Multicriteria optimization deals with optimization problems with multiple objective functions. In practice, the minimization or maximization of several objectives often conflict with each other, such as weight and stability of mechanical components, return and risk of stock portfolios, or cost and duration of transports. Various scalarization approaches allow one to formulate single-objective problems that can be solved using nonlinear or global optimization techniques, and whose optimal points have a reasonable interpretation for the underlying multicriteria problem.

However, some seemingly obvious scalarization approaches suffer from various drawbacks, so that regardless of scalarization approaches, it is necessary to clarify what is meant by the solution of a multicriteria optimization problem in the first place. For such Pareto-optimal points, optimality conditions and solution procedures based on them can be formulated. From the usually non-unique Pareto set, decision makers finally choose an alternative based on their subjective preferences.

The lecture gives a mathematically sound introduction to multicriteria optimization and is structured as follows:

- Introductory examples and terminology
- Solution concepts
- Methods for the determination of the Pareto set
- Selection of Pareto-optimal points under subjective preferences

T   7.235 Course: Multivariate Statistical Methods [T-WIWI-103124]

Responsible:	Prof. Dr. Oliver Grothe
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-101637 - Analytics and Statistics
	M-WIWI-101639 - Econometrics and Statistics II
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2550554	Multivariate Verfahren	2 SWS	Lecture / 🔊	Grothe
ST 2022	2550555	Übung zu Multivariate Verfahren	2 SWS	Practice / 🔊	Kächele

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✖ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Recommendation

The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course "Advanced Statistics". Without this, participation in the course is not advised.

Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

Below you will find excerpts from events related to this course:

V	**Multivariate Verfahren**	Lecture (V)
	2550554, SS 2022, 2 SWS, Open in study portal	**On-Site**

Literature
Skript zur Vorlesung

T   7.236 Course: Nanotechnology for Engineers and Natural Scientists [T-MACH-105180]

Responsible:	Prof. Dr. Martin Dienwiebel apl. Prof. Dr. Hendrik Hölscher Stefan Walheim
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Exams			
WT 21/22	76-T-MACH-105180	Nanotechnology for Engineers and Natural Scientists	Hölscher, Dienwiebel
ST 2022	76-T-MACH-105180	An introduction into Nanotechnology	Hölscher

Competence Certificate
written exam 90 min

Prerequisites

T 7.237 Course: Nanotechnology with Clusterbeams [T-MACH-102080]

Responsible:	Dr. Jürgen Gspann
Organisation:	KIT Department of Mechanical Engineering

Part of:	M-MACH-101293 - Microsystem Technology
	M-MACH-101294 - Nanotechnology

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Competence Certificate
written examination
presence in more that 70% of the lectures
Duration: 1 h

aids: none

Prerequisites

T   7.238 Course: Nanotribology and -Mechanics [T-MACH-102167]

Responsible: Prof. Dr. Martin Dienwiebel
                   apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
               M-MACH-101294 - Nanotechnology

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 4

Events					
WT 21/22	2182712	Nanotribology and -Mechanics	2 SWS	Block / 🗣	Dienwiebel
ST 2022	2182712	Nanotribology and -Mechanics	2 SWS	Lecture / Practice (/ 🗣	Dienwiebel

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
presentation (40%) and colloquium (30 min, 60%)

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics and physics

Below you will find excerpts from events related to this course:

V	**Nanotribology and -Mechanics** 2182712, WS 21/22, 2 SWS, Language: English, Open in study portal	**Block (B) On-Site**

Content
In the summer semester the lecture is offered in German and in the winter semester in English!

Part 1: Fundamentals of nanotribology

- General tribology / nanotechnology
- Forces and dissipation on the nanometer scale
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Carbon-based tribosystems
- Electronic friction
- Nanotribology in liquids
- Atomic abrasion
- nanolubrication

Part 2: Topical papers

The student can

- explain the physical foundations and common models used in the field of nanotribology and nanomechanics
- describe the most important experimental methods in nanotribology
- critically evaluate scientific papers on nanotribological issues with respect to their substantial quality

preliminary knowlegde in mathematics and physics recommended

regular attendance: 22,5 hours
preparation for presentation: 22,5 hours
self-study: 75 hours

presentation (40%) and oral examination (30 min, 60%)
no tools or reference materials

Organizational issues
Anmeldung per Email bis zum 08.10.2021 an den Dozenten: martin.dienwiebel@kit.edu

Literature
Tafelbilder, Folien, Kopien von Artikeln

V	**Nanotribology and -Mechanics**	**Lecture / Practice (VÜ)**
	2182712, SS 2022, 2 SWS, Language: German, Open in study portal	**On-Site**

Content
In the summer semester the lecture is offered in German and in the winter semester in English!

Part 1: Fundamentals of nanotribology

- General tribology / nanotechnology
- Forces and dissipation on the nanometer scale
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Carbon-based tribosystems
- Electronic friction
- Nanotribology in liquids
- Atomic abrasion
- nanolubrication

Part 2: Topical papers

The student can

- explain the physical foundations and common models used in the field of nanotribology and nanomechanics
- describe the most important experimental methods in nanotribology
- critically evaluate scientific papers on nanotribological issues with respect to their substantial quality

preliminary knowlegde in mathematics and physics recommended

regular attendance: 22,5 hours
preparation for presentation: 22,5 hours
self-study: 75 hours

presentation (40%) and oral examination (30 min, 60%)
no tools or reference materials

Organizational issues

Die Vorlesung wird auf Deutsch (SoSe) und auf Englisch (WiSe) angeboten!

Kontakt: martin.dienwiebel@kit.edu

Literature

Edward L. Wolf
Nanophysics and Nanotechnology, Wiley-VCH, 2006

C. Mathew Mate
Tribology on the Small Scale: A Bottom Up Approach to Friction, Lubrication, and Wear (Mesoscopic Physics and Nanotechnology)
1st Edition, Oxford University Press

Tafelbilder, Folien, Kopien von Artikeln

T 7.239 Course: Nature-Inspired Optimization Methods [T-WIWI-102679]

Responsible: PD Dr. Pradyumn Kumar Shukla

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 2

Events					
ST 2022	2511106	Nature-Inspired Optimization Methods	2 SWS	Lecture / 🧩	Shukla
ST 2022	2511107	Übungen zu Nature-Inspired Optimization Methods	1 SWS	Practice / 🧩	Shukla
Exams					
WT 21/22	7900016	Nature-Inspired Optimisation Methods			Shukla
ST 2022	79AIFB_NOM_C1	Nature-Inspired Optimization Methods (Registration until 18 July 2022)			Shukla

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called "bonus exam", 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exersices . The bonus exam may be split into several shorter written tests.

The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam 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 Nature-Inspired Optimization Methods
2511106, SS 2022, 2 SWS, Language: English, Open in study portal
Lecture (V)
Blended (On-Site/Online)

Content

Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

Learning objectives:

Students learn:

- Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization
- Different aspects and limitation of the methods
- Applications of such methods
- Multi-objective optimization methods
- Constraint handling methods
- Different aspects in parallelization and computing platforms

Literature
* E. L. Aarts and J. K. Lenstra: 'Local Search in Combinatorial Optimization'. Wiley, 1997 * D. Corne and M. Dorigo and F. Glover: 'New Ideas in Optimization'. McGraw-Hill, 1999 * C. Reeves: 'Modern Heuristic Techniques for Combinatorial Optimization'. McGraw-Hill, 1995 * Z. Michalewicz, D. B. Fogel: How to solve it: Modern Heuristics. Springer, 1999 * E. Bonabeau, M. Dorigo, G. Theraulaz: 'Swarm Intelligence'. Oxford University Press, 1999 * A. E. Eiben, J. E. Smith: 'Introduction to Evolutionary Computation'. * M. Dorigo, T. Stützle: 'Ant Colony Optimization'. Bradford Book, 2004 Springer, 2003

T   7.240 Course: Non- and Semiparametrics [T-WIWI-103126]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
                    M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

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 7.241 Course: Nonlinear Control Systems [T-ETIT-100980]

Responsible:	Dr.-Ing. Mathias Kluwe
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-ETIT-101157 - Control Engineering II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2303173	Nichtlineare Regelungssysteme	2 SWS	Lecture / 🗣	Kluwe
Exams					
WT 21/22	7303173	Nonlinear Control Systems			Kluwe
ST 2022	7303173	Nonlinear Control Systems			Kluwe

Legend: 📱 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites

| **T** | **7.242 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 4

Events					
WT 21/22	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 21/22	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Beck, Schwarze, Neumann
Exams					
WT 21/22	7900001_WS2122_HK	Nonlinear Optimization I			Stein
ST 2022	7900252_SS2022_NK	Nonlinear Optimization I			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam. The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

Annotation
Part I and II of the lecture are held consecutively in the *same* semester.

Below you will find excerpts from events related to this course:

| **V** | **Nonlinear Optimization I** 2550111, WS 21/22, 2 SWS, Language: German, Open in study portal | **Lecture (V)** **On-Site** |

Content
The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.243 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 Written examination	Credits 9	Grading scale Grade to a third	Recurrence Each winter term	Version 6

Events					
WT 21/22	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🎤	Stein
WT 21/22	2550112	Exercises Nonlinear Optimization I + II		Practice / 🎤	Stein, Beck, Schwarze, Neumann
WT 21/22	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🎤	Stein
Exams					
WT 21/22	7900003_WS2122_HK	Nonlinear Optimization I and II			Stein
ST 2022	7900266_SS2022_NK	Nonlinear Optimization I and II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

Prerequisites

None.

Annotation

Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V	**Nonlinear Optimization I** 2550111, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

V	**Nonlinear Optimization II** 2550113, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.244 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events

WT 21/22	2550112	Exercises Nonlinear Optimization I + II		Practice / 🍃	Stein, Beck, Schwarze, Neumann
WT 21/22	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🍃	Stein

Exams

WT 21/22	7900002_WS2122_HK	Nonlinear Optimization II		Stein
ST 2022	7900258_SS2022_NK	Nonlinear Optimization II		Stein

Legend: 📱 Online, 🌐 Blended (On-Site/Online), 🍃 On-Site, ✗ Cancelled

Competence Certificate

The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites

None.

Annotation

Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization II

2550113, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T   7.245 Course: Novel Actuators and Sensors [T-MACH-102152]

Responsible: Prof. Dr. Manfred Kohl
Dr. Martin Sommer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101293 - Microsystem Technology
M-MACH-101294 - Nanotechnology
M-MACH-101295 - Optoelectronics and Optical Communication

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 3

Events					
WT 21/22	2141865	Novel actuators and sensors	2 SWS	Lecture / ⚝	Kohl, Sommer
Exams					
WT 21/22	76-T-MACH-102152	Novel Actuators and Sensors			Kohl, Sommer

Legend: ▯ Online, ⚝ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

Competence Certificate
written exam, 60 minutes

Prerequisites
none

Below you will find excerpts from events related to this course:

V   Novel actuators and sensors
2141865, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
- Vorlesungsskript "Neue Aktoren" und Folienskript "Sensoren"

- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007

- "Sensors Update", Edited by H.Baltes, W. Göpel, J. Hesse, VCH, 1996, ISBN: 3-527-29432-5

- "Multivariate Datenanalyse – Methodik und Anwendungen in der Chemie", R. Henrion, G. Henrion, Springer 1994, ISBN 3-540-58188-X

T　7.246 Course: Online Concepts for Karlsruhe City Retailers [T-WIWI-111848]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105312 - Marketing and Sales Management

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

Events					
ST 2022	2571184	Online concepts for Karlsruhe city retailers	1 SWS	Others (sons / 🎤	Klarmann, Weber, Pade

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment according (interim presentation and final presentation in teams).

Annotation
Please note that only one of the 1.5 ECTS courses can be counted within the module. This course has a restriction on attendance. The Marketing and Sales Research Group typically allows all students to attend a 1.5 credit course in the corresponding module. Under no circumstances can a guarantee be made that a particular course will be attended. An application is required to attend this course. The application phase usually takes place at the beginning of the lecture period in the summer semester. More information on the application process is usually available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the lecture period in the summer semester.

Below you will find excerpts from events related to this course:

V　Online concepts for Karlsruhe city retailers
2571184, SS 2022, 1 SWS, Language: German, Open in study portal

Others (sonst.)
On-Site

Content
Content
As part of a practical project in cooperation with the city marketing department of KME Karlsruhe Marketing und Event GmbH, students will have the opportunity to directly interact with retailers in Karlsruhe. Challenges of the digitalization of brick-and-mortar retailing will be analyzed and solutions will be developed and implemented.

In a theoretical part at the beginning of the event, students will gain an insight into the theoretical foundations of specific online marketing instruments. In cooperation with Karlsruhe City Marketing, students are taught application-oriented skills in online marketing tools, such as content management systems, social media platforms, search engine optimization or Google Ads campaigns.

In the practical part of the course, student teams cooperate with a real retailer in Karlsruhe's city center and learn how to analyze and optimize online presences and digital solutions based on key performance indicators. Possible use cases range from social media communication and website optimization to the introduction of innovative pricing and payment methods. In this way, students are given the tools for developing, maintaining and optimizing individual websites and digital solutions in stationary retailing.

Learning objectives result accordingly as follows:
- Learning of theoretical basics of central, application-oriented tools of online marketing
- Application and practical deep-dive of the acquired knowledge in a real case
- Concise and structured presentation of results

Total time required for 1.5 credit points: approx. 45.0 hours

Attendance time: 8 hours

Preparation and wrap-up of the course: 29.5 hours

Exam and exam preparation: 7.5 hours

T   7.247 Course: Open Science & Reproducibility [T-WIWI-111394]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105714 - Consumer Research

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

Competence Certificate

Alternative exam assessment. Details will be communicated at the first day of the class.

Annotation

This course introduces the current debates around Open Science and Reproducibility. Since 2011, the social sciences are confronted with the replication crisis. Many study results, for example from psychology and economics, cannot be replicated. This calls into question the validity of research results in these fields. In this course, we discuss possible reasons for this crisis, ranging from the incentive structure in the publication process over questionable research practices to fraud. We will discuss possible solutions that have been developed to improve science such as replication projects, pre-registration, registered reports and open peer review. The students will develop an understanding of current debates and evolve a critical perspective on their own research practices.

The number of participants is limited. The registration will take place via the Wiwi-Portal.

The workload of the class is 4.5 ECTS. This consists of active participation in regular sessions, smaller presentations by the students during the semester, preparation of the literature, and an exam ("Prüfungsleistung anderer Art"). Details will be communicated at the first day of the class.

T   7.248 Course: Operation Methods for Earthmoving [T-BGU-101801]

Responsible:	Dr.-Ing. Heinrich Schlick
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each winter term	1

Events					
WT 21/22	6241905	Erdbau	1 SWS	Lecture / ⟰	Haghsheno, Schwarzweller
Exams					
WT 21/22	8240101801	Operation Methods for Earthmoving			Schneider

Legend: 📱 Online, ⟰ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.249 Course: Operation Methods for Foundation and Marine Construction [T-BGU-101832]

Responsible:	Dr.-Ing. Harald Schneider
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each winter term	1

Events					
WT 21/22	6241904	Tiefbau	1 SWS	Lecture	Haghsheno, Schneider
Exams					
WT 21/22	8240101832	Operation Methods for Foundation and Marine Construction			Schneider

Prerequisites
None

Recommendation
None

Annotation
None

T   7.250 Course: Operations Research in Health Care Management [T-WIWI-102884]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

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 7.251 Course: Operations Research in Supply Chain Management [T-WIWI-102715]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-102805 - Service Operations
	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Exams				
WT 21/22	7900377	Operations Research in Supply Chain Management		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.

T 7.252 Course: Optical Transmitters and Receivers [T-ETIT-100639]

Responsible: Prof. Dr. Wolfgang Freude
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	2

Events					
WT 21/22	2309460	Optical Transmitters and Receivers	2 SWS	Lecture / ⚙	Freude, Bremauer, Fang
WT 21/22	2309461	Tutorial for 2309460 Optical Transmitters and Receivers	2 SWS	Practice / ⚙	Freude, Bremauer, Fang
Exams					
WT 21/22	7309460	Optical Transmitters and Receivers			Freude
ST 2022	7309460	Optical Transmitters and Receivers			Freude

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

Prerequisites

T   7.253 Course: Optical Waveguides and Fibers [T-ETIT-101945]

Responsible: Prof. Dr.-Ing. Christian Koos
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Microoptics
M-MACH-101295 - Optoelectronics and Optical Communication

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2309464	Optical Waveguides and Fibers	2 SWS	Lecture / 🗣	Koos, Bao, Drayß
WT 21/22	2309465	Tutorial for 2309464 Optical Waveguides and Fibers	1 SWS	Practice / 🗣	Koos, Bao, Drayß
Exams					
WT 21/22	7309464	Optical Waveguides and Fibers			Koos
ST 2022	7309464	Optical Waveguides and Fibers			Koos

Legend: 🗍 Online, ⬨ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites

T   7.254 Course: Optimization Models and Applications [T-WIWI-110162]

Responsible:	Dr. Nathan Sudermann-Merx
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate

The examination will take place for the last time in the winter semester 2020/2021.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

The prerequisite for participation in the exam is the achievement of a minimum number of points in delivery sheets. Details will be announced at the beginning of the course.

Prerequisites

None.

Annotation

The course will take place for the last time in the winter semester 20/21.

| T | **7.255 Course: Optimization under Uncertainty [T-WIWI-106545]** |

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

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 | **7.256 Course: Optoelectronic Components [T-ETIT-101907]** |

Responsible: Prof. Dr. Wolfgang Freude
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2309486	Optoelectronic Components	2 SWS	Lecture / 👤	Freude
ST 2022	2309487	Optoelectronic Components (Tutorial)	1 SWS	Practice / 👤	Freude
Exams					
WT 21/22	7309486	Optoelectronic Components			Freude
ST 2022	7309486	Optoelectronic Components			Freude

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Prerequisites

T 7.257 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	2520320	Panel Data	2 SWS	Lecture	Heller
ST 2022	2520321	Übungen zu Paneldaten	2 SWS	Practice	Heller

Prerequisites

None

Below you will find excerpts from events related to this course:

V Panel Data
2520320, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Content:

Fixed-Effects-Models, Random-Effects-Models, Time-Demeaning

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Exam preparation: 40 hours

Literature

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. Cambridge and London: MIT Press.

Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach* (5th ed.). Mason, Ohio: South-Western Cengage Learning.

T 7.258 Course: Parametric Optimization [T-WIWI-102855]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Competence Certificate

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites

None

Recommendation

It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation

The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 7.259 Course: Personalization and Services [T-WIWI-102848]

Responsible:	Andreas Sonnenbichler
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101410 - Business & Service Engineering
	M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate

The exam is currently not offered.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites

None

Recommendation

None

Annotation

The course is currently not offered.

T   7.260 Course: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T   7.261 Course: PH APL-ING-TL02 [T-WIWI-106292]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 7.262 Course: PH APL-ING-TL03 [T-WIWI-106293]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T   7.263 Course: PH APL-ING-TL04 ub [T-WIWI-106294]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T   7.264 Course: PH APL-ING-TL05 ub [T-WIWI-106295]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 7.265 Course: PH APL-ING-TL06 ub [T-WIWI-106296]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 7.265 Course: PH APL-ING-TL06 ub [T-WIWI-106296]

T   7.266 Course: PH APL-ING-TL07 [T-WIWI-108384]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T   7.267 Course: Physics for Engineers [T-MACH-100530]

Responsible:	Prof. Dr. Martin Dienwiebel
	Prof. Dr. Peter Gumbsch
	apl. Prof. Dr. Alexander Nesterov-Müller
	Dr. Daniel Weygand
Organisation:	KIT Department of Mechanical Engineering

Part of:	M-MACH-101291 - Microfabrication
	M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2022	2142890	Physics for Engineers	4 SWS	Lecture / Practice (/ 🗣	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch
Exams					
WT 21/22	76-T-MACH-100530	Physics for Engineers			Gumbsch, Dienwiebel, Nesterov-Müller, Weygand
ST 2022	76-T-MACH-100530	Physics for Engineers			Gumbsch, Weygand, Nesterov-Müller, Dienwiebel

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
written exam 90 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Physics for Engineers** 2142890, SS 2022, 4 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **On-Site**

Content

1) Foundations of solid state physics

- Wave particle dualism
- Tunnelling
- Schrödinger equation
- H-atom

2) Electrical conductivity of solids

- solid state: periodic potentials
- Pauli Principle
- band structure
- metals, semiconductors and isolators
- p-n junction / diode

3) Optics

- quantum mechanical principles of the laser
- linear optics
- non-linear optics

Exercises are used for complementing and deepening the contents of the lecture as well as for answering more extensive questions raised by the students and for testing progress in learning of the topics.

The student

- has the basic understanding of the physical foundations to explain the relationship between the quantum mechanical principles and the optical as well as electrical properties of materials
- can describe the fundamental experiments, which allow the illustration of these principles

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises)
self-study: 105 hours

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Organizational issues
Kontakt: daniel.weygand@kit.edu

Literature

- Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
- Haken und Wolf: Atom- und Quantenphysik. Einführung in die experimentellen und theoretischen Grundlagen, 7. Aufl., Springer, 2000
- Harris, Moderne Physik, Pearson Verlag, 2013

T   7.268 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 Written examination	**Credits** 5,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 21/22	2581952	Planning and Management of Industrial Plants	2 SWS	Lecture / 🖥	Glöser-Chahoud, Schultmann
WT 21/22	2581953	Übungen Anlagenwirtschaft	2 SWS	Practice / 🖥	Heck, Heinzmann, Glöser-Chahoud
Exams					
WT 21/22	7981952	Planning and Management of Industrial Plants			Schultmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V   Planning and Management of Industrial Plants
2581952, WS 21/22, 2 SWS, Language: German, Open in study portal
       Lecture (V)
Online

Content
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.

During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.269 Course: PLM for Product Development in Mechatronics [T-MACH-102181]

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

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
WT 21/22	2122376	PLM for product development in mechatronics	2 SWS	Lecture / 👤	Eigner
ST 2022	2122376	PLM for product development in mechatronics		Lecture / 👤	Eigner
Exams					
WT 21/22	76-T-MACH-102181	PLM for Product Development in Mechatronics			Eigner
ST 2022	76-T-MACH-102181	PLM for Product Development in Mechatronics			Eigner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
Oral examination 20 min.

Prerequisites
none

Below you will find excerpts from events related to this course:

V	PLM for product development in mechatronics	Lecture (V)
	2122376, WS 21/22, 2 SWS, Language: German, Open in study portal	On-Site

Content
Students are able to

- compare product data management and product lifecycle management.
- describe the components and core functions of a PLM solution
- explain trends from research and practice in the field of PLM form mechatronic product development

Organizational issues
Blockveranstaltung, Zeit und Ort siehe Homepage oder ILIAS zur Lehrveranstaltung.

Literature
Vorlesungsfolien / lecture slides

V	PLM for product development in mechatronics	Lecture (V)
	2122376, SS 2022, SWS, Language: German, Open in study portal	On-Site

Content
Students are able to

- compare product data management and product lifecycle management.
- describe the components and core functions of a PLM solution
- explain trends from research and practice in the field of PLM form mechatronic product development

Organizational issues
Blockveranstaltung, Teilnehmerzahl begrenzt.

Literature
Vorlesungsfolien / lecture slides

T 7.270 Course: Plug-and-Play Material Handling [T-MACH-106693]

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

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each winter term	2

Events					
WT 21/22	2117070	Plug-and-play material handling	2 SWS	Practical course / ⚙	Furmans, Müller, Enke
Exams					
WT 21/22	76-T-MACH-106693	Plug-and-play material handling			Furmans

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

Presentation of the four steps of the course content (design, implementation, test concept and evaluation)

Prerequisites

None

Below you will find excerpts from events related to this course:

V Plug-and-play material handling
2117070, WS 21/22, 2 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content

- Theoretical basics and structure of plug-and-play-capable material handling technology
- Practical application of the contents in teamwork using various industry-related hardware components
- Development of a heterogeneous integrated mechatronic system
- Planning and implementation of a control system using the software framework ROS and the programming language Python
- Use of a simulation environment for development and transition from simulation to real hardware
- Use of different sensor systems
- Presentation of the work results and evaluation of these on the basis of logistical key figures

The students will be able to:

- Name and explain the basics of plug-and-play conveyor technology
- Expand their knowledge of plug-and-play conveyor technology through independent research
- Apply the theory they have learned to a practical problem
- Deal with the software framework ROS (Robot Operating System)
- Evaluate developed solutions on the basis of logistical key figures

Organizational issues

Die Teilnehmerzahl ist beschränkt. Die Auswahl erfolgt nach einem Auswahlverfahren.

Um sich für die Teilnahme zu bewerben stellen Sie bitte einen aufnahmeantrag für den aktuellen Ilias-Kurs mit einem kurzen Bewerbungstext. Dieser sollte ihre bisherigen Erfahrungen sowie ihre Motivation für das Praktikum behinhalten.

Das Praktikum findet zwei Wochen in Vollzeit statt. Der genaue Zeitraum wird Anfang Frühjahr 2022 auf der Institutswebsite bekanntgegeben.

Ob die Veranstaltung online stattfinden wird oder eine Durchführung in Präsenz möglich ist, wird mit Veröffentlichung des Veranstaltungszeitraums bekannt gegeben.

