Module Handbook
Economics Engineering B.Sc.

SPO 2015

Summer term 2021

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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:

> Ralf Hilser
> Anabela Relvas
> Telefon +49 721 608-43768
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2 Study plan

The Bachelor's degree program in Economics Engineering entails a six-semester standard study period. The basic program is structured systematically and provides one with the fundamental knowledge in Economics Engineering. From the fourth semester, a more advanced, specialization program that can be structured depending on one's personal interests and goals is offered.

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

Term	Credits	Business Administration	Economics	Informatics	Operations Research	Law	Physics ODER Chemistry		Statistics	Mathematics	Electives	Internship Bachelor Thesis
1 (WT)	32	BUS FA 4 CP BUS SMIEM 3 CP	ECON 1 5 CP	PROG 1 5 CP		Civil Law 5 CP Public Law 1 3 CP				MATH 1 7 CP		
2 (ST)	33	BUS PEM 4 CP	ECON 2 5 CP	INFO 1 5 CP	OR1 4,5 CP	Public Law 2 3 CP			STAT 1 5 CP	MATH 2 7 CP		
3 (WT)	33	ACC 4 CP		INFO 2 5 CP	OR2 4,5 CP		Physics 1 7 CP	Gen./Inorg. Chemistry 7 CP	STAT 2 5 CP	MATH 3 7 CP		
4 (ST)	29,5		ECON 3 5 CP				Physics 2 7 CP	Gen./Inorg. Prac. 7 CP			Seminar Module 3 CP	Internship 10 CP
5 (WT)	27	BUS 9 CP	ECON 9 CP	ECON 9 CP							Elect. Module 9 CP	Elect. Module 9 CP	
6 (ST)	25,5											Bachelor Thesis 12 CP
	180											

Figure 2: Structure of the Bachelor's degree program in Engineering Economics SPO2015 (recommended)

In the **basic program** (blue), the shown modules under business administration, economics, informatics, law, physics/chemistry, mathematics and statistics are compulsory. One can choose between physics and chemistry.

In the **specialization program** (green), two modules from economics and one module from business administration must be selected. As part of the mandatory courses, one seminar module (independent of the course) and two optional modules must be completed. The two modules can be selected from informatics, operations research, business administration, economics, engineering, science, operations research, engineering, statistics, law or sociology. Basically, both optional modules can also be integrated in one course. Only one module should be omitted from law and sociology.

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

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

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

3 Qualification objectives of the Bachelor's degree in Economics Engineering

Graduates of the Bachelor's degree in Economics Engineering are equipped with strategically oriented knowledge in economics, science, law, mathematics and information technology acquired during the three-semester core program.

The economics section includes economic-related topics from microeconomics, macroeconomics and econometrics as well as finance, business management, information industry, production management, marketing and accounting.

The math section is divided into mathematics, statistics and operations research. It includes analysis and linear algebra, descriptive and inductive statistics, elementary probability theory and optimization methods.

In the engineering field, the focus is either on the physical or chemical field.

Under law, the topics of private law and public law are covered.

The technological area is covered by the Applied and Theoretical Informatics.

Through the comprehensive methodological basis, the graduates are in a position to acknowledge and apply specialized basic concepts, methods, models and approaches. They are also able to analyze and review economic, legal and technological structures as well as situations and processes.

They can apply the relevant mathematical and scientific concepts and methods as well as legal knowledge to solve concrete tasks.

The graduates have deeper knowledge in economics, business administration and selectively in statistics, informatics, operations research, law, sociology and engineering.

They are able to react based on this knowledge from the different subjects and disciplines. They thereby largely operate independently and can review, analyze, interpret and evaluate economic, legal, scientific and technical topics systematically. They can model and classify specialized problems and then come up with appropriate methods and procedures for solving the given tasks and derive improvement potentials.

The know how to validate, illustrate and interpret the obtained results.

This practical use of their know-how also takes into account the social, scientific and ethical aspects.

Graduates of the Bachelor's degree in Economics Engineering can assume responsibility in interdisciplinary teams, technically argue and defend their position before both expert representatives and laypersons.

They have the ability to apply the acquired information to career-related activities in the industry, service sector or in the public management as well as take up a Master's degree program in Economics Engineering or any other related course.

4 Key Skills

The Bachelor's degree course in Economics Engineering at the 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. 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 compulsory courses during the bachelor programme, namely

- Basic programme in economics and business science
- Seminar module
- Mentoring of the bachelor thesis
- Internship
- Business science, economics and informatics modules

5 Field of study structure

Mandatory	
Preliminary Exam *This field will not influence the calculated grade of its parent.*	
Bachelor Thesis	12 CR
Internship	10 CR
Business Administration	24 CR
Economics	33 CR
Informatics	15 CR
Operations Research	9 CR
Law	11 CR
Physics or Chemistry	14 CR
Statistics	10 CR
Mathematics	21 CR
Compulsory Elective Modules	21 CR

5.1 Preliminary Exam

Mandatory		
M-WIWI-101726	Preliminary Exam *This module will not influence the calculated grade of this parent.*	0 CR

5.2 Bachelor Thesis

Credits
12

Mandatory		
M-WIWI-101612	Module Bachelor Thesis	12 CR

5.3 Internship

Credits
10

Mandatory		
M-WIWI-101610	Internship	10 CR

5.4 Business Administration

Credits 24

Mandatory		
M-WIWI-101494	Fundamentals of Business Administration 1	7 CR
M-WIWI-101578	Fundamentals of Business Administration 2	8 CR
Election block: Specialisation Program Business Administration (1 item)		
M-WIWI-101467	Design, Construction and Sustainability Assessment of Buildings	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-105610	Financial Data Science neu	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-104911	Information Systems & Digital Business: Interaction	9 CR
M-WIWI-104912	Information Systems & Digital Business: Platforms	9 CR
M-WIWI-104913	Information Systems & Digital Business: Servitization	9 CR
M-WIWI-101513	Human Resources and Organizations	9 CR
M-WIWI-101466	Real Estate Management	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-WIWI-105482	Machine Learning and Data Science	9 CR

5.5 Economics

Credits 33

Mandatory		
M-WIWI-105204	Economics	10 CR
M-WIWI-105203	Introduction in Econometrics	5 CR
Election block: Specialisation Program Economics (at least 18 credits)		
M-WIWI-101499	Applied Microeconomics	9 CR
M-WIWI-101403	Public Finance	9 CR
M-WIWI-101420	Econometrics and Economics	9 CR
M-WIWI-101608	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
M-WIWI-101668	Economic Policy I	9 CR
M-WIWI-101501	Economic Theory	9 CR

5.6 Informatics

Credits 15

Mandatory		
M-WIWI-101417	Foundations of Informatics	10 CR
M-WIWI-101581	Introduction to Programming	5 CR

5.7 Operations Research

Credits
9

Mandatory		
M-WIWI-101418	Introduction to Operations Research	9 CR

5.8 Law

Credits
11

Mandatory		
M-INFO-101190	Introduction to Civil Law	5 CR
M-INFO-101192	Constitutional and Administrative Law	6 CR

5.9 Physics or Chemistry

Credits
14

Election block: Physics or Chemistry (14 credits)		
M-CHEMBIO-102335	General and Inorganic Chemistry	7 CR
M-CHEMBIO-104026	Laboratory Work in Inorganic Chemistry	7 CR
M-PHYS-100283	Experimental Physics	14 CR

5.10 Statistics

Credits
10

Mandatory		
M-WIWI-101432	Introduction to Statistics	10 CR

5.11 Mathematics

Credits
21

Mandatory		
M-MATH-101676	Mathematics 1	7 CR
M-MATH-101677	Mathematics 2	7 CR
M-MATH-101679	Mathematics 3	7 CR

5.12 Compulsory Elective Modules

Credits
21

Election notes

The **seminar module** (independent of subject) and **two elective modules** are to be taken within the scope of the compulsory elective course. Both modules can be chosen from the following subjects: Informatics, Operations Research, Business Administration, Economics, Engineering, Natural Sciences, Statistics, Law or Sociology. In principle, both elective modules can also be completed in one subject. However, the subjects Law and Sociology may only have one module in total.

Mandatory		
M-WIWI-101816	Seminar Module	3 CR
Election block: Economics (at most 18 credits)		
M-WIWI-101499	Applied Microeconomics	9 CR
M-WIWI-101403	Public Finance	9 CR
M-WIWI-101420	Econometrics and Economics	9 CR
M-WIWI-101608	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
M-WIWI-101668	Economic Policy I	9 CR
M-WIWI-101501	Economic Theory	9 CR
Election block: Business Administration (at most 18 credits)		
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-105610	Financial Data Science neu	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-104911	Information Systems & Digital Business: Interaction	9 CR
M-WIWI-104912	Information Systems & Digital Business: Platforms	9 CR
M-WIWI-104913	Information Systems & Digital Business: Servitization	9 CR
M-WIWI-101513	Human Resources and Organizations	9 CR
M-WIWI-101466	Real Estate Management	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101421	Supply Chain Management	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-WIWI-105482	Machine Learning and Data Science	9 CR
Election block: Informatics (at most 18 credits)		
M-WIWI-101426	Electives in Informatics	9 CR
M-WIWI-105112	Applied Informatics	9 CR
Election block: Operations Research (at most 18 credits)		
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-103278	Optimization under Uncertainty	9 CR
Election block: Engineering Sciences (at most 18 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-102379	Power Network	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-101299	Mechanical Design	8 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-101270	Product Lifecycle Management	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-MACH-101284	Specialization in Production Engineering	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Election block: Statistics (at most 9 credits)		
M-WIWI-101608	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
Election block: Law or Sociology (at most 9 credits)		
M-INFO-101217	Public Business Law	9 CR
M-INFO-101215	Intellectual Property Law	9 CR
M-INFO-101216	Private Business Law	9 CR
M-GEISTSOZ-101167	Sociology/Empirical Social Research	9 CR
M-INFO-101191	Commercial Law	9 CR

6 Modules

M 6.1 Module: Applications of Operations Research [M-WIWI-101413]

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

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

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

Competence Certificate

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

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

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

Competence Goal

The student

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

Prerequisites

At least one of the courses *Facility Location and strategic Supply Chain Management* and *Tactical and operational Supply Chain Management* has to be taken.

Content

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

This module considers several areas of Supply Chain Management. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities like production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of Supply Chain Management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints.

Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Management, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

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

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

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

M 6.2 Module: Applied Informatics [M-WIWI-105112]

Responsible:	Prof. Dr. Andreas Oberweis
	Prof. Dr. Ali Sunyaev
	Prof. Dr. York Sure-Vetter
	Prof. Dr. Melanie Volkamer
Organisation:	KIT Department of Economics and Management
Part of:	Compulsory Elective Modules (Informatics)

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

Election block: Advanced Programming (1 item)			
T-WIWI-102747	Advanced Programming - Java Network Programming	4,5 CR	Ratz, Zöllner
T-WIWI-102748	Advanced Programming - Application of Business Software	4,5 CR	Klink, Oberweis
Election block: Compulsory Elective Area (1 item)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	Färber
T-WIWI-110341	Applied Informatics – Database Systems	4,5 CR	Oberweis
T-WIWI-110342	Applied Informatics – Information Security	4,5 CR	Volkamer
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-110338	Applied Informatics – Modelling	4,5 CR	Färber, Oberweis
T-WIWI-110343	Applied Informatics – Software Engineering	4,5 CR	Oberweis

Competence Certificate

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

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

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

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

Competence Goal

The student

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

Content

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

Workload

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

M   6.3 Module: Applied Microeconomics [M-WIWI-101499]

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

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

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-102876	Auction & Mechanism Design	4,5 CR	Szech
T-WIWI-102892	Economics and Behavior	4,5 CR	Szech
T-WIWI-102850	Introduction to Game Theory	4,5 CR	Puppe, Reiß
T-WIWI-102792	Decision Theory	4,5 CR	Ehrhart
T-WIWI-102844	Industrial Organization	4,5 CR	Reiß
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-102736	Economics III: Introduction in Econometrics	5 CR	Schienle
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

Competence Certificate

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

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

Competence Goal

Students

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

Prerequisites

None.

Content

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

Recommendation

Completion of the module Economics is assumed.

Workload

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

M   6.4 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 (Engineering Sciences)

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

Election block: Wahlpflicht (between 1 and 2 items)			
T-MACH-102194	Combustion Engines I	5 CR	Koch, Kubach
T-MACH-105564	Energy Conversion and Increased Efficiency in Internal Combustion Engines	4 CR	Koch, Kubach

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

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.

Prerequisites
None

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

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

M   6.5 Module: Combustion Engines II [M-MACH-101303]

Responsible: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules (Engineering Sciences)

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

Mandatory			
T-MACH-104609	Combustion Engines II	5 CR	Koch, Kubach
Election block: Verbrennungsmotoren II (at least 4 credits)			
T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment	4 CR	Deutschmann, Grunwaldt, Kubach, Lox
T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	4 CR	Gohl
T-MACH-105184	Fuels and Lubricants for Combustion Engines	4 CR	Kehrwald, Kubach
T-MACH-105167	Analysis Tools for Combustion Diagnostics	4 CR	Pfeil
T-MACH-105169	Engine Measurement Techniques	4 CR	Bernhardt
T-MACH-110817	Development of hybrid drivetrains	4 CR	Koch
T-MACH-110816	Großdiesel- und -gasmotoren für Schiffsantriebe	4 CR	Kubach
T-MACH-105649	Boosting of Combustion Engines	4 CR	Kech, Kubach
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.

Competence Goal
See courses.

Prerequisites
None

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 6.6 Module: Commercial Law [M-INFO-101191]

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

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

Mandatory			
T-INFO-102013	Exercises in Civil Law	9 CR	Dreier, Matz

M 6.7 Module: Constitutional and Administrative Law [M-INFO-101192]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: Law

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

Mandatory			
T-INFO-110300	Public Law I & II	6 CR	Eichenhofer

Workload
See German version.

M   6.8 Module: Design, Construction and Sustainability Assessment of Buildings [M-WIWI-101467]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)

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

Mandatory			
T-WIWI-102742	Design, Construction and Sustainability Assessment of Buildings I	4,5 CR	Lützkendorf
T-WIWI-102743	Design, Construction and Sustainability Assessment of Buildings II	4,5 CR	Lützkendorf

Competence Certificate

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

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

Competence Goal

The student

- knows the basics of sustainable design, construction and operation of buildings with an emphasis on building ecology
- has knowledge of building ecology assessment procedures and tools for design and assessment
- is capable of applying this knowledge to assessing the ecological advantageousness of buildings as well as their contribution to a sustainable development.

Prerequisites

None

Content

Sustainable design, construction and operation of buildings currently are predominant topics of the real estate sector, as well as "green buildings". Not only designers and civil engineers, but also other actors who are concerned with project development, financing and insurance of buildings or portfolio management are interested in these topics.

On the one hand the courses included in this module cover the basics of energy-efficient, resource-saving and health-supporting design and construction of buildings. On the other hand fundamental assessment procedures for analysing and communicating the ecological advantageousness of technical solutions are discussed. With the basics of green building certification systems the lectures provide presently strongly demanded knowledge.

Additionally, videos and simulation tools are used for providing a better understanding of the content of teaching.

Recommendation

The combination with the module *Real Estate Management* is recommended.

Furthermore a combination with courses in the area of

- Industrial production (energy flow in the economy, energy politics, emissions)
- Civil engineering and architecture (building physics, building construction)

is recommended.

Workload

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

M 6.9 Module: eBusiness and Service Management [M-WIWI-101434]

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

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

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-111307	Digital Services: Foundations	4,5 CR	Satzger, Weinhardt
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-109936	Platform Economy	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 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 strategic and operative design of information and information products,
- analyze the role of information on markets,
- evaluate case studies regarding information products,
- develop solutions in teams.

Prerequisites
None

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

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

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

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

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

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

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

| M | **6.10 Module: Econometrics and Economics [M-WIWI-101420]** |

Responsible: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)

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

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-103063	Analysis of Multivariate Data	4,5 CR	Grothe
T-WIWI-102792	Decision Theory	4,5 CR	Ehrhart
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-102844	Industrial Organization	4,5 CR	Reiß

Competence Certificate
See German version.

Competence Goal
See German version.

Prerequisites
For further information see German version.

Recommendation
None

Annotation
T-WIWI-102844 "Industrial Organization" replaces T-WIWI-102824 "Theory of Business Cycles" starting summer term 2016.