T 7.271 Course: Polymers in MEMS A: Chemistry, Synthesis and Applications [T-MACH-102192]

Responsible:	Dr.-Ing. Bastian Rapp
Organisation:	KIT Department of Mechanical Engineering

Part of:	M-MACH-101291 - Microfabrication
	M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2141853	Polymers in MEMS A: Chemistry, Synthesis and Applications	2 SWS	/ ⚙	Worgull
Exams					
WT 21/22	76-T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications			Rapp, Worgull

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Polymers in MEMS A: Chemistry, Synthesis and Applications** 2141853, WS 21/22, 2 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

Organizational issues
Findet als Blockveranstaltung am Semesterende statt.

T 7.272 Course: Polymers in MEMS B: Physics, Microstructuring and Applications [T-MACH-102191]

Responsible: Dr.-Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2141854	Polymers in MEMS B: Physics, Microstructuring and Applications	2 SWS	Lecture / 🧩	Worgull
Exams					
WT 21/22	76-T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications		Worgull	

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Polymers in MEMS B: Physics, Microstructuring and Applications**
2141854, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

T	**7.273 Course: Polymers in MEMS C: Biopolymers and Bioplastics [T-MACH-102200]**

Responsible:	Dr.-Ing. Bastian Rapp
	Dr.-Ing. Matthias Worgull
Organisation:	KIT Department of Mechanical Engineering

Part of:	M-MACH-101291 - Microfabrication
	M-MACH-101293 - Microsystem Technology

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	2142855	Polymers in MEMS C - Biopolymers and Bioplastics	2 SWS	/ ♻	Worgull
Exams					
WT 21/22	76-T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics			Worgull, Rapp

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Polymers in MEMS C - Biopolymers and Bioplastics**	
	2142855, SS 2022, 2 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

Content

Polymers are ubiquitous in everyday life: from packaging materials all the way to specialty products in medicine and medical engineering. Today it is difficult to find a product which does not (at least in parts) consist of polymeric materials. The question of how these materials can be improved with respect to their disposal and consumption of (natural) resources during manufacturing is often raised. Today polymers must be fully recycled in Germany and many other countries due to the fact that they do not (or only very slowly) decompose in nature. Furthermore significant reductions of crude oil consumption during synthesis are of increasing importance in order to improve the sustainability of this class of materials. With respect to disposal polymers which do not have to be disposed by combustion but rather allow natural decomposition (composting) are of increasing interest. Polymers from renewable sources are also of interest for modern microelectromechanical systems (MEMS) especially if the systems designed are intended as single-use products.

This lecture will introduce the most important classes of these so-called biopolymers and bioplastics. It will also discuss and highlight polymers which are created from naturally created analogues (e.g. via fermentation) to petrochemical polymer precursors and describe their technical processing. Numerous examples from MEMS as well as everyday life will be given.

Some of the topics covered are:

- What are biopolyurethanes and how can you produce them from castor oil?
- What are "natural glues" and how are they different from chemical glues?
- How do you make tires from natural rubbers?
- What are the two most important polymers for life on earth?
- How can you make polymers from potatoes?
- Can wood be formed by injection molding?
- How do you make buttons from milk?
- Can you play music on biopolymers?
- Where and how do you use polymers for tissue engineering?
- How can you built LEGO with DNA?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

Organizational issues

Für weitere Rückfragen, wenden Sie sich bitte an PD Dr.-Ing- Matthias Worgull (matthias.worgull@kit.edu). Eine Voranmeldung ist nicht notwendig.

Literature

Zusätzliche vorlesungsbegleitende Literatur ist nicht notwendig.

T 7.274 Course: Portfolio and Asset Liability Management [T-WIWI-103128]

Responsible:	Dr. Mher Safarian
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2520357	Portfolio and Asset Liability Management	2 SWS	Lecture	Safarian
ST 2022	2520358	Übungen zu Portfolio and Asset Liability Management	2 SWS	Practice	Safarian

Competence Certificate
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Portfolio and Asset Liability Management
2520357, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Learning objectives:

Knowledge of various portfolio management techniques in the financial industry.

Content:

Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Exam preparation: 40 hours

Organizational issues
Blockveranstaltung, Termine werden über Ilias bekanntgegeben

Literature
To be announced in the lecture

T 7.275 Course: Power Transmission and Power Network Control [T-ETIT-101941]

Responsible: Prof. Dr.-Ing. Thomas Leibfried
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101164 - Generation and Transmission of Renewable Power

Type Written examination	Credits 5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	2307372	Power Transmission and Power Network Control	2 SWS	Lecture / 🗣	Leibfried
ST 2022	2307374	Übungen zu 2307372 Energieübertragung und Netzregelung	1 SWS	Practice / 🗣	Präger
Exams					
WT 21/22	7307372	Power Transmission and Power Network Control			Leibfried
ST 2022	7307372	Power Transmission and Power Network Control			Leibfried

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites

T   7.276 Course: Practical Course Polymers in MEMS [T-MACH-105556]

Responsible:	Dr.-Ing. Bastian Rapp
	Dr.-Ing. Matthias Worgull
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	3	pass/fail	Each summer term	1

Events					
ST 2022	2142856	Practical Course Polymers in MEMS	2 SWS	Block / ⚙	Worgull

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The practical course will close with an oral examination.There will be only passed and failed results, no grades.

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Practical Course Polymers in MEMS** 2142856, SS 2022, 2 SWS, Language: German, Open in study portal	**Block (B)** **Blended (On-Site/Online)**

Content
This practical course complements the lectures "Polymers in MEMS A", "Polymers in MEMS B" and "Polymers in MEMS C" and will allow students to gain a deeper understanding of polymers and their processing. During the course of this practical course, various polymers will be synthesized and molded into components suitable for microelectromechanical systems (MEMS) applications. The aim of the course is to bring a polymer all the way from synthesis to application.

The practical course will be given in German language unless non-German speaking students attend. In this case, the course will be given in English (with some German translations of technical vocabulary). Lecture notes for the experiments are in English language and will be handed out to the students. The practical course will be held "en block" at the end of the semester (presumably beginning of October)

For further details, please contact PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is mandatory. The number of participants is limited to 5 students.

Organizational issues
Anmeldung und Terminabsprache in der Vorlesung (2142855)

Für weitere Rückfragen, wenden Sie sich bitte an PD Dr.-Ing- Matthias Worgull (matthias.worgull@kit.edu). Eine Voranmeldung ist notwendig. Die Platzanzahl ist auf 5 Teilnehmer beschränkt.

Literature
Vorlesungsunterlagen, dort empfohlene Literatur

T 7.277 Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

Responsible:	Prof. Dr. Alexander Mädche
	Prof. Dr. Gerhard Satzger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102808 - Digital Service Systems in Industry

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

Events					
WT 21/22	2540554	Practical Seminar: Information Systems & Service Design	3 SWS	Lecture / ⚙	Mädche
ST 2022	2540554	Practical Seminar: Information Systems & Service Design (Master)	3 SWS	Lecture / ⚙	Mädche
Exams					
ST 2022	7900262	Practical Seminar: Information Systems and Service Design / Seminarpraktikum: Information Systems und Service Design			Mädche

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

The assessment 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, WS 21/22, 3 SWS, Language: English, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

V	**Practical Seminar: Information Systems & Service Design (Master)** 2540554, SS 2022, 3 SWS, Language: English, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content

In this practical seminar, students get an individual assignment and develop a running software prototype. Beside the software prototype, the students also deliver a written documentation.

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

T   7.278 Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

Responsible:	Prof. Dr. Alexander Mädche
	Prof. Dr. Gerhard Satzger
	Prof.Dr. Thomas Setzer
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-103117 - Data Science: Data-Driven Information Systems

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

Exams			
WT 21/22	7900211	Practical Seminar: Data-Driven Information Systems	Weinhardt

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   7.279 Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
WT 21/22	2500008	Practical seminar: Health Care Management	3 SWS	Practical course / 🎤	Nickel, Mitarbeiter
ST 2022	2550498	Practical seminar: Health Care Management	3 SWS	Practical course / ⚙	Nickel, Mitarbeiter
Exams					
WT 21/22	7900105	Practical Seminar: Health Care Management (with Case Studies)			Nickel

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Due to a research semester of Professor Nickel in WS 19/20, the courses *Location Planning and Strategic SCM* and *Practice Seminar: Health Care Management* do NOT take place in WS 19/20. Please also refer to the information at https://dol.ior.kit.edu/Lehrveranstaltungen.php for further details.

The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

Prerequisites

None.

Recommendation

Basic knowledge as conveyed in the module *Introduction toOperations Research* is assumed.

Annotation

The credits have been reduced to 4,5 starting summer term 2016.

The lecture is offered every term.

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

T   7.280 Course: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]

Responsible:	Prof. Dr. Alexander Mädche
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102806 - Service Innovation, Design & Engineering
	M-WIWI-104068 - Information Systems in Organizations
	M-WIWI-104080 - Designing Interactive Information Systems

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Examination of another type	4,5	Grade to a third	Each term	2

Events					
ST 2022	2540554	Practical Seminar: Information Systems & Service Design (Master)	3 SWS	Lecture / ✿	Mädche
Exams					
WT 21/22	7900341	Practical Seminar: Information Systems and Service Design			Mädche
ST 2022	7900262	Practical Seminar: Information Systems and Service Design / Seminarpraktikum: Information Systems und Service Design			Mädche

Legend: 📱 Online, ✿ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

Prerequisites

None.

Recommendation

Attending the course „Digital Service Design" is recommended, but not mandatory.

Annotation

The course is held in English.

Below you will find excerpts from events related to this course:

V   Practical Seminar: Information Systems & Service Design (Master)
2540554, SS 2022, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

In this practical seminar, students get an individual assignment and develop a running software prototype. Beside the software prototype, the students also deliver a written documentation.

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

T 7.281 Course: Practical Seminar: Service Innovation [T-WIWI-110887]

Responsible:	Prof. Dr. Gerhard Satzger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101410 - Business & Service Engineering
	M-WIWI-102806 - Service Innovation, Design & Engineering

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

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 7.282 Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS
M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics
M-MACH-101293 - Microsystem Technology
M-MACH-101294 - Nanotechnology

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
WT 21/22	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
ST 2022	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
ST 2022	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
Exams					
WT 21/22	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology			Last
ST 2022	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology			Last

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam

Prerequisites
none

Below you will find excerpts from events related to this course:

V	Introduction to Microsystem Technology - Practical Course 2143875, WS 21/22, 2 SWS, Language: German, Open in study portal	Practical course (P) On-Site

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V	Introduction to Microsystem Technology - Practical Course 2143877, WS 21/22, 2 SWS, Language: German, Open in study portal	Practical course (P) On-Site

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V	Introduction to Microsystem Technology - Practical Course 2143875, SS 2022, 2 SWS, Language: German, Open in study portal	Practical course (P) On-Site

Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
3. Mikro optics: "LIGA-micro spectrometer"
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
9. Atomic force microscopy
Each student takes part in only five experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Organizational issues
Das Praktikum findet in den Laboren des IMT am CN statt. Treffpunkt: Bau 307, Raum 322.

Teilnahmeanfragen an Frau Nowotny, marie.nowotny@kit.edu

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V	**Introduction to Microsystem Technology - Practical Course** 2143877, SS 2022, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **On-Site**

Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
3. Mikro optics: "LIGA-micro spectrometer"
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
9. Atomic force microscopy
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Organizational issues
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Teilnahmeanfragen an Frau Nowotny, marie.nowotny@kit.edu

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 7.283 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Irregular	Version 1

Events					
ST 2022	2500014	Predictive Mechanism and Market Design	2 SWS	Lecture / 🖥	Reiß
ST 2022	2520403		1 SWS	Practice / 🖥	Reiß

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Annotation
The course is given every second fall term, e.g., WS2017/18, WS2019/20, ...

The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.

T 7.284 Course: Predictive Modeling [T-WIWI-110868]

Responsible:	TT-Prof. Dr. Fabian Krüger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101638 - Econometrics and Statistics I
	M-WIWI-101639 - Econometrics and Statistics II

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

Events					
ST 2022	2521311	Predictive Modeling	2 SWS	Lecture / ✿	Krüger
ST 2022	2521312	Predictive Modeling (Tutorial)	2 SWS	Practice / ✿	Krüger, Koster

Legend: 🗌 Online, ✿ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Examination of another type (open book exam, online).

Prerequisites
None

Below you will find excerpts from events related to this course:

V	Predictive Modeling	Lecture (V)
	2521311, SS 2022, 2 SWS, Language: English, Open in study portal	Blended (On-Site/Online)

Content
Contents

This course presents methods for making and evaluating statistical predictions based on data. We consider various types of predictions (mean, probability, quantile, and full distribution), all of which are practically relevant. In each case, we discuss selected modeling approaches and their implementation using R software. We consider various economic case studies. Furthermore, we present methods for absolute evaluation (assessing whether a given model is compatible with the data) and relative evaluation (comparing the predictive performance of alternative models).

Learning objectives

Students have a good conceptual understanding of statistical prediction methods. They are able to implement these methods using statistical software, and can assess which method is suitable in a given situation.

Prerequisites

Students should know econometrics on the level of the course `Applied Econometrics' [2520020]

Literature

- Elliott, G., und A. Timmermann (Hrsg.): "Handbook of Economic Forecasting", vol. 2A und 2B, 2013.
- Gneiting, T., und M. Katzfuss: "Probabilistic Forecasting", Annual Review of Statistics and Its Application 1, 125-151, 2014.
- Hastie, T., Tibshirani, R., and J. Friedman: "The Elements of Statistical Learning", 2. Ausgabe, Springer, 2009.
- Weitere Literatur wird in der Vorlesung bekanntgegeben.

V	Predictive Modeling (Tutorial)	Practice (Ü)
	2521312, SS 2022, 2 SWS, Language: English, Open in study portal	Blended (On-Site/Online)

T 7.285 Course: Price Management [T-WIWI-105946]

Responsible: Prof. Dr. Andreas Geyer-Schulz
                   Dr Paul Glenn
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2540529	Price Management	2 SWS	Lecture / 🗣	Glenn
ST 2022	2540530	Exercise Price Management	1 SWS	Practice / 🗣	Glenn
Exams					
WT 21/22	7900170	Price Management (Nachklausur SS 2021)			Geyer-Schulz
ST 2022	7900139	Price Management			Geyer-Schulz

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Lecture and exam will not be offered in summer semester 2019. The next examination is in the summer semester 2020.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The lecture is offered for the first time in summer term 2016.

Below you will find excerpts from events related to this course:

V Price Management
2540529, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- H. Simon and M. Fassnacht, *Preismanagement*, vol. 4. Wiesbaden: Springer Gabler, 2016.
- T. T. Nagle, J. E. Hogan, und J. Zalee, *The Strategy and Tactics of Pricing: A guide to growing more profitably*. New Jersey: Prentice Hall, 2010.

T 7.286 Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

Responsible:	Prof. Dr. Martin Klarmann
	Mark Schröder
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each winter term	3

Events					
WT 21/22	2572198	Price Negotiation and Sales Presentations	1 SWS	Block / 🗣	Klarmann, Schröder
Exams					
WT 21/22	7900148	Price Negotiation and Sales Presentations			Klarmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
This alternative exam assessment consists of a presentation with a subsequent discussion totalling 25 minutes. Moreover learning contents are checked by realistic 30-minute price negotiations.

Prerequisites
None

Recommendation
None

Annotation
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless, participation for a specific course can not be guaranteed. For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu). Please note that only one of the courses from the election block can be attended in the module.

Below you will find excerpts from events related to this course:

V Price Negotiation and Sales Presentations
2572198, WS 21/22, 1 SWS, Language: German, Open in study portal

Block (B)
On-Site

Content
At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

Students

- gain a clear impression of the theoretical knowledge about price negotiations and sales presentations
- improve their own negotiation abilities

Non exam assessment (following §4(2), 3 of the examination regulation).

The total workload for this course is approximately 45.0 hours. For further information see German version.

- In order to participate in this course, you need to apply. Applications usually start with the lecture period in the winter term. Detailed information on the application process is provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the 1.5 ECTS courses can be chosen in the module.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

Organizational issues
Blockveranstaltung

T 7.287 Course: Pricing Excellence [T-WIWI-111246]

Responsible:	Dr. Fabian Bill
	Prof. Dr. Martin Klarmann
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105312 - Marketing and Sales Management

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

Events					
ST 2022	2571175	Pricing Excellence	1 SWS	Others (sons / 🎤	Bill

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (team presentation of a case study with a duration of about 25 minutes and a subsequent discussion).

Prerequisites
None.

Annotation
Please note that only one of the courses in the module´s supplementary offering can be counted. This event has a restriction on participation. The Marketing and Sales Research Group typically allows all students to attend a 1.5 credit course in the corresponding module. A guarantee for the attendance of a certain event cannot be given. An application is required for participation in this event. The application phase usually takes place at the beginning of the lecture period in the summer semester. More information on the application process is usually available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the lecture period in the summer semester.

Below you will find excerpts from events related to this course:

V Pricing Excellence
2571175, SS 2022, 1 SWS, Language: English, Open in study portal

Others (sonst.)
On-Site

Content
In a theoretical part at the beginning of the course, students are taught the theoretical foundations of pricing. This includes an introduction to (1) price setting of product prices as well as (2) price setting of customer net prices (development of discount systems). Furthermore, theoretical foundations of price implementation and price monitoring are discussed.

Theoretical contents are applied and presented by teams within a case study format.

The learning objectives are as follows:
- Getting to know the theoretical foundations of price setting
- Getting to know the theoretical foundations of price execution and price monitoring
- Application of the acquired knowledge in a case study format
- Concise and structured presentation of the results

Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation (presentation of a case study with subsequent discussion).

Total time required for 1.5 credit points: approx. 45.0 hours

Attendance time: 15 hours

Preparation and wrap-up of the course: 22.5 hours

Exam and exam preparation: 7.5 hours

Organizational issues
Blockveranstaltung, Raum 115, Geb. 20.21, Termine werden noch bekannt gegeben

T   7.288 Course: Probabilistic Time Series Forecasting Challenge [T-WIWI-111387]

Responsible: TT-Prof. Dr. Fabian Krüger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

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

Events					
WT 21/22	00080	Probabilistic Time Series Forecasting Challenge		Project (P / 📱	Bracher, Koster, Krüger, Lerch, Wolffram
Exams					
WT 21/22	00023	Probabilistic Time Series Forecasting Challenge			Krüger

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment of this course is an alternative exam assessment. In order to pass the course, students are required to submit forecasts for each week of the semester (excluding the Christmas break). At the end of the course, students are required to write a report (10-15 pages) that describes the forecasting methods as well as their performance. This report is the basis for the final course grade.

Prerequisites
The course requires good basic knowledge in statistics and data science as well as knowledge in R, Python, Matlab or similar. Knowledge in time series analysis is helpful but not mandatory.

Below you will find excerpts from events related to this course:

V	**Probabilistic Time Series Forecasting Challenge** 00080, WS 21/22, SWS, Language: English, Open in study portal	Project (PRO) Online

Content
Statistical forecasts are relevant across all fields of society. In this data science project, students make, evaluate and communicate their own statistical forecasts in a real-time setting. We consider probabilistic forecasts that involve a measure of uncertainty in addition to a point forecast. Students are asked to make forecasts of several real-world time series (including energy demand and the DAX stock market index). Historical data on all series are available from public sources that are updated as time proceeds. While the time series differ from each other in important ways, statistical methods can meaningfully be used for prediction in all cases. We focus on quantile forecasts which are useful to measure forecast uncertainty in a relatively simple way.

Organizational issues
Short description

In this data science project, students make and evaluate statistical forecasts in a realistic setup (involving real-time predictions and real-world time series data). In mid October, we'll have a kick-off meeting and several lectures covering relevant background knowledge. During the semester, there will be a weekly meeting in which students and instructors discuss the current state of the forecasting challenge. Details on the logistics (precise dates, online versus offline format) are TBA.

Prerequisites

Students should have a good working knowledge of statistics and data science, including proficiency in a programming language like R, Python, or Matlab. Knowledge of time series analysis is helpful but not strictly required. Motivation and curiosity are particularly important in this new course format that requires regular, active participation over the whole semester.

Examination rules

The project seminar counts for 4.5 credit points (Leistungspunkte). The examination rules are as follows:

- In order to pass the course, students are required to submit forecasts for each week of the semester (excluding the Christmas break). Each week's submission is due on Wednesday, 6 p.m., and covers the seven following days (Thursday to Wednesday).
- At the end of the course, students are required to write a report (10-15 pages) that describes the forecasting methods as well as their performance. This report is the basis for the final course grade.

T 7.289 Course: Process Engineering [T-BGU-101844]

Responsible:	Dr.-Ing. Harald Schneider
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	6241703	Verfahrenstechnik	2 SWS	Lecture / ⚙	Schneider
Exams					
WT 21/22	8240101844	Process Engineering			Schneider

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.290 Course: Process Engineering: Example Food Processing [T-CIWVT-111536]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Version
Oral examination	6	Grade to a third	1

Events					
WT 21/22	22213	Verfahrenstechnische Grundlagen am Beispiel der Lebensmittelverarbeitung (für LmCh, WiWi)	2 SWS	Lecture / 🖥	Gaukel
ST 2022	22214	Vertiefung verfahrenstechnischer Grundlagen am Beispiel Lebensmittel	2 SWS	Lecture / 🗣	Gaukel
Exams					
WT 21/22	7220027	Process Engineering: Example Food Processing			Gaukel
ST 2022	7220027	Process Engineering: Example Food Processing			Gaukel

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

T 7.291 Course: Process Mining [T-WIWI-109799]

Responsible:	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2511204	Process Mining	2 SWS	Lecture / 🗣	Oberweis
ST 2022	2511205	Exercise Process Mining	1 SWS	Practice / 🗣	Oberweis, Schreiber, Schüler, Rybinski
Exams					
WT 21/22	7900033	Process Mining			Oberweis
ST 2022	79AIFB_PM_C2	Process Mining (Registration until 18 July 2022)			Oberweis

Legend: 🗎 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Annotation
Former name (up to winter semester 2018/1019) "Workflow Management".

Below you will find excerpts from events related to this course:

V	**Process Mining**	Lecture (V)
	2511204, SS 2022, 2 SWS, Language: German, Open in study portal	On-Site

Content

The area of process mining covers approaches which aim at deducting new knowledge on the basis of logfiles generated by information systems. Such information systems are e.g., workflow-management-systems which are used for an efficient control of processes in enterprises and organisations. The lecture introduces the foundations of processes and respective modeling and analysis techniques. In the following, the foundations of process mining and the three classical types of approaches - discovery, conformance and enhancement - will be taught. In addition to the theoretical basics, tools, application scenarios in practice and open research questions are covered as well.

Learning objectives:

Students

- understand the concepts and approaches of process mining and know how they are applied,
- create and evaluate business process models,
- analyze static and dynamic properties of workflows,
- apply approaches and tools of process mining.

Recommendations:

Knowledge of course Applied Informatics - Modelling is expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- W. van der Aalst, H. van Kees: Workflow Management: Models, Methods and Systems, Cambridge, The MIT Press, 2002.
- W. van der Aalst: Process Mining: Data Science in Action. Springer, 2016.
- J. Carmona, B. van Dongen, A. Solti, M. Weidlich: Conformance Checking: Relating Processes and Models. Springer, 2018.
- A. Drescher, A. Koschmider, A. Oberweis: Modellierung und Analyse von Geschäftsprozessen: Grundlagen und Übungsaufgaben mit Lösungen. De Gruyter Studium, 2017.
- A. Oberweis: Modellierung und Ausführung von Workflows mit Petri-Netzen. Teubner-Reihe Wirtschaftsinformatik, B.G. Teubner Verlag, 1996.
- R. Peters, M. Nauroth: Process-Mining: Geschäftsprozesse: smart, schnell und einfach, Springer, 2019.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer, 2012.
- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer, 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T   7.292 Course: Product and Innovation Management [T-WIWI-109864]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
                   M-WIWI-101514 - Innovation Economics
                   M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Events					
ST 2022	2571154	Product and Innovation Management	2 SWS	Lecture / 🗣	Klarmann
Exams					
WT 21/22	7900158	Product and Innovation Management			Klarmann
ST 2022	7900024	Product and Innovation Management			Klarmann

Legend: ▯ Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment of success takes place through a written exam with additional aids in the sense of an open book exam. The written exam will either take place in the lecture hall or online, depending on further pandemic developments. Further details will be announced during the lecture.

Prerequisites
None

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

Below you will find excerpts from events related to this course:

V	**Product and Innovation Management** 2571154, SS 2022, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **On-Site**

Content
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

Students

- know the most important terms of the product and innovation concept

- understand the models of product choice behavior (e.g., the Markov model, the Luce model)

- are familiar with the basics of network theory (e.g. the Triadic Closure concept)

- know the central strategic concepts of innovation management (especially the market driving approach, pioneer and successor, Miles/Snow typology, blockbuster strategy)

- master the most important methods and sources of idea generation (e.g. open innovation, lead user method, crowdsourcing, creativity techniques, voice of the customer, innovation games, conjoint analysis, quality function deployment, online toolkits)

- are capable of defining and evaluating new product concepts and know the associated instruments like focus groups, product testing, speculative sales, test market simulation Assessor, electronic micro test market

- have advanced knowledge about market introduction (e.g. adoption and diffusion models Bass, Fourt/Woodlock, Mansfield)

- understand important connections of the innovation process (cluster formation, innovation culture, teams, stage-gate process)

The assessment is carried out (according to §4(2), 3 SPO) in the form of a written open book exam.