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

M   6.11 Module: Economic Policy I [M-WIWI-101668]

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

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

Mandatory			
T-WIWI-103213	Basic Principles of Economic Policy	4,5 CR	Ott
Election block: Compulsory Elective Courses (1 item)			
T-WIWI-109121	Macroeconomic Theory	4,5 CR	Brumm
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-102908	Personnel Policies and Labor Market Institutions	4,5 CR	Nieken
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

Competence Certificate

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

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

Competence Goal

Students shall be given the ability to

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

Prerequisites

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

Content

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

Recommendation

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

Workload

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

M 6.12 Module: Economic Theory [M-WIWI-101501]

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

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

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

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

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

Competence Goal
See German version.

Prerequisites
None

Content
The lecture Introduction to Game Theory focuses on the basics of non-cooperative game theory. Model assumptions, solution concepts and applications are discussed in detail both for simultaneous games (normal form games) and for sequential games (extensive form games). Classical equilibrium concepts like the Nash equilibrium or the subgame perfect equilibrium, but also advanced concepts will be discussed in detail. If necessary, a brief insight into cooperative game theory will also be given.

The course Auction & Mechanism Design starts with the basic theory of equilibrium behavior and yield management in single object standard auctions. After introducing the yield equivalence theorem for standard auctions, the focus shifts to mechanism design and its applications for single-object auctions and bilateral exchanges.

The course Economics and Behavior introduces fundamental topics of behavioural economics in terms of content and methodology. Students will also gain insight into the design of economic experimental studies. Students will also be introduced to the reading of and critical examination of current research in behavioural economics.

Recommendation
None

Annotation
The course T-WIWI-102609 - Advanced Topics in Economic Theory is currently not available.

M   6.13 Module: Economics [M-WIWI-105204]

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

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

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

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

Competence Goal
The student

- knows and understands the basics of economic problems
- understands current economic policy problems which occur in a globalized world
- is able to find a solution strategies using an economical approach

Prerequisites
None

Content
Essential concepts, methods and models of the micro and macroeconomic theory are discussed.

The lecture Economics I [2610012] discusses basics of game theory in addition to microeconomic decision theory, questions of market theory and problems of imperfect competition. Economics II [2600014] handles the economical organizational model, national accounts as well as international trade and monetary policy. Furthermore, complex growth, boom and economic speculations are discussed.

Recommendation
It is recommended to attend the lectures in the following order: Economics I: Microeconomics [2610012], Economics II: Macroeconomics [2600014], Economics III: Introduction in Econometrics [2520016].

Annotation
Notice: The lecture *Economics I: Microeconomics* [2610012] is part of the preliminary examination concerning § 8(1) of the examination regulation. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Workload
The total workload for this module is approximately 300 hours.

M   6.14 Module: eFinance [M-WIWI-101402]

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

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	3	8

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

Competence Certificate

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

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

Competence Goal

The students

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

Prerequisites

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

Content

The module "eFinance" addresses current problems in the finance sector. It is investigated the role of information and knowledge in the finance sector and how information systems can solve or extenuate them. Speakers from practice will contribute to lectures with their broad knowledge. Core courses of the module deal with the background of banks and insurance companies and the electronic commerce of stocks in global finance markets. In addtion the course Derivatives offers an insight into future and forward contracts as well as the assesment of options. Exchanges and International Finance are also alternatives which provide a suplementary understanding for capital markets.

Information management topics are the focus of the lecture "eFinance: Information Systems for Securities Trading". For the functioning of the international finance markets, it is necessary that there is an efficient information flow. Also, the regulatory frameworks play an important role. In this context, the role and the functioning of (electronic) stock markets, online brokers and other finance intermediaries and their platforms are presented. Not only IT concepts of German finance intermediaries are presented, but also international system approaches will be compared. The lecture is supplemented by speakers from the practice (and excursions, if possible) coming from the Deutsche Börse and the Stuttgart Stock Exchange.

Annotation

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

Workload

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

M 6.15 Module: Electives in Informatics [M-WIWI-101426]

Responsible:	Prof. Dr. Andreas Oberweis
	Prof. Dr. Ali Sunyaev
	Prof. Dr. York Sure-Vetter
	Prof. Dr. Melanie Volkamer
Organisation:	KIT Department of Economics and Management
Part of:	Compulsory Elective Modules (Informatics)

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

Election block: Compulsory Elective Area (between 1 and 2 items)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	Färber
T-WIWI-110341	Applied Informatics – Database Systems	4,5 CR	Oberweis
T-WIWI-110342	Applied Informatics – Information Security	4,5 CR	Volkamer
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-110338	Applied Informatics – Modelling	4,5 CR	Färber, Oberweis
T-WIWI-110343	Applied Informatics – Software Engineering	4,5 CR	Oberweis
T-WIWI-110711	Supplement Applied Informatics	4,5 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-104679	Foundations of Mobile Business	4,5 CR	Oberweis
Election block: Advanced Labs (at most 1 item)			
T-WIWI-111127	Advanced Lab Blockchain Hackathon (Bachelor)	4,5 CR	Sunyaev
T-WIWI-111124	Advanced Lab Sociotechnical Information Systems Development (Bachelor)	4,5 CR	Sunyaev
T-WIWI-110541	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer

Competence Certificate

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

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

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

Competence Goal

The student

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

Prerequisites

None

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

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

M 6.16 Module: Energy Economics [M-WIWI-101464]

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

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

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

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) about the lecture *Introduction into Energy Economics* [2581010] and one optional lecture of the module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

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

Competence Goal
The student

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

Prerequisites
The lecture *Introduction into Energy Economics* [2581010] has to be examined.

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

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

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

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.

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

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

M 6.17 Module: Essentials of Finance [M-WIWI-101435]

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

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

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

Competence Certificate

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

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

Competence Goal

The student

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

Prerequisites

None

Content

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

Workload

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

M   6.18 Module: Experimental Physics [M-PHYS-100283]

Responsible: Prof. Dr. Thomas Schimmel
Organisation: KIT Department of Physics
Part of: Physics or Chemistry

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

Mandatory			
T-PHYS-100278	Experimental Physics	14 CR	Schimmel

Competence Certificate
The grade of the module is determined by a written exam.

Prerequisites
none

Workload
Total workload with 14 credit points: approx. 420 hours.

M 6.19 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 (Engineering Sciences)

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

Election block: Compulsory Elective Courses (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.

Competence Goal
See German version.

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.

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

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

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

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

Competence Certificate

The module examination is an alternative exam assessment and consists of two parts in which a maximum of 100 points can be achieved:

In the first part of the examination, a maximum of 30 points can be achieved, which are distributed equally weighted over eight worksheets to be submitted during the semester. The worksheets of the first three weeks are representative for all following worksheets in terms of scope and degree of difficulty. With the beginning of the 4th week of the course, the handing in of the worksheets is considered to be part of the alternative exam assessment.

A maximum of 70 points can be achieved in the second part of the examination. For this part of the examination, the student write a "Final Exam" in the last week of the lecture period, which takes 2 hours.

Detailed information about the course schedule and the module exam will be announced at the first course date.

A retake opportunity for those who do not pass the module exam will take place at the end of the fourth September calendar week of the same year. The registration for the examination must be made at least 1 day before the beginning of the examination. The following applies to deregistration for the examination: Deregistration can be made online in the student portal up to 1 day before the start of the examination.

Competence Goal

The objective of the module is to provide fundamental financial knowledge for advanced applications in Financial Data Science and Financial Machine Learning. The course teaches concepts and provides weekly Python assignments to scientifically address the following topics: Robo Advisory, Linear Factor Models, Statistical Arbitrage, Monte Carlo Simulation, and Financial Machine Learning. The course is for the students, who are interested in financial markets, as well as for the students, who are interested in Data Science. Scientific financial market knowledge helps in creating financial innovations, such as a Robo Advisor. Practical knowledge in using Python helps in coding machines, which are essential for offering automated financial market solutions.

Content

The module covers the following topics:

- Robo Advisory: Investor preferences, Expected utility theory, Mean-variance optimal investing
- Linear Factor Models: prediction of returns, decomposition of risks, Capital Asset Pricing Model, Arbitrage Pricing Theory
- Statistical Arbitrage: ARMA-GARCH Modeling of Return Time Series
- Monte Carlo Simulation: Simulation of ARMA-GARCH processes
- Machine Learning: Least Squares Methods, Maximum Likelihood, Prediction of Returns, Prediction of Risks
- New developments in asset management: factor investing, smart beta, I-CAPM, Fama-MacBeth estimation of risk premia, factor anomalies

Annotation

Please note that the module is only offered every second summer semester (SS2021, SS2023).