Total effort for 3 credit points: approx. 90 hours

Presence time: 30 hours

Preparation and wrap-up of LV: 45.0 hours

Exam and exam preparation: 15.0 hours

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

Organizational issues
Die Veranstaltung findet in Geb. 20.21, Raum 217 statt. Während anstehender Bauarbeiten wird die Veransaltung in Geb. 10.11, Raum 223 verlegt. Dies wird kurzfristig bekanntgegeben.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.293 Course: Product- and Production-Concepts for Modern Automobiles [T-MACH-110318]

Responsible:	Dr. Stefan Kienzle Dr. Dieter Steegmüller
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101284 - Specialization in Production Engineering M-MACH-105455 - Strategic Design of Modern Production Systems

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture / ⚙	Steegmüller, Kienzle
Exams					
WT 21/22	76-T-MACH-110318	Product- and Production-Concepts for modern Automobiles			Steegmüller, Kienzle

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ◆ On-Site, ✗ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
T-MACH-105166 - Materials and Processes for Body Leightweight Construction in the Automotive Industry must not have been started.

Below you will find excerpts from events related to this course:

V	**Product- and Production-Concepts for modern Automobiles** 2149670, WS 21/22, 2 SWS, Language: German, Open in study portal	Lecture (V) Blended (On-Site/Online)

Content

The lecture illuminates the practical challenges of modern automotive engineering. As former leaders of the automotive industry, the lecturers refer to current aspects of automotive product development and production.

The aim is to provide students with an overview of technological trends in the automotive industry. In this context, the course also focuses on changes in requirements due to new vehicle concepts, which may be caused by increased demands for individualisation, digitisation and sustainability. The challenges that arise in this context will be examined from both a production technology and product development perspective and will be illustrated with practical examples thanks to the many years of industrial experience of both lecturers.

The topics covered are:

- General conditions for vehicle and body development
- Integration of new drive technologies
- Functional requirements (crash safety etc.), also for electric vehicles
- Development Process at the Interface Product & Production, CAE/Simulation
- Energy storage and supply infrastructure
- Aluminium and lightweight steel construction
- FRP and hybrid parts
- Battery, fuel cell and electric motor production
- Joining technology in modern car bodies
- Modern factories and production processes, Industry 4.0.

Learning Outcomes:

The students …

- are able to name the presented general conditions of vehicle development and are able to discuss their influences on the final product using practical examples.
- are able to name the various lightweight approaches and identify possible areas of application.
- are able to identify the different production processes for manufacturing lightweight structures and explain their functions.
- are able to perform a process selection based on the methods and their characteristics.

Workload:

regular attendance: 25 hours
self-study: 95 hours

Organizational issues

Termine werden über Ilias bekannt gegeben.

Bei der Vorlesung handelt es sich um eine Blockveranstaltung. Eine Anmeldung über Ilias ist erforderlich.

The lecture is a block course. An application in Ilias is mandatory.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.
Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.294 Course: Production and Logistics Management [T-WIWI-102632]

Responsible:	Dr.-Ing. Simon Glöser-Chahoud
	Prof. Dr. Frank Schultmann
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101412 - Industrial Production III

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581954	Production and Logistics Management	2 SWS	Lecture / 🗣	Schultmann, Glöser-Chahoud
ST 2022	2581955	Production and Logistics Managment	2 SWS	Practice / 🗣	Huster, Treml
Exams					
WT 21/22	7981954	Production and Logistics Management			Schultmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Production and Logistics Management
2581954, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This course covers central tasks and challenges of operative production and logistics management. Students get to know the set-up and mode of planning systems such as production planning and control systems, enterprise resource planning systems and advanced planning systems to cope with the accompanying planning tasks in supply chain management. Methods to solve these tasks from the field of operational research will be explored with respect to manufacturing program planning, material requirement planning, lot size problems and scheduling. Alongside to MRP II (Manufacturing Resources Planning), students will be introduced to integrated supply chain management approaches. Finally, commercially available planning systems will be presented and discussed.

Literature
Wird in der Veranstaltung bekannt gegeben.

T   7.295 Course: Production Technology for E-Mobility [T-MACH-110984]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Dr.-Ing. Janna Ruhland

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	2150605	Production Technology for E-Mobility	2 SWS	Lecture / ⚙	Fleischer
Exams					
WT 21/22	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer
ST 2022	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V   Production Technology for E-Mobility
2150605, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In the lecture Production Engineering for Electromobility the students should be enabled to design, select and develop production processes for the production of the components of an electric drive train (electric motor, battery cells, fuel cells) by using research-oriented teaching.

Learning Outcomes:

The students are able to:

- describe the structure and function of a fuel cell, an electric traction drive and a batterysystem.
- reproduce the process chains for the production of the components fuel cell, battery and electric traction drive.
- apply methodical tools to solve problems along the process chain.
- derive the challenges in the production of electric drives for electric mobility.
- describe the factors influencing the individual process steps on each other using the process chain of Li-ion battery cells.
- enumerate or describe the necessary process parameters to counteract the influencing factors of the process steps in Li-ion battery cell production.
- apply methodical tools to solve problems along the process chain for the production of Li-ion battery cells.
- derive the challenge of mounting and dismounting battery modules.
- derive the challenges in the production of fuel cells for use in mobility.

Workload:

regular attendance: 42 hours
self-study: 78 hours

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

| T | **7.296 Course: Project Development with Case Study [T-BGU-111217]** |

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105597 - Facility Management in Hospitals

Type Oral examination	**Credits** 1,5	**Grading scale** Grade to a third	**Recurrence** Each term	**Expansion** 1 terms	**Version** 1

Events					
WT 21/22	6242904	Projectdevelopment with Case Study	1 SWS	Lecture	Lennerts, Mitarbeiter/innen

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.297 Course: Project Internship Aditive Manufacturing: Development and Production of an Additive Component [T-MACH-110960]

Responsible: Dr.-Ing. Frederik Zanger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

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

Events					
WT 21/22	2149700	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	2 SWS	Practical course / 🧩	Zanger, Lubkowitz

Exams			
WT 21/22	76-T-MACH-110960	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	Zanger

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
Alternative test achievement (graded):

- Milestone based presentation of the results in presentation form (10 min) and submitting of the presentation file with weighting 30%
- Oral exam (15 min) with weighting 40%
- Project work with weighting 30%

Prerequisites
none

Below you will find excerpts from events related to this course:

| V | **Project Internship Aditive Manufacturing: Development and Production of an Additive Component**
2149700, WS 21/22, 2 SWS, Language: German, Open in study portal | **Practical course (P)**
Blended (On-Site/Online) |
|---|---|---|

Content

The lecture "Project Internship Additive Manufacturing: Development and Production of an Additive Component" combines the basics of metallic laser powder bed fusion (LPBF) with a development project in cooperation with an industrial company.
The students learn the basics of the following topics in the project-related lecture:

- Influence of different process variables on the component quality of parts produced in the LPBF process
- Preparation and simulation of the LPBF process
- Production of additive metallic components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- CAM for subtractive rewor

The topics addressed in the course will be applied practically in various workshops on the individual topics and transferred to the developmental task in self-study.
Finally, the results of the elaborations are produced additively and post-processed subtractively.

Learning Outcomes:

The students …

- are able to describe the properties and applications of the additive manufacturing processes laser powder bed fusion (LPBF) and lithography assisted ceramic manufacturing (LCM).
- are able to select the appropriate manufacturing process for a technical application.
- are able to describe and implement the creation of a product along the entire additive process chain (CAD, simulation, work preparation, CAM) from the idea to the production.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- are able to perform topology optimization.
- are able to simulate the additive process, compensate for process-related distortions and determine the ideal alignment on the building platform.
- are able to create necessary support structures for the additive process and to derive a building order file.
- are able to create a CAM model for the subtractive rework process of additive parts.

Workload:

regular attendance: 12 hours
self-study: 108 hours

Organizational issues

Termine werden über Ilias bekannt gegeben.
Bei der Vorlesung handelt es sich um eine Blockveranstaltung.
Eine Anmeldung über Ilias ist erforderlich.

Dates will be announced via Ilias.
The lecture is a block event.
A registration via Ilias is required.

Literature

Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T	**7.298 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-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	2

Events

WT 21/22	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course / 🖥	Zöllner, Daaboul
ST 2022	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar / 🖥	Zöllner

Exams

WT 21/22	7900107	Advanced Lab Cognitive Automobile and Robots (Master)			Zöllner

Legend: 🖥 Online, ⧉ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Practical Course Cognitive automobiles and robots (Master)** 2512501, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V	**Cognitive Automobiles and Robots** 2513500, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Online**

Content

The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

T 7.299 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-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2512500	Project Lab Machine Learning	3 SWS	Practical course / 🧩	Zöllner
Exams					
ST 2022	7900086	Project Lab Machine Learning			Zöllner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Project Lab Machine Learning
2512500, SS 2022, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

T 7.300 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 Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 21/22	2581963	Project Management	2 SWS	Lecture / 🖥	Schultmann, Volk, Rosenberg, Gehring
WT 21/22	2581964	Übung zu Project Management	1 SWS	Practice / 🖥	Volk, Rosenberg, Wehrle, Gehring
Exams					
WT 21/22	7981963	Project Management			Schultmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Project Management
2581963, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management
8. Stakeholder
9. Communication, Negotiation and Leadership
10. Project Controlling
11. Agile Project Management

Literature
Wird in der Veranstaltung bekannt gegeben.

T	**7.301 Course: Project Management in Construction and Real Estate Industry I [T-BGU-103432]**

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
         M-BGU-101888 - Project Management in Construction

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 2

Events					
WT 21/22	6241701	Projektmanagement in der Bau- und Immobilienwirtschaft	4 SWS	Lecture / Practice (	Haghsheno, Hirschberger, Sittinger, Münzl
Exams					
WT 21/22	8240103432	Project Management in Construction and Real Estate Industry I			Haghsheno

Competence Certificate
see German version

Prerequisites
none

Recommendation
none

Annotation

T 7.302 Course: Project Management in Construction and Real Estate Industry II [T-BGU-103433]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 21/22	6241701	Projektmanagement in der Bau- und Immobilienwirtschaft	4 SWS	Lecture / Practice (	Haghsheno, Hirschberger, Sittinger, Münzl
Exams					
WT 21/22	8240103433	Project Management in Construction and Real Estate Industry II			Haghsheno

Competence Certificate
see German version

Prerequisites
Project Management in Construction and Real Estate Industry I (T-BGU-103432) has to be passed.

Recommendation
none

Annotation

T   7.303 Course: Project Paper Lean Construction [T-BGU-101007]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction

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

Events					
WT 21/22	6241901	Lean Construction	4 SWS	Lecture / Practice (	Haghsheno, Mitarbeiter/innen
Exams					
WT 21/22	8246101007	Project paper Lean Construction			Haghsheno

Competence Certificate
project:

report, appr. 10 pages, and
presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation

T   7.304 Course: Project Studies [T-BGU-101847]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
      Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	6243801	Projektstudien	2 SWS	Lecture / Practice (/ 🧩	Haupenthal, Gentes
Exams					
WT 21/22	8240101847	Project Studies			Gentes

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.305 Course: Public Management [T-WIWI-102740]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101504 - Collective Decision Making
	M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2561127	Public Management	3 SWS	Lecture / Practice (/ 📱	Wigger

Exams				
WT 21/22	790puma	Public Management		Wigger
ST 2022	790puma	Public Management		Wigger

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✕ Cancelled

Competence Certificate

Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites

None

Recommendation

Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V	**Public Management**	Lecture / Practice (VÜ)
	2561127, WS 21/22, 3 SWS, Language: German, Open in study portal	Online

Literature
Weiterführende Literatur:

- Damkowski, W. und C. Precht (1995): Public Management; Kohlhammer
- Richter, R. und E.G. Furubotn (2003): Neue Institutionenökonomik; 3. Auflage, Mohr
- Schedler, K. und I. Proeller (2003): New Public Management; 2. Auflage; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2. Auflage; Springer

T 7.306 Course: Public Revenues [T-WIWI-102739]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2560120	Public Revenues	2 SWS	Lecture / 🎤	Wigger
ST 2022	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice / 🎤	Wigger
Exams					
WT 21/22	790oeff	Public Revenues			Wigger
ST 2022	790oeff	Public Revenues			Wigger

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V Public Revenues
2560120, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

Learning goals:
See German version.

Workload:
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Literatur:

- Homburg, S.(2000): *Allgemeine Steuerlehre*, Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4. Aufl., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* und *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2. Aufl., Springer

T 7.307 Course: Quality Management [T-MACH-102107]

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

Part of: M-MACH-101284 - Specialization in Production Engineering
M-MACH-105455 - Strategic Design of Modern Production Systems

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2149667	Quality Management	2 SWS	Lecture / ⚙	Lanza
Exams					
WT 21/22	76-T-MACH-102107	Quality Management			Lanza
ST 2022	76-T-MACH-102107	Quality Management			Lanza

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Quality Management** 2149667, WS 21/22, 2 SWS, Language: German, Open in study portal	Lecture (V) Blended (On-Site/Online)

Content

Based on the quality philosophies Total Quality Management (TQM) and Six Sigma, the lecture deals with the requirements of modern quality management. Within this context, the process concept of a modern enterprise and the process-specific fields of application of quality assurance methods are presented. The lecture covers the current state of the art in preventive and non-preventive quality management methods in addition to manufacturing metrology, statistical methods and service related quality management. The content is completed with the presentation of certification possibilities and legal quality aspects.

Main topics of the lecture:

- The term "Quality"
- Total Quality Management (TQM) and Six Sigma
- Universal methods and tools
- QM during early product stages – product denition
- QM during product development and in procurement
- QM in production – manufacturing metrology
- QM in production – statistical methods
- QM in service
- Quality management systems
- Legal aspects of QM

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 18.10.2021

Vorlesungstermine montags 10:00 Uhr
Übung erfolgt während der Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt:

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T   7.308 Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

Responsible:	Dr. Patrick Plötz
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	2

Events

WT 21/22	2581007	Quantitative Methods in Energy Economics	2 SWS	Lecture / 🗣	Plötz, Dengiz, Yilmaz
WT 21/22	2581008	Übung zu Quantitative Methods in Energy Economics	1 SWS	Practice / 🗣	Plötz, Dengiz, Yilmaz

Exams

WT 21/22	7981007	Quantitative Methods in Energy Economics		Fichtner

Legend: 📱 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) exam (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V   Quantitative Methods in Energy Economics
2581007, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

Learning Goals:

The student

- knows and understands selected quantitative methods of energy economics
- is able to use selected quantitative methods of energy economics
- understands they range of usage, limits and is autonomously able to adress new problems by them.

Literature
Wird in der Vorlesung bekannt gegeben.

T 7.309 Course: Quantum Functional Devices and Semiconductor Technology [T-ETIT-100740]

Responsible:	Prof. Dr.-Ing. Christian Koos
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-MACH-101294 - Nanotechnology
	M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Prerequisites

T 7.310 Course: Rail System Technology [T-MACH-102143]

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

Part of: M-MACH-101274 - Rail System Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	9	Grade to a third	Each term	3

Events					
WT 21/22	2115919	Rail System Technology	2 SWS	Lecture / 👤	Heckele, Gratzfeld
WT 21/22	2115996	Rail Vehicle Technology	2 SWS	Lecture / 👤	Reimann, Gratzfeld
ST 2022	2115919	Rail System Technology	2 SWS	Lecture / 👤	Heckele, Gratzfeld
ST 2022	2115996	Rail Vehicle Technology	2 SWS	Lecture / 👤	Reimann, Gratzfeld
Exams					
WT 21/22	76-T-MACH-102143	Rail System Technology			Heckele, Reimann, Gratzfeld
ST 2022	76-T-MACH-102143	Rail System Technology			Heckele, Reimann, Gratzfeld

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate

Oral examination

Duration: ca. 45 minutes

No tools or reference materials may be used during the exam.

Prerequisites

Below you will find excerpts from events related to this course:

V Rail System Technology
2115919, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V Rail Vehicle Technology
2115996, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V	**Rail System Technology** 2115919, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V	**Rail Vehicle Technology** 2115996, SS 2022, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

T 7.311 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-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
WT 21/22	2540506	Recommender Systems	2 SWS	Lecture / 🖥	Geyer-Schulz
WT 21/22	2540507	Exercise Recommender Systems	1 SWS	Practice / 🖥	Geyer-Schulz, Nazemi
Exams					
WT 21/22	7900149	Recommender Systems (Nachklausur SS 2021)			Geyer-Schulz
WT 21/22	7900310	Recommender Systems (Hauptklausur WS 2021/2022)			Geyer-Schulz
ST 2022	7900138	Recommender Systems			Geyer-Schulz

Legend: 🖥 Online, 🜲 Blended (On-Site/Online), ◖ On-Site, ✗ Cancelled

Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five 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**	Lecture (V)
	2540506, WS 21/22, 2 SWS, Language: German, Open in study portal	Online

Content

At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

Learning objectives:

The student

- is proficient in different statistical, data-mining, and game theory methods of computing implicit and explicit recommendations
- evaluates recommender systems and compares these with related services

Workload:

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Exam:

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: 0

Literature

Rakesh Agrawal, Tomasz Imielinski, and Arun Swami. Mining association rules between sets of items in large databases. In Sushil Jajodia Peter Buneman, editor, Proceedings of the ACM SIGMOD International Conference on Management of Data, volume 22, Washington, D.C., USA, Jun 1993. ACM, ACM Press.

Rakesh Agrawal and Ramakrishnan Srikant. Fast algorithms for mining association rules. In Proceedings of the 20th Very Large Databases Conference, Santiago, Chile, pages 487 – 499, Sep 1994.

Asim Ansari, Skander Essegaier, and Rajeev Kohli. Internet recommendation systems. Journal of Marketing Research, 37:363 – 375, Aug 2000.

Christopher Avery, Paul Resnick, and Richard Zweckhauser. The market for evaluations. American Economic Review, 89(3):564 – 584, 1999.

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Richard O. Duda, Peter E. Hart, and David G. Stork. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.

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T   7.312 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 Oral examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** see Annotations	**Version** 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 7.313 Course: Responsible Artificial Intelligence [T-WIWI-111385]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-103117 - Data Science: Data-Driven Information Systems
	M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

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

Events					
WT 21/22	2545164	Responsible Artificial Intelligence	2 SWS	Lecture	Staudt, Hoffmann
Exams					
WT 21/22	7900300	Responsible Artificial Intelligence			Weinhardt
WT 21/22	7900301	Responsible Artificial Intelligence			Weinhardt

Competence Certificate

The final grade is based on an examination of other type according to § 4 Par. 2 No. 3. It consists of

- The completion of an exercise including a short presentation (15 min)(max. 30 points)
- The completion of a case study including an oral exam (max. 60 points).

Further details are explained during the lecture.

Prerequisites

Readings will be provided to work through before the lecture.

T 7.314 Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

Responsible:	Prof. Dr. Frank Schultmann
	PD 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	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2581992	Risk Management in Industrial Supply Networks	2 SWS	Lecture / 📱	Klein
WT 21/22	2581993	Übung zu Risk Management in Industrial Supply Networks	1 SWS	Practice / 📱	Klein
Exams					
WT 21/22	7981992	Risk Management in Industrial Supply Networks			Schultmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🌐 On-Site, ✘ Cancelled

Competence Certificate

The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites

None

Recommendation

None

Below you will find excerpts from events related to this course:

V Risk Management in Industrial Supply Networks
2581992, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content

Students learn methods and tools to manage risks in complex and dynamically evolving supply chain networks. Students learn the key terms and concepts of risk management and decision theory, in particular expected utility theory. Based on the theoretic prerequisites, students are able to determine and analyze risk diversification, risk pooling, insurance mechanisms and get an overview on statistical risk measures and real options. These approaches are adapted to analyze supply chain risks in a network context. In this manner, students gain knowledge in basic notions of network theory, network metrics and network-strategies for supply chain decisions.

- Introduction
- Risks in decisions under uncertainty: Expected Utility Theory & risk preferences
- The newsvendor model; multivariate risks and insurance
- Risk measures & evaluation techniques: Value-at-Risk, Conditional Value at Risk, Monte Carlo and Real Options
- Transparency in complex supply chains
- Network risk: network basics and criticality
- Risk in supply networks: empirical approaches and insights

Literature

Wird in der Veranstaltung bekannt gegeben.

T   7.315 Course: Roadmapping [T-WIWI-102853]

Responsible:	Dr. Daniel Jeffrey Koch
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101488 - Entrepreneurship (EnTechnon)
	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	2545102	Roadmapping	2 SWS	Seminar / 🗣	Koch
Exams					
ST 2022	7900055	Roadmapping			Weissenberger-Eibl

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Competence Certificate
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.

Below you will find excerpts from events related to this course:

V   Roadmapping
2545102, SS 2022, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
Technology Assessment can play a role at different points in the innovation process and can be considered as decision support for or against certain technological options. The seminar Technology Assessment will focus on the early phase "fuzzy front end" in innovation management. The technology assessment will take place here under a high degree of uncertainty regarding future technological developments. The evaluation of technologies can be done with methods such as Technology Readiness, Technology Lifecycle Analysis, Portfolio Analysis, etc.. The early evaluation of technologies is particularly important against the background of limited resources in companies and uncertainty about future developments.

T 7.316 Course: Safety Engineering [T-MACH-105171]

Responsible:	Hans-Peter Kany
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101278 - Material Flow in Networked Logistic Systems
	M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	2

Events						
WT 21/22	2117061	Safety Engineering	2 SWS	Lecture / 🗣		Kany
Exams						
WT 21/22	7600001	Safety Engineering				Kany

Legend: 📱 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Safety Engineering
2117061, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Media
Presentations

Learning content
The course provides basic knowledge of safety engineering. In particular the basics of health at the working place, job safety in Germany, national and European safety rules and the basics of safe machine design are covered. The implementation of these aspects will be illustrated by examples of material handling and storage technology. This course focuses on: basics of safety at work, safety regulations, basic safety principles of machine design, protection devices, system security with risk analysis, electronics in safety engineering, safety engineering for storage and material handling technique, electrical dangers and ergonomics. So, mainly, the technical measures of risk reduction in specific technical circumstances are covered.

Learning goals
The students are able to:

- Name and describe relevant safety concepts of safety engineering,
- Discuss basics of health at work and labour protection in Germany,
- Evaluate the basics for the safe methods of design of machinery with the national and European safety regulations and
- Realize these objectives by using examples in the field of storage and material handling systems.

Recommendations
None

Workload
Regular attendance: 21 hours
Self-study: 99 hours

Organizational issues
Termine: siehe ILIAS. Erste Vorlesung 5.November 2021.

Literature
Defren/Wickert: Sicherheit für den Maschinen- und Anlagenbau, Druckerei und
Verlag: H. von Ameln, Ratingen

T 7.317 Course: Selected Applications of Technical Logistics [T-MACH-102160]

Responsible: Viktor Milushev
                     Dr.-Ing. Martin Mittwollen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Exams			
WT 21/22	76-T-MACH-102160	Selected Applications of Technical Logistics	Mittwollen

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge out of Basics of Technical Logistics I (T-MACH-109919) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned.

| T | **7.318 Course: Selected Applications of Technical Logistics - Project [T-MACH-108945]** |

Responsible: Viktor Milushev
                   Dr.-Ing. Martin Mittwollen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	2	Grade to a third	Each summer term	1

Competence Certificate
presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation

Prerequisites
T-MACH-102160 (selected applications of technical logistics) must have been started

Recommendation
Knowledge out of Basics of Technical Logistics I (T-MACH-109919) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned.

T   7.319 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-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
WT 21/22	2513401	Seminar Selected Issues in Critical Information Infrastructures (Master)		Seminar	Sunyaev, Lins
ST 2022	2512403	Advanced Lab Blockchain Hackathon (Master)		Practical course / 🖥	Sunyaev, Beyene, Kannengießer
ST 2022	2513401	Seminar Selected Issues in Critical Information Infrastructures (Master)		Seminar / 🖥	Sunyaev, Lins
Exams					
WT 21/22	7900094	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev
ST 2022	7900030	Lab Coding da Vinci - Cultural Heritage Hackathon (Master)			Sack
ST 2022	7900031	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 📍 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO). Details will be announced in the respective course.

Prerequisites

None.

Annotation

T-WIWI-109251 "Selected Issues in Critical Information Infrastructures" serves to credit an extracurricular course in the module "Critical Digital Infrastructures".