Workload

The total workload for this module is approx. 270 hours (9 credit points). The total number of hours results from the effort for studying online videos, working on quiz questions, studying Ipython-Notebooks, participating in interactive "Python Sessions" and reading the recommended literature.

M 6.21 Module: Foundations of Informatics [M-WIWI-101417]

Responsible:	Dr. rer. nat. Pradyumn Kumar Shukla
	Prof. Dr. York Sure-Vetter
Organisation:	KIT Department of Economics and Management
Part of:	Informatics

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

Mandatory			
T-WIWI-102749	Foundations of Informatics I	5 CR	Färber
T-WIWI-102707	Foundations of Informatics II	5 CR	Herbold

Competence Certificate

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

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

- Foundations of Informatics I: Written exam in the first week of the recess period (60 min)
- Foundations of Informatics II: Written exam in the first week of the recess period (90 min). It is possible to gain 0,3-0,4 additional grading points for a passed exam by successful completion of a bonus exam.

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

Competence Goal

The student

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

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

Prerequisites

None

Content

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

Recommendation

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

Workload

The total workload for this module is approximately 300 hours.

M 6.22 Module: Foundations of Marketing [M-WIWI-101424]

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

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

Mandatory			
T-WIWI-102805	Managing the Marketing Mix	4,5 CR	Klarmann
Election block: Supplementary Courses (at least 4,5 credits)			
T-WIWI-111367	B2B Sales Management	4,5 CR	Klarmann

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

- are familiar with the most important concepts, procedures and theories of the four instruments of the marketing mix (product management, price management, communication management and sales management)
- have the knowledge to make decisions regarding current and future products (product innovations, e.g. by using conjoint analysis)
- know how customers perceive brands and how this perception can be influenced by the company
  understand how customers react to prices (e.g. using price-sales functions)
- can determine prices on the basis of conceptual and quantitative considerations
  know the basics of price differentiation
- are familiar with various communication instruments (e.g. TV advertising) and can design them accurately
- make communication decisions systematically (e.g. by means of media planning)
- can segment the market and position the product
- know how to assess the importance and satisfaction of customers
- can shape the relationship with customers and sales partners and know the basics of sales organization as well as essential sales channel decisions
- know about specifics of marketing in B2B
- are able to identify different B2B business types and their peculiarities in marketing and sales
- are able to prioritize customers and calculate B2B customer lifetime value
- are able to determine value-based prices and prepare and conduct B2B sales presentations

Prerequisites
The course *Marketing Mix* is compulsory and must be examined.

Content
The core course of the module is "Marketing Mix". This course is compulsory and must be examined. "Marketing Mix" contains instruments and methods that enable you to goal-oriented decisions in the operative marketing management (product management, pricing, promotion and sales management).
In the "B2B Sales Management" course, we impart knowledge about marketing and sales in environments in which companies themselves distribute and market (often technically highly complex) products to other companies ("business-to-business").

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

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

M 6.23 Module: Fundamentals of Business Administration 1 [M-WIWI-101494]

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

Organisation: KIT Department of Economics and Management

Part of: Business Administration (mandatory)

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

Mandatory			
T-WIWI-102817	Business Administration: Strategic Management and Information Engineering and Management	3 CR	Nieken, Ruckes
T-WIWI-102819	Business Administration: Finance and Accounting	4 CR	Ruckes, Uhrig-Homburg, Wouters

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the individual courses of this module. The examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedure of each course of this module is defined for each course separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- has core skills in business administration in particular with respect to decision making and the model based view of business corporations
- masters the fundamentals of business and information management as well as the fundamentals business finance and the principles of business accounting
- is able to analyze and assess central tasks, functions and decisions in modern corporations

The knowledge of the two fundamentals modules in business administration forms the basis for the successful completion of advanced courses in the field of business administration and management.

Prerequisites
None

Content
This module provides the fundamentals of business administration and management. Further, the module focuses on the fields of management and organization, information engineering and management, investment and financing as well as of the principles of management and financial accounting.

Recommendation
It is strongly recommended to take the courses in the first semester of study.

Workload
The total workload of the module is about 210 hours. The workload is proportional to the credit points of the individual courses.

M 6.24 Module: Fundamentals of Business Administration 2 [M-WIWI-101578]

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

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

Mandatory			
T-WIWI-102818	Business Administration: Production Economics and Marketing	4 CR	Fichtner, Klarmann, Lützkendorf, Ruckes, Schultmann
T-WIWI-102816	Financial Accounting and Cost Accounting	4 CR	Strych

Competence Certificate

The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module. The examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedures of each course of this module is defined for each course separately.

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

Competence Goal

The student

- has core skills in business administration in particular with respect to decision making and the model based view of business corporations
- masters the fundamentals of production and operations management and marketing as well as the fundamentals of management and financial accounting
- is able to analyze and assess central tasks, functions and decisions in modern corporations

The knowledge of the two fundamentals modules in business administration forms the basis for the successful completion of advanced courses in the field of business administration and management.

Prerequisites

None

Content

The basics of internal and external accounting and general business administration are taught as the theory of business in the company. Building on this, the focus will be on marketing and production management.

Recommendation

It is strongly recommended to take the courses in the second semester (Betriebswirtschaftslehre: Produktionswirtschaft und Marketing) and third semester (Rechnungswesen) of study.

Workload

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

M 6.25 Module: Fundamentals of Construction [M-BGU-101004]

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

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

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

Competence Goal

The student

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

Prerequisites

Recommendation

None

Annotation

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

M   6.26 Module: Fundamentals of Digital Service Systems [M-WIWI-102752]

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

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

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

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

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

Competence Goal
Students

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

Prerequisites
None

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

Recommendation
None

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

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

M 6.27 Module: General and Inorganic Chemistry [M-CHEMBIO-102335]

Organisation: KIT Department of Chemistry and Biosciences
Part of: Physics or Chemistry

Credits	**Grading scale**	**Language**	**Level**	**Version**
7	Grade to a tenth	German	3	1

Mandatory			
T-CHEMBIO-101866	General and Inorganic Chemistry	7 CR	Ruben

Prerequisites

M | 6.28 Module: Human Resources and Organizations [M-WIWI-101513]

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

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

Mandatory		
T-WIWI-102909	Human Resource Management	4,5 CR	Nieken
Election block: Supplementary Courses (between 4,5 and 5,5 credits)		
T-WIWI-102630	Managing Organizations	3,5 CR	Lindstädt
T-WIWI-102908	Personnel Policies and Labor Market Institutions	4,5 CR	Nieken
T-WIWI-102871	Problem Solving, Communication and Leadership	2 CR	Lindstädt

Competence Certificate

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

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

Competence Goal

The student

- knows and analyzes basic concepts, instruments, and challenges of present human resource and organizational management.
- uses the techniques he / she has learned to evaluate strategic situations which occur in human resource and organizational management.
- evaluates the strengths and weaknesses of existing structures and rules based on systematic criterions.
- Discusses and evaluates the practical use of models and methods by using case studies.
- has basic knowledge of fit and challenges of different scientific methods in the context of personnel and organizational economics.

Prerequisites

The course "Human Resource Management" is compulsory and must be examined.

Content

Students acquire basic knowledge in the field of human resource and organizational management. Strategic as well as operative aspects of human resource management practices are analyzed. The module offers an up-to-date overview over basic concepts and models. It also shows the strengths and weaknesses of rational concepts in human resources and organizational management.

The students learn to apply methods and instruments to plan, select, and manage staff. Current issues of organizational management or selected aspects of personnel politics are examined and evaluated.

The focus lies on the strategic analysis of decisions and the use microeconomic or behavioral approaches. Empirical results of field or lab studies are discussed critically.

Recommendation

Completion of module Business Administration is recommended.

Basic knowledge of microeconomics, game theory and statistics is recommended.

Workload

The total workload for this module is approximately 270 hours.

M 6.29 Module: Industrial Production I [M-WIWI-101437]

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

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

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

Competence Certificate

The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course "Fundamentals of Production Management" [2581950] and one further single course of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal

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

Prerequisites

The course "Fundamentals of Production Management" [2581950] and one additional activity have to be chosen.

Content

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

Workload

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

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

M   6.30 Module: Information Systems & Digital Business: Interaction [M-WIWI-104911]

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

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

Election block: Compulsory Elective Area ()			
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-109936	Platform Economy	4,5 CR	Dorner, Weinhardt
T-WIWI-109935	Practical Seminar Interaction	4,5 CR	Mädche, Weinhardt
T-WIWI-106569	Consumer Behavior	4,5 CR	Scheibehenne

Competence Certificate

The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP.