T   7.320 Course: Selected Legal Issues of Internet Law [T-INFO-108462]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	24821	Selected legal issues of Internet law	2 SWS	Colloquium (K / 🗣	Dreier
Exams					
ST 2022	7500099	Selected Legal Issues of Internet Law			Dreier, Matz

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

T 7.321 Course: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

Responsible:	Dr. Mathias Heckele
	Dr.-Ing. Timo Mappes
Organisation:	KIT Department of Mechanical Engineering

Part of:	M-MACH-101290 - BioMEMS
	M-MACH-101292 - Microoptics
	M-MACH-101293 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Competence Certificate
Oral examination

Prerequisites

T 7.322 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-111439]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	2	Grade to a third	2

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.323 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-111440]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	2

Self service assignment of supplementary stdues

This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation

Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.324 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-111438]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	1	Grade to a third	2

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.325 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-111442]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	2	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.326 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-111441]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	1	pass/fail	1

Self service assignment of supplementary stdues

This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation

Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T   7.327 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-111443]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	3	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.328 Course: Semantic Web Technologies [T-WIWI-110848]

Responsible: Dr. Tobias Christof Käfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2022	2511310	Semantic Web Technologies	2 SWS	Lecture / 🎤	Färber, Käfer, Braun
ST 2022	2511311	Exercises to Semantic Web Technologies	1 SWS	Practice / 📱	Färber, Käfer
Exams					
WT 21/22	7900022	Semantic Web Technologies			Käfer
ST 2022	79AIFB_SWebT_A4	Semantic Web Technologies (Registration until 18 July 2022)			Färber

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendation
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required.

Below you will find excerpts from events related to this course:

V	**Semantic Web Technologies** 2511310, SS 2022, 2 SWS, Language: English, Open in study portal	Lecture (V) On-Site

Content

The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals

Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

V	**Exercises to Semantic Web Technologies** 2511311, SS 2022, 1 SWS, Language: English, Open in study portal	**Practice (Ü)** **Online**

Content

The exercises are related to the lecture Semantic Web Technologies.

Multiple exercises are held that capture the topics, held in the lecture Semantic Web Technologies, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Organizational issues

Die Übungen finden im Rahmen der Termine der Blockvorlesung statt.

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

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- 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   7.329 Course: Seminar Data-Mining in Production [T-MACH-108737]

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

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 21/22	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🧩	Lanza
ST 2022	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🧩	Lanza
Exams					
WT 21/22	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza
ST 2022	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Annotation
The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Below you will find excerpts from events related to this course:

V	**Seminar Data Mining in Production** 2151643, WS 21/22, 2 SWS, Language: German, Open in study portal	Seminar (S) Blended (On-Site/Online)

Content

In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

Learning Outcomes:

The students ...

- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues

Die Teilnehmerzahl ist auf zwölf Studierende begrenzt. Termine und Fristen zur Veranstaltung werden unter https://www.wbk.kit.edu/studium-und-lehre.php bekanntgegeben.

The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

V	**Seminar Data Mining in Production** 2151643, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

Learning Outcomes:

The students ...

- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues

Die Teilnehmerzahl ist auf zwölf Studierende begrenzt. Termine und Fristen zur Veranstaltung werden unter https://www.wbk.kit.edu/studium-und-lehre.php bekanntgegeben.

The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

| T | **7.330 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-101808 - Seminar Module

| **Type**
Examination of another type | **Credits**
3 | **Grading scale**
Grade to a third | **Recurrence**
Each term | **Version**
1 |

Events					
WT 21/22	2500019	Digital Citizen Science	2 SWS	Seminar / 🧩	Mädche, Nieken
WT 21/22	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / 🧩	Mädche
WT 21/22	2530293		2 SWS	Seminar / 📱	Ruckes, Hoang, Benz, Strych, Luedecke, Silbereis, Wiegratz
WT 21/22	2530372	Advances in Financial Machine Learning	2 SWS	Seminar / 📱	Ulrich
WT 21/22	2540473	Data Science in Service Management	2 SWS	Seminar	Stoeckel, Badewitz
WT 21/22	2540475	Electronic Markets & User behavior	2 SWS	Seminar / 📱	Knierim
WT 21/22	2540477	Digital Experience and Participation	2 SWS	Seminar	Peukert, Fegert, Greif-Winzrieth, Hoffmann
WT 21/22	2540478	Smart Grids and Energy Markets	2 SWS	Seminar	Dinther, Staudt, Richter, vom Scheidt, Golla, Schmidt, Henni, Bluhm, Klimm, Semmelmann
WT 21/22	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar / 🧩	Geyer-Schulz, Nazemi, Schweizer
WT 21/22	2540557	Information Systems and Design (ISSD) Seminar	2 SWS	Seminar / 🧩	Mädche
WT 21/22	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar / 📱	Koch
WT 21/22	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🎙	Nieken, Mitarbeiter
WT 21/22	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🎙	Nieken, Mitarbeiter
WT 21/22	2579910	Entrepreneurial Strategy and Financing of Start-Ups	2 SWS	Seminar / 📱	Burkardt
WT 21/22	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar / 🎙	Wouters, Ebinger
WT 21/22	2581030	Seminar Energiewirtschaft IV: Aktuelle Themen der Energiepolitik	2 SWS	Seminar / 🎙	Dehler-Holland, Fichtner, Britto
WT 21/22	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar	Glöser-Chahoud, Schultmann
WT 21/22	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar	Volk, Schultmann
WT 21/22	2581980	Seminar Energy Economics II: Current Trends on European Energy Markets	2 SWS	Seminar / 📱	Fichtner, Fraunholz, Kraft, Zimmermann
WT 21/22	2581981		2 SWS	Seminar / 📱	Ardone, Finck, Fichtner, Slednev
ST 2022	2400121	Interactive Analytics Seminar	2 SWS	/ 📱	Beigl, Mädche, Pescara
ST 2022	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / 🧩	Mädche

ST 2022	2530372	Advances in Financial Machine Learning	2 SWS	Seminar	Ulrich
ST 2022	2530580	Seminar in Finance (Master): Machine Learning Stock Returns with Option Data		Seminar / 🗣	Uhrig-Homburg, Müller, Thimme
ST 2022	2540472	Digital Citizen Science	2 SWS	Seminar	Weinhardt, Knierim, Mädche
ST 2022	2540473	Business Data Analytics	2 SWS	Seminar	Badewitz, Weinhardt
ST 2022	2540475	Electronic Markets & User Behavior	2 SWS	Seminar	Knierim
ST 2022	2540477	Digital Experience & Participation	2 SWS	Seminar	Peukert, Fegert
ST 2022	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Staudt, Henni, Semmelmann, Qu, Bluhm, Golla
ST 2022	2540493	Data Science for the Industrial Internet of Things		Seminar / 🗣	Martin, Kühl
ST 2022	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2022	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar / 🧩	Mädche, Beigl
ST 2022	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar / 🧩	Mädche
ST 2022	2545002	Entrepreneurship Research	2 SWS	Seminar / 🗣	Terzidis, Dang, Kuschel
ST 2022	2571180	Seminar in Marketing und Vertrieb (Master)	2 SWS	Seminar / 🗣	Klarmann, Mitarbeiter
ST 2022	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
ST 2022	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
ST 2022	2579909	Seminar Management Accounting	2 SWS	Seminar / 🗣	Wouters, Jaedeke
ST 2022	2579910	Entrepreneurial Strategy and Financing of Start-Ups	2 SWS	Seminar / 🧩	Burkardt
ST 2022	2579919	Seminar in Management Accounting - Special Topics	2 SWS	Seminar / 🗣	Ebinger
ST 2022	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar / 🗣	Dehler-Holland, Fichtner
ST 2022	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar / 🗣	Volk, Schultmann
ST 2022	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar / 🗣	Kraft, Fichtner
ST 2022	2581990		2 SWS	Seminar / 🗣	Schultmann
Exams					
WT 21/22	00030	Seminar Business Data Analytics			Weinhardt
WT 21/22	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 21/22	7900069	Current Topics in Digital Transformation Seminar			Mädche
WT 21/22	7900106	Hospital Management			Hansis
WT 21/22	7900151	Master Seminar in Data Science and Machine Learning			Geyer-Schulz
WT 21/22	7900163	Seminar Human Resource Management (Master)			Nieken
WT 21/22	7900164	Seminar Human Resources and Organizations (Master)			Nieken
WT 21/22	7900165	Seminar Digital Experience and Participation			Weinhardt
WT 21/22	7900184	Seminar in Finance (Master)			Ruckes
WT 21/22	7900203	Seminar in Finance			Uhrig-Homburg
WT 21/22	7900233	Information Systems and Design (ISSD) Seminar			Mädche
WT 21/22	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl
WT 21/22	7900239	Technologies for Innovation Management			Weissenberger-Eibl
WT 21/22	7900335	Seminar Energy Economics IV			Fichtner
WT 21/22	7900357	Vergleichende Analyse von TGA-Umweltdeklarationsformen - Sind PEPs mit EPDs vergleichbar?			Lützkendorf

WT 21/22	7900359	Methods in Innovation Management	Weissenberger-Eibl
WT 21/22	7900364	Seminar in Business Administration A (Master) - Digital Service Innovation	Satzger
WT 21/22	7900367	Seminar in Business Administration A (Master)- Design Thinking & Intrapreneurship	Satzger
WT 21/22	7900369	Seminar in Business Administration A (Master) - Advanced Topics in Digital Service Design	Satzger
WT 21/22	7900371	Advances in Financial Machine Learning	Ulrich
WT 21/22	7900374	Seminar Digital Citizen Science	Weinhardt
WT 21/22	7900375	Seminar Electronic Markets & User behavior	Weinhardt
WT 21/22	7900385	Seminar in Business Administration A (Master) - Short Observation Period Classification in Laparoscopic Surgery via External Tool Features	Satzger
WT 21/22	79-2579919-M	Seminar Management Accounting - Special Topics (Master)	Wouters
WT 21/22	7981976	Seminar in Production and Operations Management I	Schultmann
WT 21/22	7981977	Seminar in Production and Operations Management II	Schultmann
WT 21/22	7981978	Seminar in Production and Operations Management III	Schultmann
WT 21/22	7981979	Seminar Energy Economics I	Fichtner
WT 21/22	7981980	Seminar Energy Economics II	Fichtner
WT 21/22	7981981	Seminar Energy Economics III	Fichtner
ST 2022	7900018	Globalization of Innovation – Innovation for Globalization: Methods and Analyses	Weissenberger-Eibl
ST 2022	7900025	Successful Transformation Through Innovation	Weissenberger-Eibl
ST 2022	7900052	Entrepreneurship Research	Terzidis
ST 2022	7900055	Roadmapping	Weissenberger-Eibl
ST 2022	7900081	Erstellen einer Übersicht zu soziokulturellen Anforderungen an die technische Ausrüstung von Bauwerken für den Anwendungsfall „Wohngebäude"	Lützkendorf
ST 2022	7900093	Seminar in Business Administration A	Weinhardt
ST 2022	7900101	Seminar Human Resource Management (Master)	Nieken
ST 2022	7900127	Seminar in Finance (Master) - Machine Learning Stock Returns with Option Data	Uhrig-Homburg
ST 2022	7900180	Seminar in Business Administration	Weinhardt
ST 2022	7900190	Current Topics in Digital Transformation Seminar	Mädche
ST 2022	7900233	Seminar in Marketing and Sales (Master)	Klarmann
ST 2022	7900261	Information Systems and Design (ISSD) Seminar	Mädche
ST 2022	7900265	User-adaptive Systems Seminar	Mädche
ST 2022	7900284	Digital Transformation and Business Models	Weissenberger-Eibl
ST 2022	79-2579909-M	Seminar Management Accounting (Master)	Wouters
ST 2022	79-2579919-M	Seminar Management Accounting - Special Topics (Master)	Wouters
ST 2022	79-2579929-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
ST 2022	792581030	Seminar in Business Administration (Bachelor)	Fichtner
ST 2022	792581031	Seminar in Business Administration B (Master)	Plötz
ST 2022	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2022	7981977	Seminar in Production and Operations Management II	Schultmann
ST 2022	7981978	Seminar in Production and Operations Management III	Schultmann
ST 2022	7981979	Seminar Energy Economics I	Fichtner
ST 2022	7981980	Seminar Energy Economics II	Fichtner
ST 2022	7981981	Seminar Energy Economics III	Fichtner

Legend: 📱 Online, ⚙️ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Digital Citizen Science** 2500019, WS 21/22, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Scheibehenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

V	**Advances in Financial Machine Learning** 2530372, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues

14-tägig, tba

Literature

Literatur wird in der ersten Vorlesung bekannt gegeben.

V	**Data Science in Service Management** 2540473, WS 21/22, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

Content

wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

V	**Master Seminar in Data Science and Machine Learning** 2540510, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

V	**Methoden im Innovationsmanagement** 2545107, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Online**

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

V	**Seminar Human Resource Management (Master)** 2573012, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V	**Seminar Human Resources and Organizations (Master)** 2573013, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V	**Seminar Management Accounting - Special Topics** 2579919, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 16 students.

Literature
Will be announced in the course.

V	**Interactive Analytics Seminar** 2400121, SS 2022, 2 SWS, Language: English, Open in study portal	**Online**

Content

Providing new and innovative ways for interacting with data is becoming increasingly important. In this seminar, an interdisciplinary team of students engineers a running software prototype of an advanced interactive system leveraging state-of-the-art hardware and software focusing on an analytical use case. The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). This seminar follows an interdisciplinary approach. Students the fields of computer science, information systems and industrial engineering work together in teams.

Learning Objectives

- Explore and specify a data-driven interaction challenge
- Suggest and evaluate different design solutions for addressing the identified problem
- Build interactive analytics prototypes using advanced interaction concepts and pervasive computing technologies

Prerequisites

Strong analytic abilities and profound skills in SQL as wells as Python and/or R are required.

Literature

Further literature will be made available in the seminar.

Organizational issues

nach Vereinbarung

V	**Advances in Financial Machine Learning** 2530372, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)**

Content

Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues

Location: Räume des Lehrstuhls, Blücherstraße 17, E-008

Literature

Literatur wird in der ersten Vorlesung bekannt gegeben.

V	**Data Science for the Industrial Internet of Things** 2540493, SS 2022, SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Learning Objectives

1. Gain practical experience in translating a business problem into a data modeling problem
2. Apply solid theoretical foundations from lectures to real-world data
3. Acquire hands-on experience with industrial data science tools
4. Learn how to communicate data science findings to business stakeholders

Course Credits

The practical seminar can be credited as Seminar Betriebswirtschaftslehre A [WIWI-103474] (3 ECTS). Other courses can be credited upon request.

Seminar Description

The Internet of Things is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, internet access, and economical sensors – physical products turn into cyber-physical smart products that create vast amounts of data.

Current airplanes for example have around 6.000 sensors, creating around 1 TB of data per flight. This data is about the size of all tweets in 3 months worldwide. And this number is growing tremendously. But only 3% of potentially useful data is tagged today, end even less is analyzed. Although Internet of Things use cases such as predictive maintenance are projected to help companies save $630 billion by 2025 (McKinsey, 2015), companies struggle to turn sensor data into actionable insights. To solve this challenge, substantive expertise needs to be combined with skills from software engineering and statistics and machine learning to generate valuable insights from machine data.

The practical seminar is held in cooperation with industry partners of the KSRI, which provide some real-word datasets. Students will then work in teams of three in a close and agile collaboration with the industry subject matter experts from around the world, making use of to the CRISP DM methodology (Chapman et al. 2000)

There will be four different topics and datasets, each assigned to a team of three students. The assignment will be done in the kickoff in calendar week 18. The exact date of the kickoff event will be determined when the participating students have been selected. Attendance at the kickoff event in calendar week 18 is mandatory and a prerequisite for participation.

Expertise in Python and Data Science / Machine Learning is strongly recommended.

Contact

Dominik Martin – dominik.martin@kit.edu
Dr. Niklas Kühl – niklas.kuehl@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.

V	**Master Seminar in Data Science and Machine Learning** 2540510, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

V	**User-Adaptive Systems Seminar** 2540553, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

User-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a user-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). It is offered as part of the DFG-funded graduate school "KD2School: Designing Adaptive Systems for Economic Decisions" (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-adaptive system prototype

Prerequisites

Strong analytical abilities and profound software development skills are required.

Organizational issues

Termine werden bekannt gegeben

Literature

Required literature will be made available in the seminar.

| **V** | **Information Systems and Service Design Seminar**
 2540557, SS 2022, 3 SWS, Language: English, Open in study portal | **Seminar (S)**
 Blended (On-Site/Online) |

Content

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group ISSD (Prof. Mädche). The research group "Information Systems & Service Design" (ISSD) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues

Termine werden bekannt gegeben

V	**Entrepreneurship Research** 2545002, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Content

The students independently develop a topic from entrepreneurship research in an international setting as a tandem with a partner. At first, there will be an introduction to the methodologies used such as systematic literature review, design science, qualitative and quantitative data analysis and more. As part of a written elaboration, the seminar topic must be presented scientifically on 15-20 pages. The results of the seminar paper will be presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

As part of the written elaboration, the basics of independent scientific work (literature research, argumentation + discussion, citing literature sources, application of qualitative, quantitative and simulative methods) are trained. The skills acquired in the seminar are used to prepare for a potential master thesis. The course is therefore particularly aimed at students who want to write their thesis at the Chair for Entrepreneurship and Technology Management.

Registration:

Registration is via the Wiwi portal.

Organizational issues

Termine werden noch bekannt gegeben.

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

Literature

Wird im Seminar bekannt gegeben.

V	**Seminar Human Resource Management (Master)** 2573012, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V	**Seminar Human Resources and Organizations (Master)** 2573013, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V	**Seminar Management Accounting** 2579909, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues

Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature

Will be announced in the course.

V	**Seminar in Management Accounting - Special Topics**	**Seminar (S)**
	2579919, SS 2022, 2 SWS, Language: English, Open in study portal	**On-Site**

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues

Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature

Will be announced in the course.

| T | 7.331 Course: Seminar in Business Administration B (Master) [T-WIWI-103476] |

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2500019	Digital Citizen Science	2 SWS	Seminar / 🧩	Mädche, Nieken
WT 21/22	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / 🧩	Mädche
WT 21/22	2530293		2 SWS	Seminar / 📱	Ruckes, Hoang, Benz, Strych, Luedecke, Silbereis, Wiegratz
WT 21/22	2530372	Advances in Financial Machine Learning	2 SWS	Seminar / 📱	Ulrich
WT 21/22	2540473	Data Science in Service Management	2 SWS	Seminar	Stoeckel, Badewitz
WT 21/22	2540475	Electronic Markets & User behavior	2 SWS	Seminar / 📱	Knierim
WT 21/22	2540477	Digital Experience and Participation	2 SWS	Seminar	Peukert, Fegert, Greif-Winzrieth, Hoffmann
WT 21/22	2540478	Smart Grids and Energy Markets	2 SWS	Seminar	Dinther, Staudt, Richter, vom Scheidt, Golla, Schmidt, Henni, Bluhm, Klimm, Semmelmann
WT 21/22	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar / 🧩	Geyer-Schulz, Nazemi, Schweizer
WT 21/22	2540557	Information Systems and Design (ISSD) Seminar	2 SWS	Seminar / 🧩	Mädche
WT 21/22	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar / 📱	Koch
WT 21/22	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🎙	Nieken, Mitarbeiter
WT 21/22	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🎙	Nieken, Mitarbeiter
WT 21/22	2579910	Entrepreneurial Strategy and Financing of Start-Ups	2 SWS	Seminar / 📱	Burkardt
WT 21/22	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar / 🎙	Wouters, Ebinger
WT 21/22	2581030	Seminar Energiewirtschaft IV: Aktuelle Themen der Energiepolitik	2 SWS	Seminar / 🎙	Dehler-Holland, Fichtner, Britto
WT 21/22	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar	Glöser-Chahoud, Schultmann
WT 21/22	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar	Volk, Schultmann
WT 21/22	2581980	Seminar Energy Economics II: Current Trends on European Energy Markets	2 SWS	Seminar / 📱	Fichtner, Fraunholz, Kraft, Zimmermann
WT 21/22	2581981		2 SWS	Seminar / 📱	Ardone, Finck, Fichtner, Slednev
ST 2022	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / 🧩	Mädche

ST 2022	2530372	Advances in Financial Machine Learning	2 SWS	Seminar	Ulrich
ST 2022	2530580	Seminar in Finance (Master): Machine Learning Stock Returns with Option Data		Seminar / 🗨	Uhrig-Homburg, Müller, Thimme
ST 2022	2540472	Digital Citizen Science	2 SWS	Seminar	Weinhardt, Knierim, Mädche
ST 2022	2540473	Business Data Analytics	2 SWS	Seminar	Badewitz, Weinhardt
ST 2022	2540475	Electronic Markets & User Behavior	2 SWS	Seminar	Knierim
ST 2022	2540477	Digital Experience & Participation	2 SWS	Seminar	Peukert, Fegert
ST 2022	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Staudt, Henni, Semmelmann, Qu, Bluhm, Golla
ST 2022	2540493	Data Science for the Industrial Internet of Things		Seminar / 🗨	Martin, Kühl
ST 2022	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2022	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar / 🧩	Mädche, Beigl
ST 2022	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar / 🧩	Mädche
ST 2022	2545002	Entrepreneurship Research	2 SWS	Seminar / 🗨	Terzidis, Dang, Kuschel
ST 2022	2571180	Seminar in Marketing und Vertrieb (Master)	2 SWS	Seminar / 🗨	Klarmann, Mitarbeiter
ST 2022	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🗨	Nieken, Mitarbeiter
ST 2022	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🗨	Nieken, Mitarbeiter
ST 2022	2579909	Seminar Management Accounting	2 SWS	Seminar / 🗨	Wouters, Jaedeke
ST 2022	2579910	Entrepreneurial Strategy and Financing of Start-Ups	2 SWS	Seminar / 🧩	Burkardt
ST 2022	2579919	Seminar in Management Accounting - Special Topics	2 SWS	Seminar / 🗨	Ebinger
ST 2022	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar / 🗨	Dehler-Holland, Fichtner
ST 2022	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar / 🗨	Volk, Schultmann
ST 2022	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar / 🗨	Kraft, Fichtner
ST 2022	2581990		2 SWS	Seminar / 🗨	Schultmann
Exams					
WT 21/22	00030	Seminar Business Data Analytics			Weinhardt
WT 21/22	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 21/22	7900069	Current Topics in Digital Transformation Seminar			Mädche
WT 21/22	7900106	Hospital Management			Hansis
WT 21/22	7900151	Master Seminar in Data Science and Machine Learning			Geyer-Schulz
WT 21/22	7900163	Seminar Human Resource Management (Master)			Nieken
WT 21/22	7900164	Seminar Human Resources and Organizations (Master)			Nieken
WT 21/22	7900165	Seminar Digital Experience and Participation			Weinhardt
WT 21/22	7900184	Seminar in Finance (Master)			Ruckes
WT 21/22	7900203	Seminar in Finance			Uhrig-Homburg
WT 21/22	7900233	Information Systems and Design (ISSD) Seminar			Mädche
WT 21/22	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl
WT 21/22	7900239	Technologies for Innovation Management			Weissenberger-Eibl
WT 21/22	7900335	Seminar Energy Economics IV			Fichtner
WT 21/22	7900359	Methods in Innovation Management			Weissenberger-Eibl

WT 21/22	7900363	Seminar in Business Administration B (Master) - Design Thinking & Intrapreneurship	Satzger
WT 21/22	7900371	Advances in Financial Machine Learning	Ulrich
WT 21/22	7900374	Seminar Digital Citizen Science	Weinhardt
WT 21/22	7900375	Seminar Electronic Markets & User behavior	Weinhardt
WT 21/22	7900384	Seminar in Business Administration B (Master) - Short Observation Period Classification in Laparoscopic Surgery via External Tool Features	Satzger
WT 21/22	79-2579919-M	Seminar Management Accounting - Special Topics (Master)	Wouters
WT 21/22	7981976	Seminar in Production and Operations Management I	Schultmann
WT 21/22	7981977	Seminar in Production and Operations Management II	Schultmann
WT 21/22	7981978	Seminar in Production and Operations Management III	Schultmann
WT 21/22	7981979	Seminar Energy Economics I	Fichtner
WT 21/22	7981980	Seminar Energy Economics II	Fichtner
WT 21/22	7981981	Seminar Energy Economics III	Fichtner
ST 2022	7900018	Globalization of Innovation – Innovation for Globalization: Methods and Analyses	Weissenberger-Eibl
ST 2022	7900025	Successful Transformation Through Innovation	Weissenberger-Eibl
ST 2022	7900052	Entrepreneurship Research	Terzidis
ST 2022	7900055	Roadmapping	Weissenberger-Eibl
ST 2022	7900093	Seminar in Business Administration A	Weinhardt
ST 2022	7900101	Seminar Human Resource Management (Master)	Nieken
ST 2022	7900127	Seminar in Finance (Master) - Machine Learning Stock Returns with Option Data	Uhrig-Homburg
ST 2022	7900180	Seminar in Business Administration	Weinhardt
ST 2022	7900190	Current Topics in Digital Transformation Seminar	Mädche
ST 2022	7900233	Seminar in Marketing and Sales (Master)	Klarmann
ST 2022	7900261	Information Systems and Design (ISSD) Seminar	Mädche
ST 2022	7900265	User-adaptive Systems Seminar	Mädche
ST 2022	7900284	Digital Transformation and Business Models	Weissenberger-Eibl
ST 2022	79-2579909-M	Seminar Management Accounting (Master)	Wouters
ST 2022	79-2579919-M	Seminar Management Accounting - Special Topics (Master)	Wouters
ST 2022	79-2579929-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
ST 2022	792581030	Seminar in Business Administration (Bachelor)	Fichtner
ST 2022	792581031	Seminar in Business Administration B (Master)	Plötz
ST 2022	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2022	7981977	Seminar in Production and Operations Management II	Schultmann
ST 2022	7981978	Seminar in Production and Operations Management III	Schultmann
ST 2022	7981979	Seminar Energy Economics I	Fichtner
ST 2022	7981980	Seminar Energy Economics II	Fichtner
ST 2022	7981981	Seminar Energy Economics III	Fichtner

Legend: 🗖 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Digital Citizen Science** 2500019, WS 21/22, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Scheibehenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

V	**Advances in Financial Machine Learning** 2530372, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues
14-tägig, tba

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

V	**Data Science in Service Management** 2540473, WS 21/22, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

Content
wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

V	**Master Seminar in Data Science and Machine Learning** 2540510, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

V	**Methoden im Innovationsmanagement** 2545107, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Online**

Content

The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature

Werden in der ersten Veranstaltung bekannt gegeben.

V	**Seminar Human Resource Management (Master)** 2573012, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues

Blockveranstaltung siehe Homepage

V	**Seminar Human Resources and Organizations (Master)** 2573013, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues

Blockveranstaltung siehe Homepage

V	**Seminar Management Accounting - Special Topics** 2579919, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 16 students.

Literature

Will be announced in the course.

V	**Advances in Financial Machine Learning** 2530372, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)**

Content

Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues

Location: Räume des Lehrstuhls, Blücherstraße 17, E-008

Literature

Literatur wird in der ersten Vorlesung bekannt gegeben.

V	**Data Science for the Industrial Internet of Things** 2540493, SS 2022, SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Learning Objectives

1. Gain practical experience in translating a business problem into a data modeling problem
2. Apply solid theoretical foundations from lectures to real-world data
3. Acquire hands-on experience with industrial data science tools
4. Learn how to communicate data science findings to business stakeholders

Course Credits

The practical seminar can be credited as Seminar Betriebswirtschaftslehre A [WIWI-103474] (3 ECTS). Other courses can be credited upon request.

Seminar Description

The Internet of Things is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, internet access, and economical sensors – physical products turn into cyber-physical smart products that create vast amounts of data.

Current airplanes for example have around 6.000 sensors, creating around 1 TB of data per flight. This data is about the size of all tweets in 3 months worldwide. And this number is growing tremendously. But only 3% of potentially useful data is tagged today, end even less is analyzed. Although Internet of Things use cases such as predictive maintenance are projected to help companies save $630 billion by 2025 (McKinsey, 2015), companies struggle to turn sensor data into actionable insights. To solve this challenge, substantive expertise needs to be combined with skills from software engineering and statistics and machine learning to generate valuable insights from machine data.

The practical seminar is held in cooperation with industry partners of the KSRI, which provide some real-word datasets. Students will then work in teams of three in a close and agile collaboration with the industry subject matter experts from around the world, making use of to the CRISP DM methodology (Chapman et al. 2000)

There will be four different topics and datasets, each assigned to a team of three students. The assignment will be done in the kickoff in calendar week 18. The exact date of the kickoff event will be determined when the participating students have been selected. Attendance at the kickoff event in calendar week 18 is mandatory and a prerequisite for participation.

Expertise in Python and Data Science / Machine Learning is strongly recommended.

Contact

Dominik Martin – dominik.martin@kit.edu
Dr. Niklas Kühl – niklas.kuehl@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.

V	**Master Seminar in Data Science and Machine Learning** 2540510, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

V	**User-Adaptive Systems Seminar** 2540553, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

User-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a user-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). It is offered as part of the DFG-funded graduate school "KD2School: Designing Adaptive Systems for Economic Decisions" (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-adaptive system prototype

Prerequisites

Strong analytical abilities and profound software development skills are required.

Organizational issues

Termine werden bekannt gegeben

Literature

Required literature will be made available in the seminar.

V	**Information Systems and Service Design Seminar** 2540557, SS 2022, 3 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group ISSD (Prof. Mädche). The research group "Information Systems & Service Design" (ISSD) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues
Termine werden bekannt gegeben

V	**Entrepreneurship Research** 2545002, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Content

The students independently develop a topic from entrepreneurship research in an international setting as a tandem with a partner. At first, there will be an introduction to the methodologies used such as systematic literature review, design science, qualitative and quantitative data analysis and more. As part of a written elaboration, the seminar topic must be presented scientifically on 15-20 pages. The results of the seminar paper will be presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

As part of the written elaboration, the basics of independent scientific work (literature research, argumentation + discussion, citing literature sources, application of qualitative, quantitative and simulative methods) are trained. The skills acquired in the seminar are used to prepare for a potential master thesis. The course is therefore particularly aimed at students who want to write their thesis at the Chair for Entrepreneurship and Technology Management.

Registration:

Registration is via the Wiwi portal.

Organizational issues
Termine werden noch bekannt gegeben.

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

Literature
Wird im Seminar bekannt gegeben.

V	**Seminar Human Resource Management (Master)** 2573012, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues

Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V	**Seminar Human Resources and Organizations (Master)** 2573013, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues

Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V	**Seminar Management Accounting** 2579909, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

V	**Seminar in Management Accounting - Special Topics** 2579919, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

T 7.332 Course: Seminar in Economic Policy [T-WIWI-102789]

Responsible:	Prof. Dr. Ingrid Ott
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Exams				
ST 2022	7900051	Seminar in Economic Policy		Ott

Competence Certificate

The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted scored examinations (Essay 50%, 40% oral presentation, active participation 10%).

Prerequisites

None

Recommendation

At least one of the lectures "Theory of Endogenous Growth" or "Innovation Theory and Policy" should be attended in advance, if possible.

T   7.333 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-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter, Görgen
WT 21/22	2560142	Disruption and the Digital Economy - Topics in Political Economy (Master)	2 SWS	Seminar	Szech, Huber, Rosar
WT 21/22	2560143	Overcoming the Corona Crisis - Morals & Social Behavior (Master)	2 SWS	Seminar	Szech, Zhao, Huber
WT 21/22	2560282	Wirtschaftspolitisches Seminar	2 SWS	Seminar / ✗	Ott, Assistenten
WT 21/22	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba
ST 2022	2500013	Predictive Data Analytics - An Introduction to Machine Learning		Seminar / ⚙	Lerch, Koster
ST 2022	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Görgen, Koster, Buse, Rüter
ST 2022	2560282	Seminar in economic policy	2 SWS	Seminar / 🎤	Ott, Assistenten
ST 2022	2560552	Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Master)	2 SWS	Seminar / ⚙	Szech, Zhao
ST 2022	2560555	Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Bachelor)	2 SWS	Seminar / ⚙	Szech, Rau
Exams					
WT 21/22	7900139	Seminar in Economics (Bachelor/Master)			Mitusch
WT 21/22	7900140	Seminar Disruption and Digital Economy (Master)			Szech
WT 21/22	7900254	Topics in Econometrics. Seminar in Economics			Schienle
WT 21/22	7900257	Date Mining. Seminar in Economics A (Master)			Nakhaeizadeh
WT 21/22	7900296	Seminar Overcoming the Corona Crisis (Master)			Szech
WT 21/22	7900336	Seminar in Macroeconomics I			Brumm
WT 21/22	7900337	Seminar in Macroeconomics II			Brumm
WT 21/22	7900338	Risk Preferences: Theory and Empirical Evidence (Seminar)			Puppe
WT 21/22	79100003	Topics in Experimental Economics			Reiß
WT 21/22	79sefi2	Seminar Unified Welfare Analysis of Public Policies A (Master)			Wigger
ST 2022	7900009	Demographic Change and Pension Reforms			Brumm
ST 2022	7900033	Predictive Data Analytics			Lerch
ST 2022	7900051	Seminar in Economic Policy			Ott
ST 2022	7900162	The Macroeconomics of Sanctions			Brumm
ST 2022	7900282	Digital IT-Solutions and Services Transforming the Field of Public Transportation			Mitusch

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Topics in Econometrics** 2521310, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)**

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V	**Disruption and the Digital Economy - Topics in Political Economy (Master)** 2560142, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)**

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

V	**Overcoming the Corona Crisis - Morals & Social Behavior (Master)** 2560143, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)**

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Application is possible via https://portal.wiwi.kit.edu/Seminare

V	**Predictive Data Analytics - An Introduction to Machine Learning** 2500013, SS 2022, SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

Organizational issues

The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

V	**Advanced Topics in Econometrics** 2521310, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

V	**Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Master)** 2560552, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Participation will be limited to 12 students.

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockveranstaltung:

Introductory Meeting April 20 (online)

Seminar Presentations June 3 (Präsenz or online)

V	**Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Bachelor)** 2560555, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockveranstaltung:

Introductory Meeting April 19 (online)

Seminar Presentations May 30 (Präsenz or online)

T 7.334 Course: Seminar in Economics B (Master) [T-WIWI-103477]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter, Görgen
WT 21/22	2560142	Disruption and the Digital Economy - Topics in Political Economy (Master)	2 SWS	Seminar	Szech, Huber, Rosar
WT 21/22	2560282	Wirtschaftspolitisches Seminar	2 SWS	Seminar / ✗	Ott, Assistenten
WT 21/22	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba
ST 2022	2500013	Predictive Data Analytics - An Introduction to Machine Learning		Seminar / ⚙	Lerch, Koster
ST 2022	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Görgen, Koster, Buse, Rüter
ST 2022	2560259	Organisation and Management of Development Projects	2 SWS	Seminar / ⚙	Sieber
ST 2022	2560282	Seminar in economic policy	2 SWS	Seminar / 🗣	Ott, Assistenten
ST 2022	2560552	Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Master)	2 SWS	Seminar / ⚙	Szech, Zhao
ST 2022	2560555	Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Bachelor)	2 SWS	Seminar / ⚙	Szech, Rau
Exams					
WT 21/22	7900139	Seminar in Economics (Bachelor/Master)			Mitusch
WT 21/22	7900140	Seminar Disruption and Digital Economy (Master)			Szech
WT 21/22	7900254	Topics in Econometrics. Seminar in Economics			Schienle
WT 21/22	7900258	Data Mining. Seminar in Economics B (Master)			Nakhaeizadeh
WT 21/22	7900281	Seminar in Economics B (Master), Seminar in Economics A (Bachelor)			Mitusch
WT 21/22	7900296	Seminar Overcoming the Corona Crisis (Master)			Szech
WT 21/22	7900336	Seminar in Macroeconomics I			Brumm
WT 21/22	7900337	Seminar in Macroeconomics II			Brumm
WT 21/22	7900338	Risk Preferences: Theory and Empirical Evidence (Seminar)			Puppe
WT 21/22	79100003	Topics in Experimental Economics			Reiß
WT 21/22	79sefi3	Seminar Unified Welfare Analysis of Public Policies B (Master)			Wigger
ST 2022	7900009	Demographic Change and Pension Reforms			Brumm
ST 2022	7900033	Predictive Data Analytics			Lerch
ST 2022	7900051	Seminar in Economic Policy			Ott
ST 2022	7900162	The Macroeconomics of Sanctions			Brumm
ST 2022	7900164	Seminar in Economics (Bachelor)			Mitusch
ST 2022	7900282	Digital IT-Solutions and Services Transforming the Field of Public Transportation			Mitusch

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Topics in Econometrics** 2521310, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)**

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V	**Disruption and the Digital Economy - Topics in Political Economy (Master)** 2560142, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)**

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

V	**Predictive Data Analytics - An Introduction to Machine Learning** 2500013, SS 2022, SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

Organizational issues

The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

V	**Advanced Topics in Econometrics** 2521310, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

V	**Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Master)** 2560552, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Participation will be limited to 12 students.

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockveranstaltung:

Introductory Meeting April 20 (online)

Seminar Presentations June 3 (Präsenz or online)

V	**Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Bachelor)** 2560555, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockveranstaltung:

Introductory Meeting April 19 (online)

Seminar Presentations May 30 (Präsenz or online)

T   7.335 Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

Responsible:	Fachvertreter ingenieurwissenschaftlicher Fakultäten
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 21/22	2115009	Seminar for Rail System Technology	1 SWS	Seminar / 📱	Gratzfeld, Tesar, Geimer
WT 21/22	2119100	Fördertechnik und Logistiksysteme		Seminar / ❀	Furmans, Pagani
ST 2022	2119100	Fördertechnik und Logistiksysteme		Seminar / ❀	Furmans, Padhy
Exams					
WT 21/22	76-T-MACH-102135	Conveying Technology and Logistics			Furmans
WT 21/22	76-T-MACH-2115009	Seminar for Rail System Technology			Gratzfeld, Geimer
WT 21/22	8245100014	Seminar in Transportation			Vortisch, Chlond
ST 2022	7311633	Seminar Creating a Patent Specification			Stork
ST 2022	76-T-MACH-2115009	Seminar for Rail System Technology			Gratzfeld, Geimer

Legend: 📱 Online, ❀ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
See German version.

Prerequisites
See module description.

Recommendation
None

Below you will find excerpts from events related to this course:

V   Seminar for Rail System Technology
2115009, WS 21/22, 1 SWS, Language: German/English, Open in study portal   **Seminar (S)** **Online**

Content

- Railway system: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact, history, challenges and future developments in the context of mega trends
- Operation: Transportation, public/regional/long-distance transport, freight service, scheduling
- System structure of railway vehicles: Tasks and classification, main systems
- Project management: definitions, project management, main and side processes, transfer to practice
- Scientific working: structuring and writing of scientific papers, literature research, scheduling (mile stones), self-management, presentation skills, using the software Citavi for literature and knowledge management, working with templates in Word, giving and taking feedback
- The learnt knowledge regarding scientific writing is used to elaborate a Seminararbeit. To this the students create a presentation, train and reflect it and finally present it to an auditorium.

Organizational issues
Teilnehmerzahl ist auf 10 begrenzt. Die Prüfung besteht aus einer schriftlichen Ausarbeitung (Seminararbeit) und einem Vortrag über die Ausarbeitung. Weitere Infos siehe Institutshomepage.
Max. 10 participants. Examination: Writing a Seminararbeit, final presentation. Please check the homepage for further information.

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V	**Fördertechnik und Logistiksysteme** 2119100, SS 2022, SWS, Language: German/English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues

Ort: Gebäude 50.38, Raum 0.22, Termine siehe homepage

T   7.336 Course: Seminar in Informatics A (Master) [T-WIWI-103479]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2400125	Security and Privacy Awareness	2 SWS	Seminar /	Boehm, Seidel-Saul, Volkamer, Aldag
WT 21/22	2513313	Seminar Linked Data and the Semantic Web (Master)	3 SWS	Seminar /	Färber, Käfer
WT 21/22	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/	Nickel, Weinhardt, Färber, Brandt, Kulbach
WT 21/22	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/	Nickel, Weinhardt, Färber, Brandt, Kulbach
WT 21/22	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar /	Zöllner, Daaboul
WT 21/22	2513605	Seminar Representation Learning on Knowledge Graphs (Master)	2 SWS	Seminar /	Sack, Alam, Biswas
ST 2022	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar /	Oberweis, Forell, Frister, Fritsch, Rybinski, Schreiber, Schüler, Ullrich, Schiefer
ST 2022	2513219	Seminar Advanced Topics in Petri Net Modeling (Master)	2 SWS	Seminar /	Oberweis, Fritsch
ST 2022	2513309	Seminar Knowledge Discovery and Data Mining (Master)	3 SWS	Seminar /	Färber, Noullet, Saier, Popovic
ST 2022	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar /	Färber, Käfer, Kulbach, Thoma
ST 2022	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar /	Lins, Sunyaev, Thiebes
ST 2022	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar /	Lins, Sunyaev, Thiebes
ST 2022	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar /	Zöllner
ST 2022	2513553	Seminar E-Voting (Master)	2 SWS	Seminar /	Beckert, Müller-Quade, Volkamer, Dörre, Düzgün, Kirsten

Exams			
WT 21/22	7900094	Seminar Selected Issues in Critical Information Infrastructures (Master)	Sunyaev
WT 21/22	7900102	Advanced Lab Information Service Engineering	Sack
WT 21/22	7900119	Seminar Cognitive Automobiles and Robots	Zöllner
WT 21/22	7900129	Security and Privacy Awareness	Volkamer
WT 21/22	7900304	Seminar Linked Data and the Semantic Web (Master)	Färber
WT 21/22	7900305	Seminar Representation Learning on Knowledge Graphs (Master)	Sack
WT 21/22	7900356	Seminar Real-World Challenges in Data Science and Analytics (Master)	Sure-Vetter
ST 2022	7900031	Seminar Selected Issues in Critical Information Infrastructures (Master)	Sunyaev

ST 2022	7900088	Seminar Business Information Systems (Master)	Oberweis
ST 2022	7900128	Seminar Emerging Trends in Internet Technologies (Master)	Sunyaev
ST 2022	7900146	Seminar Emerging Trends in Digital Health (Master)	Sunyaev
ST 2022	7900147	Cognitive Automobiles and Robots	Zöllner
ST 2022	7900198	Seminar Data Science & Real-time Big Data Analytics (Master)	Färber
ST 2022	7900200	Seminar E-Voting (Master)	Volkamer
ST 2022	7900202	Seminar Knowledge Discovery and Data Mining (Master)	Sure-Vetter

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.

Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Security and Privacy Awareness** 2400125, WS 21/22, 2 SWS, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Note: The link to enrol is for every student, regardless of the study background!

Dates:

- Kick-Off : 22.10.21, 14:00 o'clock
- Final version: 23.01.2022
- Presentation: 04.02.2022, 13:00 o'clock

Topics will be assigned after the enrolment deadline, before the Kick-Off.

Consider that legal focused topics require you to speak and understand german legal texts.

Topics:

- Phishing for Difference: How Does Phishing Impact Visually-Impaired Users?
- Wann wird Marketing im Security-Kontext ethisch bedenklich?
- Untersuchung der Wahrnehmung von (technischen) Backdoors zur Strafverfolgung.
- Data-Governance-Act – Fluch oder Segen für den Datenschutz?
- Würde lieber kein Thema anbieten, notfalls "Was ist der Wert von Privatheit?"
- Massenüberwachung von Kommunikationsknotenpunkten und Chilling Effects -- Eine rechtliche und ethische Auseinandersetzung
- Verletzt algorithmische Analyse von personenbezogenen Daten durch KI Privatheit -- und wenn ja, wie schlimm ist das?

ATTENTION: The seminar is only for MASTER students!

V	**Seminar Linked Data and the Semantic Web (Master)**	**Seminar (S)**
	2513313, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**On-Site**

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V	**Seminar Real-World Challenges in Data Science and Analytics (Bachelor)**	
	2513314, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Online**

Content

In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V	**Seminar Real-World Challenges in Data Science and Analytics (Master)**	
	2513315, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Online**

Content

In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V	**Seminar Cognitive Automobiles and Robots (Master)**	**Seminar (S)**
	2513500, WS 21/22, 2 SWS, Language: German/English, Open in study portal	**Online**

Content

The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V	**Seminar Representation Learning on Knowledge Graphs (Master)** 2513605, WS 21/22, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Data representation or feature representation plays a key role in the performance of machine learning algorithms. In recent years, rapid growth has been observed in Representation Learning (RL) of words and Knowledge Graphs (KG) into low dimensional vector spaces and its applications to many real-world scenarios. Word embeddings are a low dimensional vector representation of words that are capable of capturing the context of a word in a document, semantic similarity as well as its relation with other words. Similarly, KG embeddings are a low dimensional vector representation of entities and relations from a KG preserving its inherent structure and capturing the semantic similarity between the entities.

KG representation learning algorithms (a.k.a. KG embedding models) could be either unimodal where a single source is used or multimodal where multiple sources are explored. The sources of information could be relations between entities, text literals, numeric literals, images, and etc. It is important to capture the information present in each of these sources in order to learn representations which are rich in semantics. Multimodal KG embeddings learn either multiple representations simultaneously based on each source of information in a non-unified space or learn a single representation for each element of the KG in a unified space. Representation of entities and relations learnt using both unimodal and multimodal KG embedding models could be used in various downstream applications such as clustering, classification, and so on. On the other hand, language models such as BERT, ELMo, GPT, etc. learn the probability of word occurrence based on text corpus and learn representation of words in a low-dimensional embedding space. Representation of the words generated by the language models are often used for various KG completion tasks such as link prediction, entity classification, and so on.

In this seminar, we would like to study the different state of the art algorithms for multimodal embeddings, applications of KG embeddings, or the use of language models for KG representation.

Contributions of the students:

Each student will be assigned 1 paper on the topic. The student will have to

1. give a seminar presentation,
2. write a seminar report paper of 15 pages explaining the method from the assigned paper, in their own words, and
3. implementation. If code is available from the authors, then re-implementation of it for small scale experiments using Google Colab or make it available via GitHub.

V	**Seminar Advanced Topics in Petri Net Modeling (Master)** 2513219, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

A system should be correct and efficient. We specify discrete event systems by Petri nets to apply formal analysis techniques based on graph theory and linear algebra to prove correctness. Extended models, such as colored Petri nets, are applied to implement performance evaluation via simulation. We start from case studies using the modeling system Tina and its facilities of model checking for verification of communication protocols. Then we apply Petri nets for the control of robotic manufacturing and consider the sharing of resources in automated manufacturing. Colored Petri nets allow more precise specification of systems, which also leads to reduced abilities for applying formal techniques. So the basic method of investigation is simulation. Our case study concerns modern technology of networking and models are supplied with measuring components which compute statistical characteristics directly in the process of simulation. Finally, a review of modern theory of infinite Petri nets and Sleptsov net computing are provided with a view on cybersecurity of intelligent grids and clouds and hyper-performance concurrent computations.

Organizational issues

Die Veranstaltung findet auf Englisch statt. Die Bewerbung erfolgt über das Wiwi-Portal

Literature

Tools:

Tina https://projects.laas.fr/tina/index.php

CPN Tools https://cpntools.org/

References:

Zaitsev D.A. Clans of Petri Nets: Verification of protocols and performance evaluation of networks, LAP LAMBERT Academic Publishing, 2013, 292 p. (http://daze.ho.ua/daze-clans-covered-draft.djvu)

Zaitsev D.A., Shmeleva T.R. Simulating Telecommunication Systems with CPN Tools: Students' book // Odessa: ONAT, 2006. - 60 p. (http://daze.ho.ua/cpnmp2.pdf)

Recent developments in papers on http://daze.ho.ua

V	**Seminar Knowledge Discovery and Data Mining (Master)** 2513309, SS 2022, 3 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science

The exact dates and information for registration will be announced at the event page.

Organizational issues

Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu/.

Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

Literature

Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V	**Seminar Data Science & Real-time Big Data Analytics (Master)** 2513311, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues

Further information as well as the registration form can be found under the following link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

V	**Cognitive Automobiles and Robots** 2513500, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Online**

Content

The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V	**Seminar E-Voting (Master)** 2513553, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **On-Site**

Content

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

Organizational issues

Die Anmeldung für das Seminar ist bis zum Sonntag 03.04.2022, 23:59 Uhr,
über die Seite https://portal.wiwi.kit.edu/ys/5915 möglich.

T 7.337 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2400125	Security and Privacy Awareness	2 SWS	Seminar / 🔀	Boehm, Seidel-Saul, Volkamer, Aldag
WT 21/22	2513313	Seminar Linked Data and the Semantic Web (Master)	3 SWS	Seminar / 🗣	Färber, Käfer
WT 21/22	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/ 🖥	Nickel, Weinhardt, Färber, Brandt, Kulbach
WT 21/22	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/ 🖥	Nickel, Weinhardt, Färber, Brandt, Kulbach
WT 21/22	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar / 🖥	Zöllner, Daaboul
WT 21/22	2513605	Seminar Representation Learning on Knowledge Graphs (Master)	2 SWS	Seminar / 🔀	Sack, Alam, Biswas
ST 2022	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar / 🔀	Oberweis, Forell, Frister, Fritsch, Rybinski, Schreiber, Schüler, Ullrich, Schiefer
ST 2022	2513219	Seminar Advanced Topics in Petri Net Modeling (Master)	2 SWS	Seminar / 🔀	Oberweis, Fritsch
ST 2022	2513309	Seminar Knowledge Discovery and Data Mining (Master)	3 SWS	Seminar / 🖥	Färber, Noullet, Saier, Popovic
ST 2022	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar / 🖥	Färber, Käfer, Kulbach, Thoma
ST 2022	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar / 🖥	Lins, Sunyaev, Thiebes
ST 2022	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar / 🖥	Lins, Sunyaev, Thiebes
ST 2022	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar / 🖥	Zöllner
ST 2022	2513553	Seminar E-Voting (Master)	2 SWS	Seminar / 🗣	Beckert, Müller-Quade, Volkamer, Dörre, Düzgün, Kirsten
Exams					
WT 21/22	7500175	Seminar: Energy Informatics			Wagner
WT 21/22	7500220	Seminar Ubiquitous Computing			Beigl
WT 21/22	7900094	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev
WT 21/22	7900102	Advanced Lab Information Service Engineering			Sack
WT 21/22	7900119	Seminar Cognitive Automobiles and Robots			Zöllner
WT 21/22	7900129	Security and Privacy Awareness			Volkamer
WT 21/22	7900304	Seminar Linked Data and the Semantic Web (Master)			Färber
WT 21/22	7900305	Seminar Representation Learning on Knowledge Graphs (Master)			Sack
WT 21/22	7900356	Seminar Real-World Challenges in Data Science and Analytics (Master)			Sure-Vetter

ST 2022	7900031	Seminar Selected Issues in Critical Information Infrastructures (Master)	Sunyaev
ST 2022	7900088	Seminar Business Information Systems (Master)	Oberweis
ST 2022	7900128	Seminar Emerging Trends in Internet Technologies (Master)	Sunyaev
ST 2022	7900146	Seminar Emerging Trends in Digital Health (Master)	Sunyaev
ST 2022	7900147	Cognitive Automobiles and Robots	Zöllner
ST 2022	7900198	Seminar Data Science & Real-time Big Data Analytics (Master)	Färber
ST 2022	7900200	Seminar E-Voting (Master)	Volkamer
ST 2022	7900202	Seminar Knowledge Discovery and Data Mining (Master)	Sure-Vetter

Legend: 📱 Online, ⚇ Blended (On-Site/Online), ♟ On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Security and Privacy Awareness** 2400125, WS 21/22, 2 SWS, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Note: The link to enrol is for every student, regardless of the study background!