The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

Competence Goal

Students

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

Content
The "Information Systems & Digital Business" modules of the research groups of Prof. Dr. Alexander Mädche (Information Systems & Service Design), Prof. Dr. Gerhard Satzger (Digital Service Innovation) and Prof. Dr. Christof Weinhardt (Information & Market Engineering), offer a comprehensive overview on important topics of digitalization – blending aspects of digital interaction, digital services and the platform economy.

Courses in this module cover the aspects of interaction between humans and information systems as well as the economic foundations of platform businesses:

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

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

- **Consumer Behavior:** Consumer decisions are ubiquitous in daily life and they can have long-ranging and important consequences for individual (financial) well-being and health but also for societies and the planet as a whole. To help people making better choices it is important to understand the factors that influence their behavior. Towards this goal, we will explore how consumer behavior is shaped by social influences, situational and cognitive constraints, as well as by emotions, motivations, evolutionary forces, neuronal processes, and individual differences. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates. The lecture will be held in English.

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.31 Module: Information Systems & Digital Business: Platforms [M-WIWI-104912]

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

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

Election block: Compulsory Elective Courses ()			
T-WIWI-111307	Digital Services: Foundations	4,5 CR	Satzger, Weinhardt
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-109936	Platform Economy	4,5 CR	Dorner, Weinhardt
T-WIWI-109937	Practical Seminar Platforms	4,5 CR	Satzger, Weinhardt

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP.
The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

Competence Goal
Students

- understand services from different perspectives, the concept of value creation in service systems as well as the economic foundations and key components or platforms
- get familiar with concepts, methods and tools for the design, modelling, development and management of digital services and platforms
- understand the categories and trends of platforms as providers of digital services
- gain experience in group work as well as in the analysis of case studies and the professional presentation of research results
- are enabled to design new platforms based on a business idea.

Content
The "Information Systems & Digital Business" modules of the research groups of Prof. Dr. Alexander Mädche (Information Systems & Service Design), Prof. Dr. Gerhard Satzger (Digital Service Innovation) and Prof. Dr. Christof Weinhardt (Information & Market Engineering), offer a comprehensive overview on important topics of digitalization – blending aspects of digital interaction, digital services and the platform economy.

Courses in this module cover the technical and economic aspects of digital services as well as their application in the platform economy:

- **Digital Services:** The global economy is increasingly determined by services: in industrialized countries, nearly 70% of gross value added is achieved in the tertiary sector. For the design, development and the management of services traditional "goods-focused" concepts are often insufficient or inappropriate – even more so, if companies reap the ample opportunities to offer digital services. The course is centered around the concepts of joint value creation within service systems. It covers the theoretical background of services and service innovation, technical and economic aspects of cloud and cloud labor services as well as webservices. It focusses on the potential to leverage data for novel digital services and business models and to form dynamic and scalable service value networks. It comprises hands-on experience to conceive and build novel digital, cloud-based services.

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

Workload

Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.32 Module: Information Systems & Digital Business: Servitization [M-WIWI-104913]

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

Organisation: KIT Department of Economics and Management

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

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

Election block: Compulsory Elective Courses ()			
T-WIWI-111307	Digital Services: Foundations	4,5 CR	Satzger, Weinhardt
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-109939	Practical Seminar Servitization	4,5 CR	Mädche, Satzger

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP.
The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

Competence Goal
Students

- understand services from different perspectives and the concept of value creation in service systems
- get familiar with concepts, methods and tools for the design, modelling, development and management of digital services and interactive systems
- understand the basic characteristics and effects of interactive systems as an integral element of digital services – theoretically grounded in reference disciplines such as psychology
- get hands-on experience in conceptualizing and designing digital services and interactive systems in real use cases.

Content
The "Information Systems & Digital Business" modules of the research groups of Prof. Dr. Alexander Mädche (Information Systems & Service Design), Prof. Dr. Gerhard Satzger (Digital Service Innovation) and Prof. Dr. Christof Weinhardt (Information & Market Engineering), offer a comprehensive overview on important topics of digitalization – blending aspects of digital interaction, digital services and the platform economy.

Courses in this module cover the technical and economic aspects of digital services as well as the interaction of humans with information systems:

- **Digital Services:** The global economy is increasingly driven by services: in industrialized countries, nearly 70% of gross value added is achieved in the tertiary sector. For the design, development and the management of services traditional "goods-focused" concepts are often insufficient or inappropriate – even more so, if companies reap the ample opportunities to offer digital services. The course is centered around the concepts of joint value creation within service systems. It covers the theoretical background of services and service innovation, technical and economic aspects of cloud and cloud labor services as well as webservices. It focuses on the potential to leverage data for novel digital services and business models and to form dynamic and scalable service value networks. It comprises hands-on experience to conceive and build novel digital, cloud-based services.

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

Workload

Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.33 Module: Integrated Production Planning [M-MACH-101272]

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

Part of: Compulsory Elective Modules (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)

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.

Prerequisites
none

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

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

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

Election block: Intellectual Property Law (at least 1 item as well as at least 9 credits)			
T-INFO-102036	Computer Contract Law	3 CR	Bartsch
T-INFO-101308	Copyright	3 CR	Dreier
T-INFO-101310	Patent Law	3 CR	Hössle, Koch
T-INFO-101313	Trademark and Unfair Competition Law	3 CR	Matz
T-INFO-101307	Internet Law	3 CR	Dreier
T-INFO-108462	Selected Legal Isues of Internet Law	3 CR	Dreier

Prerequisites
None

M 6.35 Module: Internship [M-WIWI-101610]

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

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

Mandatory			
T-WIWI-102756	Internship	10 CR	Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

Competence Certificate

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

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

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

The certificate must at least contain the following information:

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

2. Information on to the presentation:

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

Competence Goal

The student

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

Prerequisites

None

Content

Primarily the internship should be done to gain economic and business work experiences. Certainly, the interns are free to integrate technical activities as well. A commercial internship provides an insight into business or administrative processes of business transactions. Therefor departments such as controlling, organizing, marketing and planning appear particularly suitable. It remains the companies and interns left, which stations and areas the intern will eventually go through. But the focus should always be in accordance with operational realities of the company.

Regarding the election of the company, in which the internship is absolved, there are no specific rules. Beside of banks, public administration or international organizations even large industrial companies be considered, because of the technical profile of the Bachelor Programme.

Recommendation

None

Annotation

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

Regarding to the election of the company, in which the internship is completed, there are no specific rules. Beside of banks, public administration or international organizations even large industrial companies be considered, because of the technical profile of the Bachelor Programme.

With a view to the future professional career, it is recommended to absolve the internship in a larger, possibly international company.

Vacation days are not figured into the internship.

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

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

Workload

The total workload for this module is approximately 300 hours.

M 6.36 Module: Introduction in Econometrics [M-WIWI-105203]

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

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

Mandatory		
T-WIWI-102736	Economics III: Introduction in Econometrics	5 CR	Schienle

Competence Certificate
See course description.

Competence Goal

- Familiarity with the basic concepts and methods of econometrics
- Preparation of simple econometric surveys

Prerequisites
None.

Content
In Economics III [2520016] the students learn about quantitative economic relations. The basic problems of econometrics are applied to simple economic studies.

Recommendation
It is recommended to attend the lectures in the following order: Economics I: Microeconomics [2610012], Economics II: Macroeconomics [2600014], Economics III: Introduction in Econometrics [2520016].

Workload
The total workload for this module is approximately 150 hours.