Dates:

- Kick-Off : 22.10.21, 14:00 o'clock
- Final version: 23.01.2022
- Presentation: 04.02.2022, 13:00 o'clock

Topics will be assigned after the enrolment deadline, before the Kick-Off.

Consider that legal focused topics require you to speak and understand german legal texts.

Topics:

- Phishing for Difference: How Does Phishing Impact Visually-Impaired Users?
- Wann wird Marketing im Security-Kontext ethisch bedenklich?
- Untersuchung der Wahrnehmung von (technischen) Backdoors zur Strafverfolgung.
- Data-Governance-Act – Fluch oder Segen für den Datenschutz?
- Würde lieber kein Thema anbieten, notfalls "Was ist der Wert von Privatheit?"
- Massenüberwachung von Kommunikationsknotenpunkten und Chilling Effects -- Eine rechtliche und ethische Auseinandersetzung
- Verletzt algorithmische Analyse von personenbezogenen Daten durch KI Privatheit -- und wenn ja, wie schlimm ist das?

ATTENTION: The seminar is only for MASTER students!

V	**Seminar Linked Data and the Semantic Web (Master)** 2513313, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Seminar (S)** **On-Site**

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V	**Seminar Real-World Challenges in Data Science and Analytics (Bachelor)** 2513314, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Online**

Content

In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V	**Seminar Real-World Challenges in Data Science and Analytics (Master)**	**Online**
	2513315, WS 21/22, 3 SWS, Language: German/English, Open in study portal	

Content

In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V	**Seminar Cognitive Automobiles and Robots (Master)**	**Seminar (S)** **Online**
	2513500, WS 21/22, 2 SWS, Language: German/English, Open in study portal	

Content

The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V	**Seminar Representation Learning on Knowledge Graphs (Master)**	**Seminar (S)** **Blended (On-Site/Online)**
	2513605, WS 21/22, 2 SWS, Language: English, Open in study portal	

Content

Data representation or feature representation plays a key role in the performance of machine learning algorithms. In recent years, rapid growth has been observed in Representation Learning (RL) of words and Knowledge Graphs (KG) into low dimensional vector spaces and its applications to many real-world scenarios. Word embeddings are a low dimensional vector representation of words that are capable of capturing the context of a word in a document, semantic similarity as well as its relation with other words. Similarly, KG embeddings are a low dimensional vector representation of entities and relations from a KG preserving its inherent structure and capturing the semantic similarity between the entities.

KG representation learning algorithms (a.k.a. KG embedding models) could be either unimodal where a single source is used or multimodal where multiple sources are explored. The sources of information could be relations between entities, text literals, numeric literals, images, and etc. It is important to capture the information present in each of these sources in order to learn representations which are rich in semantics. Multimodal KG embeddings learn either multiple representations simultaneously based on each source of information in a non-unified space or learn a single representation for each element of the KG in a unified space. Representation of entities and relations learnt using both unimodal and multimodal KG embedding models could be used in various downstream applications such as clustering, classification, and so on. On the other hand, language models such as BERT, ELMo, GPT, etc. learn the probability of word occurrence based on text corpus and learn representation of words in a low-dimensional embedding space. Representation of the words generated by the language models are often used for various KG completion tasks such as link prediction, entity classification, and so on.

In this seminar, we would like to study the different state of the art algorithms for multimodal embeddings, applications of KG embeddings, or the use of language models for KG representation.

Contributions of the students:

Each student will be assigned 1 paper on the topic. The student will have to

1. give a seminar presentation,
2. write a seminar report paper of 15 pages explaining the method from the assigned paper, in their own words, and
3. implementation. If code is available from the authors, then re-implementation of it for small scale experiments using Google Colab or make it available via GitHub.

V	**Seminar Advanced Topics in Petri Net Modeling (Master)** 2513219, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

A system should be correct and efficient. We specify discrete event systems by Petri nets to apply formal analysis techniques based on graph theory and linear algebra to prove correctness. Extended models, such as colored Petri nets, are applied to implement performance evaluation via simulation. We start from case studies using the modeling system Tina and its facilities of model checking for verification of communication protocols. Then we apply Petri nets for the control of robotic manufacturing and consider the sharing of resources in automated manufacturing. Colored Petri nets allow more precise specification of systems, which also leads to reduced abilities for applying formal techniques. So the basic method of investigation is simulation. Our case study concerns modern technology of networking and models are supplied with measuring components which compute statistical characteristics directly in the process of simulation. Finally, a review of modern theory of infinite Petri nets and Sleptsov net computing are provided with a view on cybersecurity of intelligent grids and clouds and hyper-performance concurrent computations.

Organizational issues

Die Veranstaltung findet auf Englisch statt. Die Bewerbung erfolgt über das Wiwi-Portal

Literature

Tools:
Tina https://projects.laas.fr/tina/index.php
CPN Tools https://cpntools.org/

References:
Zaitsev D.A. Clans of Petri Nets: Verification of protocols and performance evaluation of networks, LAP LAMBERT Academic Publishing, 2013, 292 p. (http://daze.ho.ua/daze-clans-covered-draft.djvu)
Zaitsev D.A., Shmeleva T.R. Simulating Telecommunication Systems with CPN Tools: Students' book // Odessa: ONAT, 2006. - 60 p. (http://daze.ho.ua/cpnmp2.pdf)
Recent developments in papers on http://daze.ho.ua

V	**Seminar Knowledge Discovery and Data Mining (Master)** 2513309, SS 2022, 3 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science

The exact dates and information for registration will be announced at the event page.

Organizational issues

Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu/.

Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

Literature

Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V	**Seminar Data Science & Real-time Big Data Analytics (Master)** 2513311, SS 2022, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues

Further information as well as the registration form can be found under the following link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

V	**Cognitive Automobiles and Robots** 2513500, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Online**

Content

The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V	**Seminar E-Voting (Master)** 2513553, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **On-Site**

Content

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

Organizational issues

Die Anmeldung für das Seminar ist bis zum Sonntag 03.04.2022, 23:59 Uhr,
über die Seite https://portal.wiwi.kit.edu/ys/5915 möglich.

T 7.338 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-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 21/22	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Neumann, Schwarze
WT 21/22	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / ❖	Nickel, Mitarbeiter
ST 2022	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
ST 2022	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar / ❖	Rebennack, Warwicker
ST 2022	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / ❖	Nickel, Mitarbeiter
Exams					
WT 21/22	7900011_WS2122	Seminar in Operations Research B (Bachelor)			Stein
WT 21/22	7900342	Seminar Modern OR and Innovative Logistics			Nickel
WT 21/22	7900348	Digitization in the Steel Industry			Nickel
ST 2022	7900018_SS2022	Seminar in Operations Research A (Master)			Stein

Legend: 📱 Online, ❖ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/).

Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Seminar on Methodical Foundations of Operations Research (B)
2550131, WS 21/22, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content

The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature

Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V	**Seminar: Modern OR and Innovative Logistics** 2550491, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues

wird auf der Homepage bekannt gegeben

Literature

Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V	**Seminar: Modern OR and Innovative Logistics** 2550491, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:

If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:

The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Organizational issues

wird auf der Homepage dol.ior.kit.edu bzw. auf dem WiWi-Portal bekannt gegeben

Literature

Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

T 7.339 Course: Seminar in Operations Research B (Master) [T-WIWI-103482]

Responsible:	Prof. Dr. Stefan Nickel
	Prof. Dr. Steffen Rebennack
	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101808 - Seminar Module

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Events					
WT 21/22	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🎤	Stein, Beck, Neumann, Schwarze
WT 21/22	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter
ST 2022	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🎤	Stein, Beck, Schwarze
ST 2022	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar / 🧩	Rebennack, Warwicker
ST 2022	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter
Exams					
WT 21/22	7900011_WS2122	Seminar in Operations Research B (Bachelor)			Stein
WT 21/22	7900348	Digitization in the Steel Industry			Nickel
WT 21/22	7900361	Seminar in Operations Research B (Master)			Nickel
ST 2022	7900018_SS2022	Seminar in Operations Research A (Master)			Stein

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✕ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Seminar on Methodical Foundations of Operations Research (B)** 2550131, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S) On-Site**

Content

The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature

Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V	**Seminar: Modern OR and Innovative Logistics** 2550491, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues

wird auf der Homepage bekannt gegeben

Literature

Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V	**Seminar: Modern OR and Innovative Logistics** 2550491, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:

If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:

The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Organizational issues

wird auf der Homepage dol.ior.kit.edu bzw. auf dem WiWi-Portal bekannt gegeben

Literature

Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

T 7.340 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-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 21/22	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter, Görgen
ST 2022	2500013	Predictive Data Analytics - An Introduction to Machine Learning		Seminar / 🌐	Lerch, Koster
ST 2022	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Görgen, Koster, Buse, Rüter
ST 2022	2550561	Spezielle fortgeschrittene Themen der Datenanalyse und Statistik	2 SWS	Seminar / 🎤	Grothe, Kaplan, Kächele
Exams					
WT 21/22	7900254	Topics in Econometrics. Seminar in Economics			Schienle
ST 2022	7900033	Predictive Data Analytics			Lerch

Legend: 📱 Online, 🌐 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Topics in Econometrics**	**Seminar (S)**
	2521310, WS 21/22, 2 SWS, Language: German, Open in study portal	

Organizational issues

Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V	**Predictive Data Analytics - An Introduction to Machine Learning**	**Seminar (S)**
	2500013, SS 2022, SWS, Language: English, Open in study portal	**Blended (On-Site/Online)**

Content

Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

Organizational issues

The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

	Advanced Topics in Econometrics	
V	2521310, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

T 7.341 Course: Seminar in Statistics B (Master) [T-WIWI-103484]

Responsible:	Prof. Dr. Oliver Grothe
	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2022	2500013	Predictive Data Analytics - An Introduction to Machine Learning		Seminar / 🖧	Lerch, Koster
ST 2022	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Görgen, Koster, Buse, Rüter
ST 2022	2550561	Spezielle fortgeschrittene Themen der Datenanalyse und Statistik	2 SWS	Seminar / 🗣	Grothe, Kaplan, Kächele
Exams					
WT 21/22	7900254	Topics in Econometrics. Seminar in Economics			Schienle
ST 2022	7900033	Predictive Data Analytics			Lerch

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Predictive Data Analytics - An Introduction to Machine Learning**	**Seminar (S)**
	2500013, SS 2022, SWS, Language: English, Open in study portal	**Blended (On-Site/Online)**

Content

Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

Organizational issues

The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

V	**Advanced Topics in Econometrics** 2521310, SS 2022, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)**

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

T 7.342 Course: Seminar in Transportation [T-BGU-100014]

Responsible:	Bastian Chlond Prof. Dr.-Ing. Peter Vortisch
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101064 - Fundamentals of Transportation M-BGU-101065 - Transportation Modelling and Traffic Management M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	6232903	Seminar Verkehrswesen	2 SWS	Seminar / 🧩	Vortisch, KIT
ST 2022	6232903	Seminar Verkehrswesen	2 SWS	Seminar / 🧩	Chlond, Vortisch, Kagerbauer

Exams				
WT 21/22	8245100014	Seminar in Transportation		Vortisch, Chlond

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✕ Cancelled

Competence Certificate

seminar paper, appr. 10 pages, and presentation, appr. 10 min.

Prerequisites

The seminar is subject to approval. The approval must be applied for at the examination secretariat of the Department of Economics and Management. The application for admission is made via the corresponding engineering seminar form on the department's download page.

Recommendation

Annotation

T 7.343 Course: Seminar Methods along the Innovation process [T-WIWI-110987]

Responsible:	Dr. Daniela Beyer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Competence Certificate

Alternative exam assessment.

Recommendation

Prior attendance of the course Innovation Management [2545015] is recommended.

T 7.344 Course: Seminar Mobility Services (Master) [T-WIWI-103174]

Responsible:	Prof. Dr. Gerhard Satzger
	Carola Stryja
Organisation:	KIT Department of Economics and Management
Part of:	M-BGU-101064 - Fundamentals of Transportation
	M-BGU-101065 - Transportation Modelling and Traffic Management

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Irregular	**Version** 1

Competence Certificate
A final written exam will be conducted.

Prerequisites
None

Annotation
The course is not offered regularly.

T 7.345 Course: Seminar Production Technology [T-MACH-109062]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Prof. Dr.-Ing. Gisela Lanza
Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2149665	Seminar Production Technology	1 SWS	Seminar / 🧩	Fleischer, Lanza, Schulze
ST 2022	2149665	Seminar Production Technology	1 SWS	Seminar / 🧩	Fleischer, Lanza, Schulze, Zanger
Exams					
WT 21/22	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze
ST 2022	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
Alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Annotation
The specific topics are published on the homepage of the wbk Institute of Production Science.

Below you will find excerpts from events related to this course:

V	**Seminar Production Technology** 2149665, WS 21/22, 1 SWS, Language: German, Open in study portal	**Seminar (S) Blended (On-Site/Online)**

Content

In course of the seminar Production Technology current issues of the wbk main fields of research "Manufacturing and Materials Technology", "Machines, Equipment and Process Automation" as well as "Production Systems" are discussed.

The specific topics are published on the homepage of the wbk Institute of Production Science.

Learning Outcomes:

The students …

- are in a position to independently handle current, research-based tasks according to scientific criteria.
- are able to research, analyze, abstract and critically review the information.
- can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues

siehe http://www.wbk.kit.edu/seminare.php

V	**Seminar Production Technology** 2149665, SS 2022, 1 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

In course of the seminar Production Technology current issues of the wbk main fields of research "Manufacturing and Materials Technology", "Machines, Equipment and Process Automation" as well as "Production Systems" are discussed.

The specific topics are published on the homepage of the wbk Institute of Production Science.

Learning Outcomes:

The students …

- are in a position to independently handle current, research-based tasks according to scientific criteria.
- are able to research, analyze, abstract and critically review the information.
- can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues

siehe http://www.wbk.kit.edu/seminare.php

T 7.346 Course: Seminar: Commercial and Corporate Law in the IT Industry [T-INFO-111405]

Responsible:	Prof. Dr. Thomas Dreier
	Dr. Georg Nolte
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2400165	Seminar Commercial and Corporate Law in Information Technology	2 SWS	Seminar / ▯	Nolte
Exams					
WT 21/22	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe
WT 21/22	7500310	Seminar: Commercial and Corporate Law in the IT Industry			Dreier, Matz

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

T	**7.347 Course: Seminar: IT- Security Law [T-INFO-111404]**

Responsible: Martin Schallbruch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	24389	Seminar "IT-Sicherheitsrecht"	2 SWS	Seminar	Schallbruch
Exams					
WT 21/22	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe
WT 21/22	7500249	Seminar: IT- Security Law			

T 7.348 Course: Seminar: Legal Studies I [T-INFO-101997]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	2400311	Seminar "Aktuelle Probleme des Markenrechts"	2 SWS	Seminar	Matz
ST 2022	2400005	Governance, Risk & Compliance	2 SWS	Seminar / 🎤	Herzig
ST 2022	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar / 🎤	Bless, Boehm, Hartenstein, Mädche, Zitterbart, Volkamer
ST 2022	2400078	Die Bedeutung von ISMS im Datensicherheitsrecht	2 SWS	Seminar / 🎤	Raabe
ST 2022	2400168	„Vom Original zur Kopie und vom Analogen zum Digitalen"	2 SWS	Seminar / 🎤	Dreier, Jehle
ST 2022	2400240	Grundlagen Ethik und IT	2 SWS	Seminar / 🎤	Dreier
ST 2022	24820	Current Issues in Patent Law	2 SWS	Seminar / 🧩	Melullis
Exams					
WT 21/22	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe
ST 2022	7500140	Seminar: Legal Studies I			Dreier, Boehm, Melullis, Matz

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Below you will find excerpts from events related to this course:

V Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung
2400061, SS 2022, 2 SWS, Open in study portal
Seminar (S) On-Site

Content

- Registration via https://portal.wiwi.kit.edu/ys/5877

Organizational issues
nach Vereinbarung

T 7.349 Course: Seminar: Legal Studies II [T-INFO-105945]

Responsible:	Prof. Dr. Thomas Dreier
Organisation:	KIT Department of Informatics
Part of:	M-WIWI-101808 - Seminar Module

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Version** 1

Events					
WT 21/22	2400014	Current Issues in Patent Law	2 SWS	Seminar / 🗣	Melullis
WT 21/22	2400125	Security and Privacy Awareness	2 SWS	Seminar / 🔀	Boehm, Seidel-Saul, Volkamer, Aldag
WT 21/22	2400311	Seminar "Aktuelle Probleme des Markenrechts"	2 SWS	Seminar	Matz
ST 2022	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar / 🗣	Bless, Boehm, Hartenstein, Mädche, Zitterbart, Volkamer
ST 2022	2400168	„Vom Original zur Kopie und vom Analogen zum Digitalen"	2 SWS	Seminar / 🗣	Dreier, Jehle
ST 2022	2400240	Grundlagen Ethik und IT	2 SWS	Seminar / 🗣	Dreier
Exams					
WT 21/22	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe

Legend: 🗔 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Below you will find excerpts from events related to this course:

V Security and Privacy Awareness
2400125, WS 21/22, 2 SWS, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Note: The link to enrol is for every student, regardless of the study background!

Dates:

- Kick-Off : 22.10.21, 14:00 o'clock
- Final version: 23.01.2022
- Presentation: 04.02.2022, 13:00 o'clock

Topics will be assigned after the enrolment deadline, before the Kick-Off.

Consider that legal focused topics require you to speak and understand german legal texts.

Topics:

- Phishing for Difference: How Does Phishing Impact Visually-Impaired Users?
- Wann wird Marketing im Security-Kontext ethisch bedenklich?
- Untersuchung der Wahrnehmung von (technischen) Backdoors zur Strafverfolgung.
- Data-Governance-Act – Fluch oder Segen für den Datenschutz?
- Würde lieber kein Thema anbieten, notfalls "Was ist der Wert von Privatheit?"
- Massenüberwachung von Kommunikationsknotenpunkten und Chilling Effects -- Eine rechtliche und ethische Auseinandersetzung
- Verletzt algorithmische Analyse von personenbezogenen Daten durch KI Privatheit -- und wenn ja, wie schlimm ist das?

ATTENTION: The seminar is only for MASTER students!

V Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung
2400061, SS 2022, 2 SWS, Open in study portal

Seminar (S)
On-Site

Content

- Registration via https://portal.wiwi.kit.edu/ys/5877

Organizational issues
nach Vereinbarung

T   7.350 Course: Seminar: Patent Law [T-INFO-111403]

Responsible: Markus Dammler
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	24186	Seminar Patent Law	2 SWS	Seminar / 📱	Dammler
Exams					
WT 21/22	7500150	Seminar: Patent Law			Dreier, Matz
WT 21/22	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T   7.351 Course: Service Design Thinking [T-WIWI-102849]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101503 - Service Design Thinking

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	12	Grade to a third	Irregular	4

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

Annotation
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems". For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

T 7.352 Course: Service Innovation [T-WIWI-102641]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101448 - Service Management
M-WIWI-102754 - Service Economics and Management
M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2022	2595468	Service Innovation	2 SWS	Lecture / 🗣	Satzger
Exams					
WT 21/22	7900009	Service Innovation			Satzger
ST 2022	7900266	Service Innovation			Satzger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.). A bonus can be acquired through successful participation in the exercise. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by one grade (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Service Innovation
2595468, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Continuous innovation is a prerequisite for firms to stay competitive. While innovation in manufacturing or agriculture can build on a considerable body of research, experience and best practices, innovation in services has not reached the same level of maturity.

This course takes a close look at the topic of service innovation. We will lay the foundations with an initial overview of service innovation including the basic concepts, challenges and innovation processes. We will compare product and service innovation and understand how innovation diffusion works.

The second part focuses on applicable methods and tools for service innovation: we will cover possible sources of innovations, ways to identify opportunities for innovations and the potential of service innovations built on data. For example, open and closed innovation approaches will be contrasted, the benefits of leveraging user communities to drive innovation will be explored and the human-centric innovation approach (Service) Design Thinking will be introduced. We will also look into the opportunities that technology offers for service innovation.

The last part of the lecture covers the management of service innovation and insights from practice. You will understand obstacles and enablers, and learn how to manage, incentivize and foster service innovation.

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), 155-175.
- Christensen, Clayton M. (2013). The Innovator's Dilemma - when new technologies cause great firms to fail. Boston, Massachusetts: Harvard Business Review Press.
- Rogers, S. (2003). Diffusion of Innovations. 5. ed. New York: Free Press.
- Chesbrough, H. W. (2011). Open services innovation - rethinking your business to grow and compete in a new era. 1. ed. San Francisco: Jossey-Bass.
- Chesbrough, H. (2011). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons.
- Uebernickel, F., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2015). Design Thinking: Das Handbuch. Frankfurt am Main: Frankfurter Allgemeine Buch.
- Runco, M.A. (2014). Creativity: Theories and Themes: Research, Development, and Practice (2nd ed.). Amsterdam: Academic Press.

T 7.353 Course: SIL Entrepreneurship Emphasis [T-WIWI-110287]

Responsible:	Prof. Dr. Orestis Terzidis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2500002	SIL Entrepreneurship Emphasis	2-4 SWS	Seminar	Terzidis
Exams					
WT 21/22	7900041	SIL Entrepreneurship Emphasis			Terzidis

Competence Certificate

Alternative exam assessment (§4(2), 3 SPO). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar. In addition, smaller, ungraded tasks are provided in the course to monitor progress.

Prerequisites

None

Recommendation

None

T	**7.354 Course: SIL Entrepreneurship Project [T-WIWI-110166]**

Responsible:	Prof. Dr. Orestis Terzidis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 21/22	2545082	SIL Entrepreneurship Project	2-4 SWS	Seminar	Terzidis
Exams					
WT 21/22	7900037	SIL Entrepreneurship Project			Terzidis

Competence Certificate

Alternative exam assessment (§4(2), 3 SPO). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar. In addition, smaller, ungraded tasks are provided in the course to monitor progress.

Prerequisites

None

Recommendation

None

T 7.355 Course: Simulation Game in Energy Economics [T-WIWI-108016]

Responsible:	Dr. Massimo Genoese
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2022	2581025	Simulation Game in Energy Economics	3 SWS	Lecture / Practice (/ 🗣	Genoese, Zimmermann

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

Competence Certificate
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Prerequisites
None

Recommendation
Visiting the course "Introduction to Energy Economics"

Annotation
The number of participants is limited.
There is a registration procedure via CAS followed by a selection of the participants.

Below you will find excerpts from events related to this course:

V Simulation Game in Energy Economics
2581025, SS 2022, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

Assessment: presentation and written summary

Prerequisites: Basics in Energy economics ad markets are advantageous.

Organizational issues
CIP-Pool West, Raum 102, Geb. 06.41 - siehe Institutsaushang

Literature
Weiterführende Literatur:

Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

T   7.356 Course: Site Management [T-BGU-103427]

Responsible:	Prof. Dr.-Ing. Shervin Haghsheno
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101884 - Lean Management in Construction
	M-BGU-101888 - Project Management in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each summer term	1

Events					
ST 2022	6241801	Site Management	1 SWS	Lecture / Practice (/ ⚙	N.N.
Exams					
WT 21/22	8240103427	Site Management			Haghsheno

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T   7.357 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 Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2581023	(Smart) Energy Infrastructure	2 SWS	Lecture / ❁	Ardone, Pustisek
Exams					
WT 21/22	7981023	Smart Energy Infrastructure			Fichtner

Legend: ▯ Online, ❁ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

None.

Below you will find excerpts from events related to this course:

V	**(Smart) Energy Infrastructure** 2581023, WS 21/22, 2 SWS, Language: German, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Content

- Basic terms and concepts
- Meaning of infrastructure
- Excursus: regulation of infrastructure
- Natural gas transportation
- Natural gas storage
- Electricity transmission
- (Overview) Crude oil and oil product transportation

T 7.358 Course: Smart Grid Applications [T-WIWI-107504]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101446 - Market Engineering
	M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 21/22	2540452	Smart Grid Applications	2 SWS	Lecture	Staudt, van Dinther
WT 21/22	2540453	Übung zu Smart Grid Applications	1 SWS	Lecture	Staudt, Henni
Exams					
WT 21/22	7900235	Smart Grid Applications			Weinhardt
WT 21/22	7900308	Smart Grid Applications			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

The lecture will be read for the first time in winter term 2018/19.