M 6.37 Module: Introduction to Civil Law [M-INFO-101190]

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

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

Mandatory			
T-INFO-103339	Civil Law for Beginners	5 CR	Matz

M 6.38 Module: Introduction to Natural Hazards and Risk Analysis [M-WIWI-104838]

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

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

Election block: Compulsory Elective Courses (between 9 and 12 credits)			
T-BGU-101500	Introduction to Engineering Geology	5 CR	Blum
T-BGU-103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite	3 CR	Rösch, Wursthorn
T-BGU-101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	3 CR	Rösch, Wursthorn
T-BGU-101637	Systems of Remote Sensing, Prerequisite	1 CR	Hinz, Weidner
T-BGU-101638	Procedures of Remote Sensing, Prerequisite	1 CR	Weidner
T-BGU-101636	Remote Sensing, Exam	4 CR	Hinz, Weidner
T-BGU-103542	Procedures of Remote Sensing	3 CR	Weidner
T-PHYS-103525	Geological Hazards and Risk	8 CR	Gottschämmer
T-BGU-101693	Hydrology	4 CR	Zehe
T-PHYS-101092	Climatology	1 CR	Ginete Werner Pinto
T-BGU-101814	Project in Applied Remote Sensing	1 CR	Hinz, Weidner
T-PHYS-105594	Exam on Climatology	5 CR	Ginete Werner Pinto
T-BGU-101667	Hydraulic Engineering and Water Management	4 CR	Nestmann

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
See German version

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

Content
See German version

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

Annotation
Information on the course "Geological Hazards and Risk":

Language: English

Content:

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

Learning outcomes:

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

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

Workload:

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

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

M   6.39 Module: Introduction to Operations Research [M-WIWI-101418]

Responsible: Prof. Dr. Stefan Nickel
                   Prof. Dr. Steffen Rebennack
                   Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Research

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

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

Competence Certificate

The assessment of the module is carried out by a written examination (120 minutes) according to Section 4(2), 1 of the examination regulation.

In each term (usually in March and July), one examination is held for both courses.

Competence Goal

The student

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

Module grade calculation

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

Prerequisites

None

Content

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

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

Workload

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

M   6.40 Module: Introduction to Programming [M-WIWI-101581]

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

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

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

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

Competence Goal
see german version

Prerequisites
None

Content
see german version

Workload
The total workload for this course is approximately 150 hours. For further information see German version.

M 6.41 Module: Introduction to Statistics [M-WIWI-101432]

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

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

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

Competence Certificate

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

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

Competence Goal

See German version.

Module grade calculation

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

Prerequisites

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

Content

The module contains the fundamental methods and scopes of Statistics.

A. Descriptive Statistics: univariate und bivariate analysis

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

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

Workload

The total workload for this module is approximately 300 hours. For further information see German version.

M   6.42 Module: Laboratory Work in Inorganic Chemistry [M-CHEMBIO-104026]

Organisation: KIT Department of Chemistry and Biosciences
Part of: Physics or Chemistry

Credits	Grading scale	Language	Level	Version
7	Grade to a tenth	German	3	1

Mandatory			
T-CHEMBIO-108287	Laboratory Work in General and Inorganic Chemistry	7 CR	

Prerequisites

M 6.43 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 (Engineering Sciences)

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

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.

Prerequisites
None

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

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

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

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

Competence Certificate

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

Competence Goal

The student

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

Prerequisites

None

Content

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

Workload

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

M 6.45 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 (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)

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.

Prerequisites
None

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.

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

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

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

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

Competence Certificate

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

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

Competence Goal

Students

• are familiar with various management accounting methods,

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

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

• have the capacity to devise instruments for organizational control.

Prerequisites

None

Content

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

Annotation

The following courses are part of this module:

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

Workload

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

M   6.47 Module: Manufacturing Technology [M-MACH-101276]

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

Part of: Compulsory Elective Modules (Engineering Sciences)

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

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

Competence Certificate
Written Exam (180 min)

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.

Prerequisites
None

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 6.48 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 (Engineering Sciences)

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

Mandatory			
T-MACH-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.

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.

Prerequisites
none

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 6.49 Module: Mathematics 1 [M-MATH-101676]

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

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

Mandatory			
T-MATH-102260	Mathematics I - Midterm Exam	3,5 CR	Folkers, Hug, Last, Winter
T-MATH-102261	Mathematics I - Final Exam	3,5 CR	Folkers, Hug, Last, Winter

Competence Certificate

The assessment consists of two written exams of 60 min each (in accordance with §4(2), 1 of the examination regulations). The first (midterm) exam takes place after half of the course, the second (final) exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are not allowed. Resit exams for both exams are offered in the first weeks of the subsequent semester.

Competence Goal

Students

• are confident with basic terms and definitions of mathematical language (propositions, sets, number systems, mappings, etc.).
• have a basic knowledge of differentiable calculus for functions of a single variable.

Module grade calculation

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

Content

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

• Propositional logic and basic set theory,
• Combinatorics and principles of counting,
• Number systems and basic arithmetics,
• Systems of linear equations,
• Convergence of sequences and series,
• Mappings and functions,
• Continuous functions,
• Differentiable functions,
• Power series and special functions,
• Taylor's theorem.

Recommendation

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

Workload

work load: 210 hours (7 ECTS)
classes: 60 hours lectures + 30 hours exercises

M 6.50 Module: Mathematics 2 [M-MATH-101677]

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

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

Mandatory			
T-MATH-102262	Mathematics II - Midterm Exam	3,5 CR	Folkers, Hug, Last, Winter
T-MATH-102263	Mathematics II - Final Exam	3,5 CR	Folkers, Hug, Last, Winter

Competence Certificate
The assessment consists of two written exams of 60 min each (in accordance with §4(2), 1 of the examination regulations). The first (midterm) exam takes place after half of the course, the second (final) exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are not allowed. Resit exams for both exams are offered in the first weeks of the subsequent semester.

Competence Goal
Students

• know basic concepts of matrix theory.
• have a basic knowledge of integral calculus in a single variable.
• have a basic knowledge of multivariate differential calculus.

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

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

• Riemann integral,
• n-dimensional vector spaces,
• scalar product, length and angle,
• linear mappings and matrices,
• determinants,
• eigenvalue theory,
• multivariate calculus.

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

Workload
work load: 210 hours (7 ECTS)
classes: 60 hours lectures + 30 hours exercises

M 6.51 Module: Mathematics 3 [M-MATH-101679]

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

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

Mandatory			
T-MATH-102264	Mathematics III - Final Exam	7 CR	Folkers, Hug, Last, Winter

Competence Certificate

The assessment consists of a written exams of 105 min (in accordance with §4(2), 1 of the examination regulations). The exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are allowed. A resit exam is offered in the first weeks of the subsequent semester.

Competence Goal

Students

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

Module grade calculation

The examination mark for Mathematics 3 is the mark of the written exam.

Content

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

- Multiple integrals,
- Implicit functions,
- General linear spaces,
- Normed vector spaces,
- Banach's fixed point theorem,
- Ordinary differential equations,
- Linear differential equations,
- Fourier analysis,
- Integral transformations.

Workload

work load: 210 hours (7 ECTS)
classes: 60 hours lectures + 30 hours exercises

M 6.52 Module: Mechanical Design [M-MACH-101299]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules (Engineering Sciences)

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

Mandatory			
T-MACH-110363	Mechanical Design Basics I and II	6 CR	Matthiesen
T-MACH-110364	Mechanical Design Basics I, Tutorial	1 CR	Matthiesen
T-MACH-110365	Mechanical Design Basics II, Tutorial	1 CR	Matthiesen

Competence Certificate

Written examination on the contents of Mechanical Design I&II

Duration: 90 min plus reading time

Preliminary examination: Successful participation in the preliminary work in the field of Mechanical Design I&II

Competence Goal

Learning object springs:

- be able to recognize spring types and explain stress
- Identify and describe the properties of a resilient LSS in machine elements presented later on
- Understanding and explaining the principle of action
- Know and list areas of application for springs
- graphically illustrate the load and the resulting stresses
- be able to describe the degree of species usefulness as a means of lightweight construction
- be able to analyse different solution variants with regard to lightweight construction (use species efficiency)
- Being able to explain several springs as a circuit and calculate total spring stiffness

Learning objects Technical Systems:

- Being able to explain what a technical system is
- "Thinking in systems."
- Using system technology as an abstraction tool for handling complexity
- Recognizing functional relationships of technical systems
- Getting to know the concept of function
- be able to use C&C²-A as a means of system technology

Learning objects Visualization:

- Ability to create and interpret schematics
- Using freehand technical drawing as a means of communication
- To be able to apply the technical basics of freehand drawing
- Derivation of 2D representations into different perspective representations of technical structures and vice versa
- Master reading of technical drawings
- Dedicated dimensioning of technical drawings
- Create sectional views of technical systems as a technical sketch

Learning objects Bearings:

- be able to recognize bearings in machine systems and explain their basic functions
- name bearings (type/type/function) and recognize them in machine systems and technical drawings
- Being able to name areas of application and selection criteria for the various bearings and bearing arrangements and explain interrelationships
- Ability to functionally explain the design of the bearing definitions in different directions radially/axially and circumferentially
- Know and describe selection as an iterative process as an example
- be able to perform dimensioning of bearing arrangements as an example of the engineer's approach to dimensioning machine elements
- Develop first ideas for probabilities in predicting the life of machine elements
- Recognise from the damage pattern whether static or dynamic overload was the cause of material failure
- Calculate equivalent static and dynamic bearing loads from the catalogue and given external forces on the bearing
- Being able to name, explain and transfer the basic equation of the dimensioning to the bearing dimensioning

Learning objectives seals:

The students...

- can discuss the basic functions of seals
- can describe the physical causes for mass transfer
- can apply the C&C-Model on seals
- can name, describe and apply the three most important classification criteria of seals
- can explain the function of a contacting seal and a non-contacting seal.
- can differentiate the seal types and organize them to the classification criteria.
- can discuss the structure and the effect of a radial shaft seal
- can evaluate radial shaft seals, compression packings, mechanical seals, gap seals and labyrinth seals
- can describe and apply the constructional principle of selffortification
- can describe the stick-slip phenomenon during the movement sequences of a reciprocating seal

Learning design:

The students...

- understand the meaning of design
- are able to recognize and implement basic rules and principles of design
- are able to design the connection of partial systems into the total system
- can name requirements of design and take them into account
- know the main groups of manufacturing methods

- are able to explain the manufacturing processes
- are able to depict a casted design in a drawing clearly, e.g. draft of the mold, no material accumulation, …
- know how components are designed
- Know how the production of the components has an effect on
- their design
- Know the requirements and boundary conditions on design

Learning bolted connections:

The students…

- can list and explain various bolt applications.
- can recognize bolt types and explain their function
- can build a C&C² model of a bolted joint and discuss the influences on its function
- can explain the function of a bolted connection with the help of a spring model
- can reproduce, apply and discuss the screw equation.
- Can estimate the load-bearing capacity of low-loaded bolted joints for dimensioning purposes
- Can indicate which bolted joint is to be calculated and which only roughly dimensioned.
- Can carry out the dimensioning of bolted connections as flange connections
- Can create, explain and discuss the force deflection diagram of a bolted connection

Prerequisites
None

Content
MKL I:

Introduction to product development

Tools for visualization (technical drawing)

Product creation as a problem solution

Technical Systems Product Development

- Systems theorie
- Contact and Channel Approach C&C²-A

Basics of selected construction and machine elements

- Federn
- bearings and fence
- sealings

The lecture is accompanied by exercises with the following content:

gear workshop

Tools for visualization (technical drawing)

Technical Systems Product Development

- Systemtheorie
- Contact amd Channel Approach C&C²-A

Exercises for springs

Exercises for bearings and fence

MKL II:

- sealings
- design
- dimensioning
- component connections
- bolts

Recommendation
An in-depth study of machine design (parts 3 + 4) can be carried out as part of the "Extracurricular Module in Engineering".

Workload

MKL1:

presence: 33,5 h

Attendance in lectures: 15 * 1.5 h = 22.5 h

Presence in exercises: 8 * 1.5 h = 12 h

self-study: 56,5 h

Personal preparation and wrap-up of lecture and exercises including the processing of the test certificates and preparation for the exam: 56.5 h

Total: 90 h = 3 LP

MKL2:

Presence: 33 h

Attendance in lectures: 15 * 1.5 h = 22.5 h

Presence in exercises: 7 * 1.5 h = 10.5 h

Self study: 87 h

Personal preparation and wrap-up of lectures and exercises, including the processing of the test certificates and preparation for the exam: 87h

Total: 150 h = 5 LP

Additional expenditure for degree programs from other disciplines MKL1 + MKL2 in total: 30 h = 1 LP

Learning type

Lecture

Tutorial

Project work during the semester

Online-test

M 6.53 Module: Methodical Foundations of OR [M-WIWI-101414]

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

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

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

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

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

Competence Goal
The student

- names and describes basic notions for optimization methods, in particular from nonlinear and from global optimization,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions.

Prerequisites
At least one of the courses *Nonlinear Optimization I* [2550111] and *Global Optimization I* [2550134] has to be examined.

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

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

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

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

M 6.54 Module: Microsystem Technology [M-MACH-101287]

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

Part of: Compulsory Elective Modules (Engineering Sciences)

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

Election block: Mikrosystemtechnik (at least 9 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-105182	Introduction to Microsystem Technology I	3 CR	Badilita, Jouda, Korvink
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-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.

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

Prerequisites
none

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

Workload
270 hours

M 6.55 Module: Mobility and Infrastructure [M-BGU-101067]

Responsible:	Prof. Dr.-Ing. Ralf Roos
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	Compulsory Elective Modules (Engineering Sciences)

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

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

Prerequisites
none

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

Annotation

M   6.56 Module: Module Bachelor Thesis [M-WIWI-101612]

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

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

Mandatory			
T-WIWI-103096	Bachelor Thesis	12 CR	Ruckes

Competence Certificate

The Bachelor Thesis is a written exam which shows that the student can autonomously investigate a scientific problem in Industrial Engineering and Management. The Bachelor Thesis is described in detail in § 11 (SPO 2007) and § 14 (SPO 2015) of the examination regulation. The review is carried out

- according to SPO 2007 by at least one examiner of the Department of Economics and Management, or, after approval by at least one examiner of another faculty. The examiner has to be involved in the degree programme. Involved in the degree programme are the persons that coordinate a module or a lecture of the degree programme.
- according to SPO 2015 by at least two examiners of the Department of Economics and Management.

The regular processing time takes three/six months (SPO 2007/SPO2015). On a reasoned request of the student, the examination board can extend the processing time of a maximum of on month. If the Bachelor Thesis is not completed in time, this exam is "failed", unless the student is not being responsible (eg maternity leave).

With consent of the examinor the thesis can be written in English as well. Other languages require besides the consent of the examiner the approval of the examination board. The issue of the Bachelor Thesis may only returned once and only within the first month of processing time. A new topic has to be released within four weeks.

The overall grade of the module is the grade of the Bachelor Thesis.

Competence Goal

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

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

He/she reviews the task ahead, can select scientific methods and techniques and apply them to solve a problem or identify further potential. This is basically also done under consideration of social and/or ethical aspects.

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

He/she is in a position to clearly structure a research paper and communicate in writing using the technical terminology.

Prerequisites

Prerequisites for admission to the Bachelor Thesis:

- according to SPO 2007: the student is in the 3rd Academic year (5th and 6th semester) and has not been completed at most one of the exams of the basic program.
- according to SPO 2015: A minimum of 120 credits must be earned. All module examinations of the basic program must be passed.

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

It is recommended to begin the Bachelor Thesis in the 5th or 6th Semester.
A written confirmation of the examinor about supervising the Bachelor's Thesis is required.
Please pay regard to the institute specific rules for supervising a Bachelor Thesis.
The Bachelor Thesis has to contain the following declaration: "I hereby declare that I produced this thesis without external assistance, and that no other than the listed references have been used as sources of information. Passages taken literally or analogously from published or non published sources are marked as this." If this declaration is not given, the Bachelor Thesis will not be accepted.

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

Recommendation
None

Workload
See German version.

M   6.57 Module: Optimization under Uncertainty [M-WIWI-103278]

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

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

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

Competence Certificate

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

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

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

Competence Goal

The student

- denominates and describes basic notions for optimization methods under uncertainty, in particular from stochastic optimization,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems under uncertainty and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions, in particular of
- stochastic optimization problems.

Prerequisites

At least one of the courses *Introduction to Stochastic Optimization* and *Optimization approaches under uncertainty* has to be taken.

Content

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

Recommendation

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

Annotation

The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload

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

M 6.58 Module: Power Network [M-ETIT-102379]

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

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Compulsory Elective Modules (Engineering Sciences)

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

Mandatory			
T-ETIT-101923	Electric Energy Systems	5 CR	Leibfried
T-ETIT-100830	Power Network	6 CR	Leibfried

M 6.59 Module: Preliminary Exam [M-WIWI-101726]

Organisation: University
Part of: Preliminary Exam

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

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

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

Prerequisites
none

Annotation
The deadline for taking the orientation exam shall be extended by two semesters for first-year students of the winter semester of 2018/19 and first-year students of the winter semester of 2019/20, provided that they were enrolled in the same degree program during both semesters.

For first-year students of the winter semester of 2020/2021 or for students who have changed their degree program for the winter semester of 2020/2021, the deadline for taking the orientation exam shall be extended by one semester.