T 7.359 Course: Social Choice Theory [T-WIWI-102859]

Responsible:	Prof. Dr. Clemens Puppe
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101500 - Microeconomic Theory
	M-WIWI-101504 - Collective Decision Making

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events

ST 2022	2520537	Social Choice Theory	2 SWS	Lecture / 🔊	Müller, Kretz
ST 2022	2520539	Übung zu Social Choice Theory	1 SWS	Practice / 🔊	Kretz, Müller

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an alternative exam assessment (open book exam). The exam takes place in every summer semester.

Prerequisites

None

Below you will find excerpts from events related to this course:

V Social Choice Theory

2520537, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

How should (political) candidates be elected? What are good ways of merging individual judgments into collective judgments? Social Choice Theory is the systematic study and comparison of how groups and societies can come to collective decisions.

The course offers a rigorous and comprehensive treatment of judgment and preference aggregation as well as voting theory. It is divided into two parts. The first part deals with (general binary) aggregation theory and builds towards a general impossibility result that has the famous Arrow theorem as a corollary. The second part treats voting theory. Among other things, it includes prooving the Gibbard-Satterthwaite theorem.

Literature

Main texts:

- Hervé Moulin: Axioms of Cooperative Decision Making, Cambridge University Press, 1988
- Christian List and Clemens Puppe: Judgement Aggregation. A survey, in: Handbook of rational & social choice, P.Anand,P.Pattanaik, C.Puppe (Eds.), Oxford University Press 2009.

Secondary texts:

- Amartya Sen: Collective Choice and Social Welfare, Holden-Day, 1970
- Wulf Gaertner: A Primer in Social Choice Theory, revised edition, Oxford University Press, 2009
- Wulf Gaertner: Domain Conditions in Social Choice Theory, Oxford University Press, 2001

T 7.360 Course: Sociotechnical Information Systems Development [T-WIWI-109249]

Responsible:	Prof. Dr. Ali Sunyaev
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events

ST 2022	2512400	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	3 SWS	Practical course / 📱	Sunyaev, Pandl, Goram
ST 2022	2512401	Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course / 📱	Sunyaev, Pandl, Goram

Exams

WT 21/22	7900080	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	Sunyaev
WT 21/22	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)	Sunyaev
ST 2022	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)	Sunyaev

Legend: 📱 Online, 🗺 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

The alternative exam assessment consists of an implementation and a final thesis documenting the development and use of the application.

Prerequisites

None.

Below you will find excerpts from events related to this course:

V Advanced Lab Development of Sociotechnical Information Systems (Bachelor)
2512400, SS 2022, 3 SWS, Language: German/English, Open in study portal

**Practical course (P)
Online**

Content

The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

V Development of Sociotechnical Information Systems (Master)
2512401, SS 2022, 3 SWS, Language: German/English, Open in study portal

**Practical course (P)
Online**

Content

The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

T 7.361 Course: Software Quality Management [T-WIWI-102895]

Responsible:	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2022	2511208	Software Quality Management	2 SWS	Lecture / 🗣	Alpers
ST 2022	2511209	Übungen zu Software-Qualitätsmanagement	1 SWS	Practice / 🗣	Frister, Forell

Exams				
WT 21/22	7900027	Software Quality Management		Oberweis
ST 2022	79AIFB_STQM_A5	Software Quality Management (Registration until 18 July 2022)		Oberweis

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Software Quality Management**	Lecture (V)
	2511208, SS 2022, 2 SWS, Language: German, Open in study portal	On-Site

Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

Learning objectives:
Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of sofware certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

Recommendations:
Programming knowledge in Java and basic knowledge of computer science are expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 2008
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Weitere Literatur wird in der Vorlesung bekanntgegeben.

T 7.362 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
	M-WIWI-101497 - Agglomeration and Innovation

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2561260	Spatial Economics	2 SWS	Lecture / ✗	Ott
WT 21/22	2561261		1 SWS	Practice / ✗	Ott, Assistenten
Exams					
WT 21/22	7900075	Spatial Economics			Ott
ST 2022	7900103	Spatial Economics			Ott

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as an open-book examination, or as a 60-minute written examination.

Prerequisites

None

Recommendation

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses "Economics I" [2600012], and "Economics II" [2600014]. In addition, an interest in quantitative-mathematical modeling is required. The attendance of the course "Introduction to economic policy" [2560280] is recommended.

Annotation

Due to the research semester of Prof. Dr. Ingrid Ott, the course will not be offered in the winter semester 2021/22. The exam will take place. Preparation materials can be found in ILIAS.

Below you will find excerpts from events related to this course:

V **Spatial Economics**
2561260, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
Cancelled

Content

The course covers the following topics:

- Geography, trade and development
- Geography and economic theory
- Core models of economic geography and empirical evidence
- Agglomeration, home market effect, and spatial wages
- Applications and extensions

Learning objectives:

The student

- analyses how spatial distribution of economic activity is determined.
- uses quantitative methods within the context of economic models.
- has basic knowledge of formal-analytic methods.
- understands the link between economic theory and its empirical applications.
- understands to what extent concentration processes result from agglomeration and dispersion forces.
- is able to determine theory based policy recommendations.

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. An interest in mathematical modeling is advantageous.

Workload:

The total workload for this course is approximately 135 hours.

- Classes: ca. 30 h
- Self-study: ca. 45 h
- Exam and exam preparation: ca. 60 h

Assessment:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Organizational issues

Die Vorlesung wird im WiSe 2021 aufgrund eines Forschungssemesters nicht gelesen. Die Prüfung findet statt. Vorbereitungsmaterialien finden Sie im ILIAS.

Literature

Steven Brakman, Harry Garretsen, Charles van Marrewijk (2009): The New Introduction to Geographical Economics, 2nd ed, Cambridge University Press.

Weitere Literatur wird in der Vorlesung bekanntgegeben.
(Further literature will be announced in the lecture.)

T 7.363 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-101411 - Information Engineering
M-WIWI-101506 - Service Analytics
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Exams			
WT 21/22	7900178	Special Topics in Information Systems: Continuous Deployment: Building an Integrated Dev-Ops Environment	Weinhardt
WT 21/22	7900263	Special Topics in Information Systems	Weinhardt
WT 21/22	7900370	Special Topics in Information Systems: Interpretable Recommender Systems	Weinhardt

Competence Certificate

The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.

Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

Prerequisites
see below

Recommendation
None

Annotation
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in "Information Systems" so far. With this course students majoring in "Industrial Engineering and Management" and "Economics Engineering" also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 7.364 Course: Startup Experience [T-WIWI-111561]

Responsible:	Prof. Dr. Orestis Terzidis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
WT 21/22	2545004	Startup Experience	4 SWS	Seminar / ♻	González
ST 2022	2545004	Startup Experience	4 SWS	Seminar / 🗣	González, Finner, Terzidis
Exams					
WT 21/22	7900186	Startup Experience			Terzidis
ST 2022	7900186	Startup Experience			Terzidis

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Competence Certificate
Alternative exam assessment. Details on the design of the examination performance of other types will be announced in the course.The grade is composed of a presentation and a written paper (plus any specified documentation, e.g. work results, experience diary, reflection).

Recommendation
Lecture Entrepreneurship already completed

Annotation
The language in the seminar is English. The seminar contents will be published on the chair homepage.

Below you will find excerpts from events related to this course:

V	**Startup Experience** 2545004, WS 21/22, 4 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

In the Startup Experience course, you develop entrepreneurial competences that enable you to develop a new venture. In an entrepreneurial project, you have three main goals:

1. Identify and develop an opportunity. Who is your target customer and what problem or task does he or she have? How attractive and how big is this market?

2. How will you provide value for them? How can you use specific resources, including technology to develop a solution?

3. How can you conceive and set up a viable organization? Which business model do you suggest to create, deliver, and capture value?

After the teams have been formed, they start with an analysis of the personal values and competences of the team members. This will create a basis for their common project.

The focus of the seminar is on technology-based venturing. In this context, we will use the TAS (Technology-Application-Selection) approach developed at the EnTechnon. By default, we start from KIT patents (but you can also 'bring with you' other new technologies). We analyze the technology and use creativity techniques to find potential applications. Among other approaches, we will systematically explore applications around the UN sustainable development goals. Prototyping, business model development, and pitching are part of the seminar.

Learning Objectives

You will be able to explore deep technology venturing opportunities and create new products and services. The pedagogical approach is that of action learning. In a team, you will experience typical challenges and processes related to setting up a new business and develop the corresponding entrepreneurial competences.

After completing this course, the course participants will be able to:

- Characterize the core process of Deep Tech Venturing,
- Describe their personal core values and competences, and the relationship to the entrepreneur-opportunity nexus,
- Use a technology characterization canvas to extract the core characteristics of a technology,
- Apply creativity techniques to ideate potential applications,
- Use utility analysis approaches to select a promising technology application,
- Develop a value proposition based on techniques like the value proposition canvas or the jobs-to-be-done method,
- Use approaches of technology impact assessment to implement responsible innovation processes,
- Apply advanced business modeling methods to develop a sound business concept,
- Develop and deliver a concise presentation ("pitch") to communicate you project.

Additional information:

Alternative exam assessment. The grade consists of the presentation and the written elaboration. Potentially, a 'project diary' of the seminar progress may be part of the deliverables (depends on tutor and will be communicated at the kick-off).

For a successful course completion, we expect you to submit a Business Plan with the following features:

- Scope: 9000 words,
- Sound and clear structure,
- Expression and spelling are correct
- Complete and correct references, quotations, etc.
- Visual elements are chosen appropriately
- Documentation and traceability of data acquisition, analysis and evaluation,
- Content is developed according to the course instructions.

Furthermore, we expect you to deliver a team Pitch.

- Duration: will be communicated (typically 7 minutes)
- Content: Introduction/Purpose; Problem; Solution; Business Model; Prototype; Competition; Management Team; Current Status and next steps,
- Layout and form: appropriate choice,
- Appearance: appropriate amount of visual elements,
- Data: well researched and organized visually
- Story Line: is sound; clear and convincing.

Organizational issues

The seminar will be conducted in Zoom and/or face-to-face (Detailed information will be available in ILIAS). In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation. The seminars will be held in English.

V	**Startup Experience** 2545004, SS 2022, 4 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Content

From the conception of an idea to the final pitch, experience the life of a founder yourself through the seminar Startup X. Challenge yourself to experience the life of an entrepreneur and learn how to attain resources to realize your vision.

Go through the different districts with us to let your idea become a validated business model. You will start your entrepreneurial journey in the **Opportunity district**, where you will open your eyes to the world's needs and discover your core values and competencies. In the **Problem** and **Solutiondistricts**, you will find out the pains of your customers and how you can design, build and test a solution for them. In the **Market district**, you will identify the competitors and learn how to reach your customers. The **Company district** will enable you to set up your own organization, including the core people, core assets, and key activities. Your ability to express your business idea to investors and stakeholders will be developed in the **Communication district**. Prototyping, business model development, and pitching are part of the seminar.

Learning Objectives

The pedagogical approach is that of action learning. In a team, you will experience typical challenges and processes related to setting up a new business and develop the corresponding entrepreneurial competences.

After completing this course, the course participants will be able to:

- Describe why personal and team core values are essential for team formation and how they can affect startup projects
- Develop a sound value proposition for a target customer
- Recognize Business Opportunities
- Build a Prototype
- Create concrete Business Model
- Pitch their Business Ideas to potential investors

Organizational issues

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

T 7.365 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	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture	Heller
Exams					
WT 21/22	7900146	Statistical Modeling of generalized regression models			Heller

Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites

None

Recommendation

Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Below you will find excerpts from events related to this course:

V Statistical Modeling of Generalized Regression Models
2521350, WS 21/22, 2 SWS, Open in study portal   Lecture (V)

Content

Learning objectives:

The student has profound knowledge of generalized regression models.

Requirements:

Knowledge of the contents covered by the course *Economics III: Introduction in Econometrics" [2520016]*.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

T 7.366 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2521331	Stochastic Calculus and Finance	2 SWS	Lecture	Safarian
Exams					
WT 21/22	7900225	Stochastic Calculus and Finance			Safarian

Competence Certificate

The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.).

Prerequisites

None

Annotation

For more information see http://statistik.econ.kit.edu/

Below you will find excerpts from events related to this course:

V Stochastic Calculus and Finance
2521331, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Learning objectives:

After successful completion of the course students will be familiar with many common methods of pricing and portfolio models in finance. Emphasis we be put on both finance and the theory behind it.

Content:

The course will provide rigorous yet focused training in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus: Stochastic Processes, Brownian Motion and Martingales, Entropy, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes, Stable and Levy processes.
2. Mathematical Finance: Pricing Models, The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Incomplete Markets, Markets with Transaction Costs, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem, CAPM), Equilibrium models, Numerical Methods.

Workload:

Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours

Organizational issues

Blockveranstaltung, Termine werden über Ilias bekannt gegeben

Literature

- Dynamic Asset Pricing Theory, Third Edition by D. Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models by S. E. Shreve, Springer, 2003
- Stochastic Finance: An Introduction in Discrete Time by H. Föllmer, A. Schied, de Gruyter, 2011
- Methods of Mathematical Finance by I. Karatzas, S. E. Shreve, Springer, 1998
- Markets with Transaction Costs by Yu. Kabanov, M. Safarian, Springer, 2010
- Introduction to Stochastic Calculus Applied to Finance by D.Lamberton, B. Lapeyre, Chapman&Hall,1996

T 7.367 Course: Strategic Finance and Technology Change [T-WIWI-110511]

Responsible:	Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

Type Written examination	**Credits** 1,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Exams				
WT 21/22	7900219	Strategic Finance and Technoloy Change		Ruckes
ST 2022	7900268	Strategic Finance and Technoloy Change		Ruckes

Competence Certificate

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

Prerequisites

None

Recommendation

Attending the lecture "Financial Management" is strongly recommended.

T   7.368 Course: Strategic Foresight China [T-WIWI-110986]

Responsible:	Prof. Dr. Marion Weissenberger-Eibl
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Competence Certificate
Alternative exam assessment.

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

T 7.369 Course: Strategic Transport Planning [T-BGU-103426]

Responsible: Volker Waßmuth
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	6232808	Strategische Verkehrsplanung	2 SWS	Lecture / 🗣	Waßmuth
Exams					
WT 21/22	8240103426	Strategic Transport Planning			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.370 Course: Strategy and Management Theory: Developments and "Classics" [T-WIWI-106190]

Responsible:	Prof. Dr. Hagen Lindstädt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 21/22	2577921	Strategy and Management Theory: Developments and "Classics" (Master)	2 SWS	Seminar / 📱	Lindstädt

Exams			
WT 21/22	7900120	Strategy and Management Theory: Developments and "Classics"	Lindstädt

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a conclusion meeting. Details on the design of the performance review will be announced during the lecture.

Prerequisites

None

Recommendation

Basic knowledge as conveyed in the bachelor module „Strategy and Organization" is recommended.

Annotation

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V	**Strategy and Management Theory: Developments and "Classics" (Master)** 2577921, WS 21/22, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Online**

Content

In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a final meeting. Details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

Organizational issues

siehe Homepage

T	**7.371 Course: Successful Transformation Through Innovation [T-WIWI-111823]**

Responsible: Malte Busch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Irregular	Version 1

Exams				
ST 2022	7900025	Successful Transformation Through Innovation		Weissenberger-Eibl

Competence Certificate
Alternative exam assessments. The grade consists of an presentation of the results (50%) and a seminar paper (50%).

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

| **T** | **7.372 Course: Supplement Enterprise Information Systems [T-WIWI-110346]** |

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Competence Certificate
The assessment of this course is a written or (if necessary) oral examination.

Prerequisites
None

Annotation
This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but is not equivalent to another course of this topic.

T **7.373 Course: Supplement Software- and Systemsengineering [T-WIWI-110372]**

Responsible:	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101472 - Informatics
	M-WIWI-101628 - Emphasis in Informatics
	M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate
The assessment of this course is a written or (if necessary) oral examination.

Prerequisites
None

Annotation
This course can be used in particular for the acceptance of external courses whose content is in the broader area of software and systems engineering, but cannot assigned to another course of this topic.

T 7.374 Course: Supply Chain Management in the Automotive Industry [T-WIWI-102828]

Responsible:	Tilman Heupel
	Hendrik Lang
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101412 - Industrial Production III
	M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2581957	Supply Chain Management in the automotive industry	2 SWS	Lecture / 🖥	Heupel, Lang
Exams					
WT 21/22	7981957	Supply Chain Management in the Automotive Industry			Schultmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Supply Chain Management in the automotive industry
2581957, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

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

Organizational issues
Blockveranstaltung, siehe Homepage

Literature
Wird in der Veranstaltung bekannt gegeben.

T   7.375 Course: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]

Responsible:	Claus J. Bosch
	Dr. Mathias Göbelt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101412 - Industrial Production III
	M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2022	2581961	Supply Chain Management with Advanced Planning Systems	2 SWS	Lecture / 🎤	Göbelt, Bosch

Exams				
WT 21/22	7981961	Supply Chain Management with Advanced Planning Systems		Schultmann

Legend: 📱 Online, ♺ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites

None

Recommendation

None

Below you will find excerpts from events related to this course:

V	**Supply Chain Management with Advanced Planning Systems**	Lecture (V)
	2581961, SS 2022, 2 SWS, Language: English, Open in study portal	**On-Site**

Content

This lecture deals with supply chain management from a practitioner's perspective with a special emphasis Advanced Planning Systems (APS) and the planning domain. The software solution SAP SCM, one of the most widely used Advanced Planning Systems, is used as an example to show functionality and application of an APS in practice.

First, the term supply chain management is defined and its scope is determined. Methods to analyze supply chains as well as indicators to measure supply chains are derived. Second, the structure of an APS (advanced planning system) is discussed in a generic way. Later in the lecture, the software solution SAP SCM is mapped to this generic structure. The individual planning tasks and software modules (demand planning, supply network planning / sales & operations planning, production planning / detailed scheduling, deployment, transportation planning, global available-to-promise) are presented by discussing the relevant business processes, providing academic background, describing typical planning processes and showing the user interface and user-related processes in the software solution. At the end of the lecture, implementation methodologies and project management approaches for SAP SCM are covered.

Contents

1. Introduction to Supply Chain Management

1.1.   Supply Chain Management Fundamentals

1.2.   Supply Chain Management Analytics

2. Structure of Advanced Planning Systems

3. SAP SCM

3.1.   Introduction / SCM Solution Map

3.2.   Demand Planning

3.3.   Supply Network Planning / Sales & Operations Planning

3.4.   Production Planning and Detailed Scheduling

3.5.   Deployment

3.6.   Transportation Planning / Global Available to Promise

3.7.   Cloud-based Supply Chain Planning

4. SAP SCM in Practice

4.1.   Project Management and Implementation

4.2.   SAP Implementation Methodology

Literature

will be announced in the course

T 7.376 Course: Sustainability in Mobility Systems [T-BGU-111057]

Responsible:	PD Dr.-Ing. Martin Kagerbauer
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101064 - Fundamentals of Transportation
	M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 21/22	6232906	Sustainability in Mobility Systems	2 SWS	Lecture / 🖥	Kagerbauer, Plötz, Gnann
Exams					
WT 21/22	8245111057	Sustainability in Mobility Systems			Kagerbauer

Legend: 🖥 Online, ⚘ Blended (On-Site/Online), 🎙 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min., computer-based

Prerequisites
none

Recommendation
none

Annotation

T 7.377 Course: Sustainable Vehicle Drivetrains [T-MACH-111578]

Responsible:	Prof. Dr. Thomas Koch
	Dr.-Ing. Olaf Toedter
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2133132	Sustainable Vehicle Drivetrains	2 SWS	Lecture / 🗣	Toedter
Exams					
WT 21/22	76-T-MACH-105655	Sustainable Vehicle Drivetrains			Toedter

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam (20 minutes)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Sustainable Vehicle Drivetrains
2133132, WS 21/22, 2 SWS, Open in study portal

Lecture (V)
On-Site

Content
Sustainability

Environmental balance

Legislation

Alternative fuels

BEV

Fuel cell

Hybrid drives

Organizational issues
Die Vorlesung beginnt um 14 h und endet um 15:30 h (nicht um 17:30 h)

T	**7.378 Course: Tax Law [T-INFO-111437]**

Responsible: Detlef Dietrich
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2022	24646	Tax Law	2 SWS	Lecture / 🗣	Dietrich
Exams					
ST 2022	7500120	Tax Law			Dreier, Matz

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 7.379 Course: Technologies for Innovation Management [T-WIWI-102854]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	2

Events					
WT 21/22	2545106	Technologies for Innovation Management	2 SWS	Block / 🗎	Koch
Exams					
WT 21/22	7900239	Technologies for Innovation Management			Weissenberger-Eibl

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

Competence Certificate
Presentation and individual paper (ca. 15 pages) as alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovationsmanagement: Konzepte, Strategien und Methoden is recommended.

Below you will find excerpts from events related to this course:

V Technologies for Innovation Management
2545106, WS 21/22, 2 SWS, Language: German, Open in study portal

Block (B)
Online

Content
The seminar "Technologies for Innovation Management" will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 7.380 Course: Technology Assessment [T-WIWI-102858]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management
is recommended.

Annotation
See German version.

T 7.381 Course: Telecommunication and Internet Economics [T-WIWI-102713]

Responsible:	Prof. Dr. Kay Mitusch
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101406 - Network Economics
	M-WIWI-101409 - Electronic Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 21/22	2561232	Telecommunication and Internet Economics	2 SWS	Lecture / ♟	Mitusch
WT 21/22	2561233	Übung zu Telekommunikations- und Internetökonomie	1 SWS	Practice / ♟	Mitusch, Wisotzky, Corbo
Exams					
WT 21/22	7900246	Telecommunication and Internet Economics			Mitusch

Legend: ▯ Online, ♟ Blended (On-Site/Online), ♟ On-Site, ✗ Cancelled

Competence Certificate
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None

Recommendation
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.

Particularly helpful but not necessary: Industrial Economics. Prior attendance of the lecture „Competition in Networks" [26240] or "Industrial Organisation" is helpful in any case but not considered a formal precondition. The english taught course "Communications Economics" is complementary and recommendet for anyone interested in the sector.

Annotation
Due to the research semester of Prof. Mitusch the course for partial performance will not be offered in the winter semester 2020/2021. An examination will be offered in each semester.

Below you will find excerpts from events related to this course:

V Telecommunication and Internet Economics
2561232, WS 21/22, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
J.-J. Laffont, J. Tirole (2000): Competition in Telecommunications, MIT Press.

Zarnekow, Wulf, Bronstaedt (2013): Internetwirtschaft: Das Geschäft des Datentransports im Internet.

Weitere Literatur wird in den einzelnen Veranstaltungen angegeben

T 7.382 Course: Telecommunications Law [T-INFO-101309]

Responsible:	Dr. Yoan Hermstrüwer
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101217 - Public Business Law

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2022	24632	Telekommunikationsrecht	2 SWS	Lecture / 🔲	Döveling
Exams					
WT 21/22	7500049	Telecommunications Law			Dreier
ST 2022	7500085	Telecommunications Law			Dreier

Legend: 🔲 Online, 🔀 Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T 7.383 Course: Tendering, Planning and Financing in Public Transport [T-BGU-101005]

Responsible:	Prof. Dr.-Ing. Peter Vortisch
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101064 - Fundamentals of Transportation
	M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Events					
ST 2022	6232807	Wettbewerb, Planung und Finanzierung im ÖPNV	2 SWS	Lecture / 🗣	Pischon
Exams					
ST 2022	8245101005	Tendering, Planning and Financing in Public Transport			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation

T   7.384 Course: The negotiation of open innovation [T-WIWI-110867]

Responsible:	Dr. Daniela Beyer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101507 - Innovation Management
	M-WIWI-101507 - Innovation Management

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Examination of another type	3	Grade to a third	Once	1

Competence Certificate

Non exam assessment.

The following aspects are included in the evaluation:

- Exposé of the seminar paper (15%)
- Preparation of the methodology (15%) (interview guide, quantitative survey, etc.)
- informed participation and preparation of the simulation game (20%)
- written elaboration (50%).

Prerequisites

None

Recommendation

Prior attendance of the course Innovation Management [2545015] is recommended.

T 7.385 Course: Topics in Experimental Economics [T-WIWI-102863]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101505 - Experimental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Competence Certificate
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

Annotation
The course is offered in summer 2020 for the next time, not in summer 2018.

T 7.386 Course: Topics in Stochastic Optimization [T-WIWI-112109]

Responsible:	Prof. Dr. Steffen Rebennack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101473 - Mathematical Programming
	M-WIWI-101637 - Analytics and Statistics
	M-WIWI-102832 - Operations Research in Supply Chain Management
	M-WIWI-103289 - Stochastic Optimization

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

Competence Certificate

Students will be given problem sets on which they work in groups. The problem sets will involve the implementation of the models presented in the course, and exploring features of these models. The groups will present their findings in front of the class. The grading will be based on the presentation.

Recommendation

A solid understanding of Stochastic Optimization and/or Optimization under Uncertainty as well as optimization in general is highly recommended, since we will heavily build upon basics of these areas.

T 7.387 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 Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 21/22	24136	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
ST 2022	24609	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
Exams					
WT 21/22	7500061	Trademark and Unfair Competition Law			Dreier, Matz
ST 2022	7500051	Trademark and Unfair Competition Law			Dreier, Matz

Legend: 📱 Online, ❁ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 7.388 Course: Traffic Engineering [T-BGU-101798]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	6232703	Straßenverkehrstechnik	2 SWS	Lecture / Practice (/ 🗣	Vortisch, Mitarbeiter/innen
Exams					
WT 21/22	8240101798	Traffic Engineering			Vortisch
ST 2022	8240101798	Traffic Engineering			Vortisch

Legend: 🗎 Online, ✣ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

Below you will find excerpts from events related to this course:

V Straßenverkehrstechnik
6232703, WS 21/22, 2 SWS, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture teaches basic principles and skills necessary to understand the methods and tools of traffic engineering, including theoretical background information as well as application of the relevant manuals and guidelines.

- Applications of traffic engineering: design of infrastructure and traffic control
- Description and analysis of traffic flow: Basic principles (kinematics, measurements of traffic flows, microscopic and macroscopic traffic parameters, Fundamental diagram)
- Methods in traffic engineering: travel demand structure, traffic flow characteristics, Queuing theory, Level-of-Service-concepts
- Capacity analysis for intersections with and without signalisation (entries and weaving sections, roundabouts and signal-controlled intersection),
- Backgrounds and application of the German Highway Capacity Manual
- Design of signal control (Fixed time signal controls, vehicle actuated control, „green waves", network control, progressive signal systems) including public transport (prioritizing systems) and other transport modes (bicycles, pedestrians)
- Introduction to traffic management (for more detailed information see lecture "Transport Management and Transport Telematics [6232802])

T   7.389 Course: Traffic Flow Simulation [T-BGU-101800]

Responsible:	Prof. Dr.-Ing. Peter Vortisch
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	6232804	Simulation von Verkehr	2 SWS	Lecture / Practice (/ ❖	Vortisch, Mitarbeiter/innen
Exams					
WT 21/22	8240101800	Traffic Flow Simulation			Vortisch
ST 2022	8240101800	Traffic Flow Simulation			Vortisch

Legend: 📱 Online, ❖ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

Below you will find excerpts from events related to this course:

V   Simulation von Verkehr
6232804, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content
The lecture teaches basic principles and application of traffic flow simulation tools in traffic engineering and transport planning.

This includes application of simulation software as well as the knowledge about models and how to deal with the stochastic nature of simulation results.

The lecture teaches the application of microscopic traffic flow simulation using the simulation software PTV Vissim, combining practical and theoretical aspects. Theoretical aspects include car following models, lane changing behavior and route choice models. Calibration and validation of the models will be explained and demonstrated by practical examples. Furthermore, German and American guidelines for the application of simulation models will be discussed and background information will be given.

In addition to the lectures, students will build a microscopic traffic flow model of an intersection. The aim is to practically apply what has been learned and to deepen the modeling knowledge.

Coordination: Weyland, Claude

T 7.390 Course: Traffic Management and Transport Telematics [T-BGU-101799]

Responsible:	Prof. Dr.-Ing. Peter Vortisch
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2022	6232802	Verkehrsmanagement und Telematik	2 SWS	Lecture / Practice (/ 🗣	Vortisch
Exams					
WT 21/22	8240101799	Traffic Management and Transport Telematics			Vortisch
ST 2022	8240101799	Traffic Management and Transport Telematics			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.391 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2022	2560230	Transport Economics	2 SWS	Lecture	Mitusch, Szimba
ST 2022	2560231	Übung zu Transportökonomie	1 SWS	Practice	Mitusch, Szimba, Wisotzky
Exams					
WT 21/22	7900232	Transport Economics			Mitusch

Competence Certificate

The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Below you will find excerpts from events related to this course:

V Transport Economics
2560230, SS 2022, 2 SWS, Language: German, Open in study portal   **Lecture (V)**

Content

The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticans and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport
- empirical analysis of transport demand
- assessment of transport infrastructure projects
- external effects in transport
- transport policy
- cost structures of transport infrastructure
- Project evaluation from the perspective of the public sector

Literature
Literatur:

Aberle, G: Transportwirtschaft: einzelwirtschaftliche und gesamtwirtschaftliche Grundlagen München; Wien: Oldenbourg, 2003.

Blauwens, G., De Baere, P. and Van der Voorde, E. (2006): Transport Economics.

Frerich, J; Müller, G: Europäische Verkehrspolitik, Landverkehrspolitik München; Wien: Oldenbourg, 2004.

Dasgupta, A, Pearce, D (1972): Cost-Benefit Analysis, MacMillan, London.

Europäische Kommission (2008): Guide to Cost Benefit Analysis of Investment Projects, online unter http://ec.europa.eu/regional_policy/sources/Ben-Akiva, M., Meerseman, H., and Van de Voorde, E. (2008): Recent developments in transport modelling: Lessons for the freight sector.

Ortúzar, J. d. D. and Willumsen, L. (1990): Modelling Transport.

T	**7.392 Course: Transportation Data Analysis [T-BGU-100010]**

Responsible: PD Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	6232901	Empirische Daten im Verkehrswesen	2 SWS	Lecture / Practice (/ 🗣	Kagerbauer
Exams					
WT 21/22	8245100010	Transportation Data Analysis			Kagerbauer
ST 2022	8245100010	Transportation Data Analysis			Kagerbauer

Legend: 🗎 Online, ⚉ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

| T | **7.393 Course: Transportation Systems [T-BGU-106610]** |

Responsible:	Prof. Dr.-Ing. Peter Vortisch
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-BGU-101064 - Fundamentals of Transportation

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 2

Events					
ST 2022	6200406	Transportation Systems	2 SWS	Lecture / 🗣	Vortisch
Exams					
WT 21/22	8230106610	Transportation Systems			Vortisch

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T   7.394 Course: Tunnel Construction and Blasting Engineering [T-BGU-101846]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	6241903	Tunnelbau und Sprengtechnik	2 SWS	Lecture / 🧩	Haghsheno, Scheuble, Matz
Exams					
WT 21/22	8240101846	Tunnel Construction and Blasting Engineering			Haghsheno

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🍃 On-Site, ✘ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.395 Course: Turnkey Construction [T-BGU-111921]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction
M-BGU-105592 - Digitalization in Facility Management

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each term	Expansion 1 terms	Version 1

Events					
ST 2022	6241808	Turnkey Construction	2 SWS	Lecture / Practice (/ ⚙	Teizer

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation

T   7.396 Course: Tutorial Global Production [T-MACH-110981]

Responsible:	Prof. Dr.-Ing. Gisela Lanza
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101282 - Global Production and Logistics
	M-MACH-101284 - Specialization in Production Engineering
	M-MACH-105455 - Strategic Design of Modern Production Systems

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each winter term	2

Events					
WT 21/22	2149611	Tutorial Global Production	1 SWS	Practice / 🧩	Lanza
Exams					
WT 21/22	76-T-MACH-110981	Tutorial Global Production			Lanza
ST 2022	76-T-MACH-110981	Tutorial Global Production			Lanza

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Alternative achievement (ungraded). Successful completion of the case studies required. Further information will be announced in the course Global Production.

Below you will find excerpts from events related to this course:

V	**Tutorial Global Production**	**Practice (Ü)**
	2149611, WS 21/22, 1 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

Content

The exercise serves as a supplement to the lecture Global Production and deals with the practical implementation of the management of global production networks of manufacturing companies. The contents conveyed in the lecture are put into practice in the exercise and supplemented by lectures from industry and research. The exercise initially builds on a basic understanding of the influencing factors and challenges of global production. Common methods and procedures for planning, designing and managing global production networks are applied in online case studies based on the restructuring of a fictitious company.

According to the lecture, the exercise is divided into three aspects: production strategy, network configuration and network management.

First of all, the exercise shows the connections between the company strategy and the production strategy and highlights the tasks necessary to define a production strategy. Subsequently, in the context of the design of global production networks, methods for site selection, site-specific adaptation of product design and production technology as well as for the establishment of a new production site and the adaptation of existing production networks to changing conditions are taught. With regard to the management of global production networks, the exercise primarily addresses the topic of procurement and supplier management in greater depth.

The topics in detail are:

- Production strategies for global production Networks
- From corporate strategy to production strategy
- Tasks of the production strategy (product portfolio management, recycling management, vertical integration planning, production-related research and development)
- Design of global production Networks
- Ideal-typical network structures
- Planning process for designing the network structure
- Adaptation of the network structure
- Choice of Location
- Production adjustment to suit the Location
- Management of global production Networks
- Coordination in global production Networks
- Procurement process

Learning Outcomes

The students ...

- are able to apply defined procedures for site selection and evaluate a site decision with the help of different Methods.
- are capable of selecting adequate design options for site-specific production and product design on a case-specific basis.
- can explain the central elements of the planning process when setting up a new production site.
- are capable of applying the methods for the design and layout of global production networks to individual Company problems.
- are able to show the challenges and potentials of the corporate divisions sales, procurement and research and development on a global level.

Workload:

e-Learning: ~ 20 h
regular attendance: ~ 10 h
self-study: covered in the course of the lecture.

Organizational issues
Start: 05.11.2021

Übungstermine alle zwei Wochen freitags 16:00 Uhr - 17:30 Uhr.

Lectures every other week on Fridays, 16:00 h - 17:30 h.

T	**7.397 Course: Upgrading of Existing Buildings [T-BGU-111218]**

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105597 - Facility Management in Hospitals

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each term	Expansion 1 terms	Version 1

Events					
WT 21/22	6240901	Bauen im Bestand	3 SWS	Lecture / Practice (	Lennerts, Schneider
Exams					
WT 21/22	8240111218	Upgrading of Existing Buildings			Lennerts, Schneider

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation

T 7.398 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 21/22	2530212	Valuation	2 SWS	Lecture / 🖥	Ruckes
WT 21/22	2530213	Übungen zu Valuation	1 SWS	Practice / 🖥	Ruckes, Luedecke
Exams					
WT 21/22	7900057	Valuation			Ruckes
ST 2022	7900072	Valuation			Ruckes

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V	**Valuation** 2530212, WS 21/22, 2 SWS, Language: English, Open in study portal	**Lecture (V) Online**

Literature
Weiterführende Literatur

Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T 7.399 Course: Virtual Engineering I [T-MACH-102123]

Responsible:	Prof. Dr.-Ing. Jivka Ovtcharova
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101283 - Virtual Engineering A

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 21/22	2121352	Virtual Engineering I	2 SWS	Lecture / ⚙	Ovtcharova
WT 21/22	2121353	Exercises Virtual Engineering I	2 SWS	Practice / ⚙	Ovtcharova, Mitarbeiter
Exams					
WT 21/22	76-T-MACH-102123	Virtual Engineering I			Ovtcharova
ST 2022	76-T-MACH-102123	Virtual Engineering I			Ovtcharova

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
Writen examination 90 min.

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Virtual Engineering I** 2121352, WS 21/22, 2 SWS, Language: English, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Content
The course includes:

- Conception of the product (system approaches, requirements, definitions, structure)
- Generation of domain-specific product data (CAD, ECAD, software, …) and AI methods
- Validation of product properties and production processes through simulation
- Digital twin for optimization of products and processes using AI methods

After successful attendance of the course, students can:

- conceptualize complex systems with the methods of virtual engineering and continue the product development in different domains
- model the digital product with regard to planning, design, manufacturing, assembly and maintenance.
- use validation systems to validate product and production in an exemplary manner.
- Describe AI methods along the product creation process.

Literature
Vorlesungsfolien / Lecture slides

V	**Exercises Virtual Engineering I** 2121353, WS 21/22, 2 SWS, Language: English, Open in study portal	**Practice (Ü) Blended (On-Site/Online)**

Content
The theoretical Konzepts and contents of the lecture will be trained within practical relevance by basic functionalities of VE System solutions.

Organizational issues
Practice dates will probably be offered on different afternoons (14:00 - 17:15) in two-week intervals at the IMI in Kriegsstrasse 77 / Übungstermine werden voraussichtlich an unterschiedlichen Nachmittagen (14:00 - 17:15) in zweiwöchigem Rhythmus am IMI in der Kriegsstrasse 77 angeboten.

Literature
Exercise script / Übungsskript

T 7.400 Course: Virtual Engineering II [T-MACH-102124]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2022	2122378	Virtual Engineering II	2/1 SWS	Lecture / Practice (/ 👤	Ovtcharova, Häfner
Exams					
WT 21/22	76-T-MACH-102124	Virtual Engineering II			Ovtcharova, Häfner
ST 2022	76-T-MACH-102124	Virtual Engineering II			Ovtcharova, Häfner

Legend: 📱 Online, ✿ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
Writen examination 90 min.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Virtual Engineering II
2122378, SS 2022, 2/1 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ) On-Site

Content
The course includes:

- Fundamentals (Computer Graphics, VR, AR, MR)
- Hardware and Software Solutions
- Virtual Twin, Validation and application

After successful attendance of the course, students can:

- describe Virtual Reality concepts, as well as explaining and comparing the underlying technologies
- discuss the modeling and computer-internal picture of a VR scene and explain the operation of the pipeline to visualize the scene
- designate different systems to interact with a VR scene and assess the pros and cons of manipulation and tracking devices
- differentiate between static, dynamic and functional Virtual Twins
- describe applications and validation studies with Virtual Twins in the area of building and production

Organizational issues
Zusätzliche Übungszeiten (1 SWS) werden zu Vorlesungsbegin bekannt gegeben / Additional practice times (1 SWS) will be announced at the beginning of the lecture.

Literature
Vorlesungsfolien / Lecture slides

T 7.401 Course: Virtual Engineering Lab [T-MACH-106740]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

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

Events					
WT 21/22	2123350	Virtual Engineering Lab	3 SWS	Project (P / ♻	Ovtcharova, Mitarbeiter
ST 2022	2123350	Virtual Engineering Lab	3 SWS	Project (P / ♟	Ovtcharova, Häfner
Exams					
WT 21/22	76-T-MACH-106740	Virtual Engineering Lab			Ovtcharova, Häfner

Legend: ▤ Online, ♻ Blended (On-Site/Online), ♟ On-Site, ✗ Cancelled

Competence Certificate
Assessment of another type (graded), procedure see webpage.

Below you will find excerpts from events related to this course:

V	**Virtual Engineering Lab**	**Project (PRO)**
	2123350, WS 21/22, 3 SWS, Language: German/English, Open in study portal	**Blended (On-Site/Online)**

Content

- Introduction in Virtual Reality (hardware, software, applications)
- Exercises in the task specific software systems
- Autonomous project work in the area of Virtual Reality in small groups

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Keine / None

V	**Virtual Engineering Lab**	**Project (PRO)**
	2123350, SS 2022, 3 SWS, Language: German/English, Open in study portal	**On-Site**

Content

- Introduction in Virtual Reality (hardware, software, applications)
- Exercises in the task specific software systems
- Autonomous project work in the area of Virtual Reality in small groups

Organizational issues
Siehe Webseite zur Lehrveranstaltung / see web page of the lecture

Literature
Keine / None

T   7.402 Course: Virtual Solution Methods and Processes [T-MACH-111285]

Responsible: Dipl.-Ing. Thomas Maier
                    Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
                    M-MACH-101283 - Virtual Engineering A

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

Events					
WT 21/22	2121003	Virtual Solution Methods and Processes	4 SWS	Project (P / ✳	Maier
ST 2022	2121003	Virtual Solution Methods and Processes	4 SWS	Project (P / ●	Ovtcharova, Maier
Exams					
WT 21/22	76-T-MACH-111285	Virtual Solution Methods and Processes			Ovtcharova

Legend: ▯ Online, ✳ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Graded examination performance of another type weighted according to: 30% project documentation, 30% colloquium and 40% successfully completed project task.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V   Virtual Solution Methods and Processes
2121003, WS 21/22, 4 SWS, Language: German/English, Open in study portal

**Project (PRO)
Blended (On-Site/Online)**

Content
Requirements, SysML, Modelica, high performance computing, process modeling, Virtual Twin

Students can:

- Collect requirements for large technical systems (e.b.: Helmholtz large-scale device KATRIN).
- Describe physical systems across domains with the modeling language Modelica and simulate the systems behavior.
- Generate complex FE meshes for simulations of structural mechanics, electrodynamics or fluid mechanics.
- Perform advanced simulations on mainframe computers and prepare and explain results in a self-explanatory manner.
- Individually design a small project and carry it out independently.

Organizational issues
Siehe ILIAS und Homepage zur Lehrveranstaltung

V   Virtual Solution Methods and Processes
2121003, SS 2022, 4 SWS, Language: German/English, Open in study portal

**Project (PRO)
On-Site**

Content

Requirements, SysML, Modelica, high performance computing, process modeling, Virtual Twin

Students can:

- Collect requirements for large technical systems (e.b.: Helmholtz large-scale device KATRIN).
- Describe physical systems across domains with the modeling language Modelica and simulate the systems behavior.
- Generate complex FE meshes for simulations of structural mechanics, electrodynamics or fluid mechanics.
- Perform advanced simulations on mainframe computers and prepare and explain results in a self-explanatory manner.
- Individually design a small project and carry it out independently.

T 7.403 Course: Virtual Training Factory 4.X [T-MACH-106741]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

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

Events					
WT 21/22	2123351	Virtual training factory 4.X		/ 🗣	Ovtcharova, Mitarbeiter
ST 2022	2123351	Virtual training factory 4.X	3 SWS	Project (P / 🧩	Ovtcharova
Exams					
WT 21/22	76-T-MACH-106741	Virtual training factory 4.X			Ovtcharova

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Assessment of another type (graded), procedure see webpage.

Below you will find excerpts from events related to this course:

V	**Virtual training factory 4.X** 2123351, WS 21/22, SWS, Language: German, Open in study portal	**On-Site**

Content
In interdisciplinary teams, the creation of a product is implemented in the style of a start-up. The event is carried out across universities in cooperation with the HsKA.

Organizational issues
Siehe ILIAS zur Lehrveranstaltung

Literature
Keine / None

V	**Virtual training factory 4.X** 2123351, SS 2022, 3 SWS, Language: German, Open in study portal	**Project (PRO) Blended (On-Site/Online)**

Content
In interdisciplinary teams, the creation of a product is implemented in the style of a start-up. The event is carried out across universities in cooperation with the HsKA.

Organizational issues
Siehe ILIAS

Literature
Keine / None

T 7.404 Course: Warehousing and Distribution Systems [T-MACH-105174]

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

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2022	2118097	Warehousing and distribution systems	2 SWS	Lecture / 🎤	Furmans
Exams					
WT 21/22	76-T-MACH-105174	Warehousing and Distribution Systems			Furmans, Mittwollen
ST 2022	76-T-MACH-105174	Warehousing and Distribution Systems			Furmans

Legend: 📱 Online, ⚖ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Warehousing and distribution systems
2118097, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
ARNOLD, Dieter, FURMANS, Kai (2005)
Materialfluss in Logistiksystemen, 5. Auflage, Berlin: Springer-Verlag

ARNOLD, Dieter (Hrsg.) et al. (2008)
Handbuch Logistik, 3. Auflage, Berlin: Springer-Verlag

BARTHOLDI III, John J., HACKMAN, Steven T. (2008)
Warehouse Science

GUDEHUS, Timm (2005)
Logistik, 3. Auflage, Berlin: Springer-Verlag

FRAZELLE, Edward (2002)
World-class warehousing and material handling, McGraw-Hill

MARTIN, Heinrich (1999)
Praxiswissen Materialflußplanung: Transport, Hanshaben, Lagern, Kommissionieren, Braunschweig, Wiesbaden: Vieweg

WISSER, Jens (2009)
Der Prozess Lagern und Kommissionieren im Rahmen des Distribution Center Reference Model (DCRM); Karlsruhe : Universitätsverlag

Eine ausführliche Übersicht wissenschaftlicher Paper findet sich bei:

**ROODBERGEN, Kees Jan (2007)**
Warehouse Literature

T 7.405 Course: Water Chemistry and Water Technology I [T-CIWVT-101900]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101121 - Water Chemistry and Water Technology I

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 21/22	22621	Water Technology	2 SWS	Lecture / 🗣	Horn
WT 21/22	22622	Excersises to Water Technology	1 SWS	Practice / ⚙	Horn, und Mitarbeiter
WT 21/22	22664	Practical Course: Water Quality and Water Assessment	2 SWS	Practical course / ⚙	Horn, Abbt-Braun, und Mitarbeiter
Exams					
WT 21/22	7232001	Water Chemistry and Water Technology I			Horn, Abbt-Braun
ST 2022	7232001	Water Chemistry and Water Technology I			Horn, Abbt-Braun

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
T-CIWVT-103351 - Wasserchemisches Praktikum must be passed.

T 7.406 Course: Water Quality Assessment [T-CIWVT-108841]

Responsible:	Dr. Gudrun Abbt-Braun
Organisation:	KIT Department of Chemical and Process Engineering
Part of:	M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 21/22	22603	Scientific Principles for Water Quality Assessment	2 SWS	Lecture / ⚙	Abbt-Braun
WT 21/22	22604	Excercises and Demonstration for 22603 Scientific Principles for Water Quality Assessment	1 SWS	Practice / ⚙	Abbt-Braun, Horn, und Mitarbeiter
Exams					
WT 21/22	7232603	Water Quality Assessment			Abbt-Braun
ST 2022	7232603	Water Quality Assessment			Abbt-Braun

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

The examination is an oral examination with a duration of about 30 minutes (section 4 subsection 2 number 2 SPO).

Prerequisites

None

T 7.407 Course: Web App Programming for Finance [T-WIWI-110933]

Responsible:	TT-Prof. Dr. Julian Thimme
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101480 - Finance 3
	M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Once	1

Competence Certificate

Non exam assessment according to § 4 paragraph 3 of the examination regulation. (Anmerkung: gilt nur für SPO 2015). The grade is made up as follows: 50% result of the project (R-code), 50% presentation of the project.

Prerequisites

None

Recommendation

The content of the bachelor course Investments is assumed to be known and necessary to follow the course.

T   7.408 Course: Wildcard Seminar Module Master [T-WIWI-110215]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence see Annotations	Version 1

T 7.409 Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

Responsible:	Prof. Dr. Hagen Lindstädt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
ST 2022	2577922	Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)	2 SWS	Seminar / 🎤	Lindstädt

Legend: 📱 Online, ⚅ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the performance review will be announced during the lecture.

Prerequisites

None

Recommendation

Basic knowledge as conveyed in the bachelor module „Strategy and Organization" is recommended.

Annotation

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

Below you will find excerpts from events related to this course:

V	**Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)** 2577922, SS 2022, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content

In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

Learning Objectives:

Students

- are able to analyze business strategies and derive recommendations for the management
- learn to express their position through compelling reasoning in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you werealready admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

T 7.410 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 Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Irregular	Version 1

Events					
ST 2022	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar / 🗣	Lindstädt

Legend: 📱 Online, ⚛ Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Competence Certificate

The evaluation of the performance takes place through the active participation in the discussion rounds; an appropriate preparation is expressed here and a clear understanding of the topic and framework becomes recognizable. Further details on the design of the performance review will be announced during the lecture.

Prerequisites

None

Recommendation

Basic knowledge as conveyed in the bachelor module „Strategy and Organization" is recommended.

Annotation

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V	**Workshop aktuelle Themen Strategie und Management (Master)** 2577923, SS 2022, 2 SWS, Language: German, Open in study portal	Seminar (S) On-Site

Content

In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

The assessment of performance is made through active participation in the discussion rounds; adequate preparation is expressed here and a clear understanding of the topic and framework becomes evident. Further details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you werealready admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

T 7.411 Course: X-ray Optics [T-MACH-109122]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics

Type Oral examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Events					
WT 21/22	2141007	X-ray Optics	2 SWS	Lecture / 🔊	Last
ST 2022	2141007	X-ray optics	2 SWS	Lecture / 🔊	Last
Exams					
WT 21/22	76-T-MACH-109122	X-ray Optics			Last
ST 2022	76-T-MACH-109122	X-ray Optics			Last

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate
oral exam (about 20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V X-ray Optics
2141007, WS 21/22, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Organizational issues
Termin und Ort nach Absprache mit den Angemeldeten

Literature
M. Born und E. Wolf
Principles of Optics, 7th (expanded) edition
Cambridge University Press, 2010

A. Erko, M. Idir, T. Krist und A. G. Michette
Modern Developments in X-Ray and Neutron Optics
Springer Series in Optical Sciences, Vol. 137
Springer-Verlag Berlin Heidelberg, 2008

D. Attwood
Soft X-Rays and Extreme Ultraviolet Radiation: Principles and Applications
Cambridge University Press, 1999

V X-ray optics
2141007, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
see Institute homepage

If you are interested, please contact arndt.last@kit.edu by 30.5.2022 to make an appointment.

Organizational issues
Viertägiger Blockkurs im Juni oder Juli 2022. Interessenten melden sich bitte zur Terminabsprache bis zum 30.5.2022 bei
arndt.last@kit.edu