M 6.60 Module: Private Business Law [M-INFO-101216]

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

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

Election block: Private Business Law (at least 1 item as well as at least 9 credits)			
T-INFO-101329	Employment Law I	3 CR	Hoff
T-INFO-101330	Employment Law II	3 CR	Hoff
T-INFO-101315	Tax Law I	3 CR	Dietrich
T-INFO-101314	Tax Law II	3 CR	Dietrich
T-INFO-101316	Law of Contracts	3 CR	Hoff

Competence Goal

The student

- has gained in-depth knowledge of German company law, commercial law and civil law;
- is able to analyze, evaluate and solve complex legal and economic relations and problems;
- is well grounded in individual labour law, collective labour law and commercial constitutional law, evaluates and critically assesses clauses in labour contracts;
- recognizes the significance of the parties to collective labour agreements within the economic system and has differentiated knowledge of labour disputes law and the law governing the supply of temporary workers and of social law;
- possesses detailed knowledge of national earnings and corporate tax law and is able to deal with provisions of tax law in a scientific manner and assesses the effect of these provisions on corporate decision-making.

Prerequisites

None

Content

The module provides the student with knowledge in special matters in business law, like employment law, tax law and business law, which are essential for managerial decisions.

M 6.61 Module: Product Lifecycle Management [M-MACH-101270]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: Compulsory Elective Modules (Engineering Sciences)

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

Election block: Product Lifecycle Management (Kernbereich) (1 item)			
T-MACH-105147	Product Lifecycle Management	4 CR	Ovtcharova
Election block: Product Lifecycle Management (2 items)			
T-MACH-106744	Agile Product Innovation Management - Value-driven Planning of New Products	4 CR	Kläger
T-MACH-102187	CAD-NX Training Course	2 CR	Ovtcharova
T-MACH-111283	Development Methods of Technical Systems	4 CR	Maier, Ovtcharova
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-106457	I4.0 Systems Platform	4 CR	Maier, Ovtcharova
T-MACH-102153	PLM-CAD Workshop	4 CR	Ovtcharova
T-MACH-102155	Product, Process and Resource Integration in the Automotive Industry	4 CR	Mbang
T-MACH-102083	Integrated Information Systems for Engineers	4 CR	Ovtcharova
T-MACH-102149	Virtual Reality Practical Course	4 CR	Ovtcharova

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.

Competence Goal

The students should:

- have basic knowledge about the challenges in product and process data management regarding the whole product lifecycle;
- have understanding about challenges and functional concepts of product lifecycle management;
- be able to rudimental operate common PLM/CAx/VR - systems,
- develop and present prototype solutions in teams of different domains.

Prerequisites

None

Content

Product Lifecycle Management (PLM), Generation and management of information, Architecture and functionality of information systems, Industry 4.0, CAx and VR-systems.

Workload

270 hours

Learning type

Lectures, Tutorials

M 6.62 Module: Public Business Law [M-INFO-101217]

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

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

Election block: Public Business Law (at least 1 item as well as at least 9 credits)			
T-INFO-101309	Telecommunications Law	3 CR	Hermstrüwer
T-INFO-101303	Data Protection Law	3 CR	Eichenhofer
T-INFO-101311	Public Media Law	3 CR	Dreier
T-INFO-101312	European and International Law	3 CR	Brühann
T-BGU-111102	Environmental Law	3 CR	

Competence Certificate
see course description.

M 6.63 Module: Public Finance [M-WIWI-101403]

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

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

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102877	Introduction to Public Finance	4,5 CR	Wigger
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-109590	Public Sector Finance	4,5 CR	Wigger

Competence Certificate

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

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

Competence Goal

See German version.

Content

As a branch of Economics, Public Finance is concerned with the theory and policy of the public sector and its interrelations with the private sector. It analyzes the economic role of the state from a normative as well as from a positive point of view. The normative view examines efficiency- and equity-oriented motives for government intervention and develops fiscal policy guidelines. The positive view explains the actual behavior of economic agents in public sector affairs. Special fields of Public Finance are public revenues, i.e. taxes and public debt, public expenditures for publicly provided goods, and welfare programs.

Recommendation

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

Annotation

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

Workload

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

M 6.64 Module: Real Estate Management [M-WIWI-101466]

Responsible:	Prof. Dr.-Ing. Thomas Lützkendorf
Organisation:	KIT Department of Economics and Management
Part of:	Business Administration (Specialisation Program Business Administration)
	Compulsory Elective Modules (Business Administration)

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

Mandatory			
T-WIWI-102744	Real Estate Management I	4,5 CR	Lützkendorf
T-WIWI-102745	Real Estate Management II	4,5 CR	Lützkendorf

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

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

Competence Goal
The student

- possesses an overview concerning the different facets and interrelationships within the real estate business, the important decision points in real estate lifecycle and the different views and interests of the actors concerned, and
- is capable of applying basic economic methods an procedures to problems within the real estate area.

Prerequisites
None

Content
The real estate business offers graduates very interesting jobs and excellent work- and advancement possibilities. This module provides an insight into the macroeconomic importance of this industry, discusses problems concerned to the administration of real estate and housing companies and provides basic knowledge for making decisions both along the lifecycle of a single building and the management of real estate portfolios. Innovative operating and financing models are illustrated, as well as the current development when looking at real estate as an asset-class.

This module is also suitable for students who want to discuss macroeconomic, business-management or financial problems in a real estate context.

Recommendation
The combination with the module *Design Constructions and Assessment of Green Buildings* is recommended.

Furthermore a combination with courses in the area of

- Finance
- Insurance
- Civil engineering and architecture (building physics, building construction, facility management)

is recommended.

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

M   6.65 Module: Seminar Module [M-WIWI-101816]

Responsible: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (mandatory)

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

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

Competence Certificate

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

SPO 2007: The modul examination consists of **two** seminars and of at least one **key qualification** (KQ) course (according to §4 (3), 3 of the examintaion regulation). As key qualification one of the following courses must be chosen: Academic Learning HoC (2-3 credits), Key Qualifikations ZAK (1-3 credits), Elective „Educational development for student teachers" (2-3 credits) or language courses SpZ. A detailed description of every singled assessment is given in the specific course characerization.

Competence Goal

- Students are able to independently deal with a defined problem in a specialized field based on scientific criteria.
- They are able to research, analyze the information, abstract and derive basic principles and regularities from unstructured information.
- They can solve the problems in a structured manner using their interdisciplinary know-how.
- They know how to validate the obtained results.
- Finally, they are able to logically and systematically present the results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Prerequisites

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

Content

Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailled description o these qualifications is given in the section "Key Qualifications" of the module handbook.

Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
See German version.

M 6.66 Module: Sociology/Empirical Social Research [M-GEISTSOZ-101167]

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

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

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

Competence Goal

The student

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

Content

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

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

M   6.67 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 (Engineering Sciences)

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

Election block: Vertiefung der Produktionstechnik (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, Hofmann
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.

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.

Prerequisites

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	6.68 Module: Statistics and Econometrics [M-WIWI-101608]

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

Organisation: KIT Department of Economics and Management

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

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

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-103063	Analysis of Multivariate Data	4,5 CR	Grothe
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh

Competence Certificate

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

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

Competence Goal

The student

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

Content

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

Recommendation

None

Annotation

New module starting winter term 2015/2016. It replaces the old module "Statistical Applications of Financial Risk Management" [WW3STAT].

Workload

The total workload for this module is approximately 270 hours.

M 6.69 Module: Statistics and Econometrics II [M-WIWI-105414]

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

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

Election block: Compulsory Elective Courses ()			
T-WIWI-103063	Analysis of Multivariate Data	4,5 CR	Grothe
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-110939	Financial Econometrics II	4,5 CR	Schienle
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller

Competence Certificate

The assessment is carried out as partial exams of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

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

Competence Goal

The student

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

Prerequisites

The following module must be passed: Statistics and Econometrics [M-WIWI-101599]

Content

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

Workload

The total workload for this module is approximately 270 hours.

M   6.70 Module: Strategy and Organization [M-WIWI-101425]

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

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

Election block: Strategy and Organization (at least 9 credits)			
T-WIWI-102630	Managing Organizations	3,5 CR	Lindstädt
T-WIWI-102871	Problem Solving, Communication and Leadership	2 CR	Lindstädt
T-WIWI-102629	Management and Strategy	3,5 CR	Lindstädt

Competence Certificate

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

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

Competence Goal

- The student describes both central concepts of strategic management as well as concepts and models for the design of organizational structures.
- He / she evaluates the strengths and weaknesses of existing organizational structures and regulations on the basis of systematic criteria.
- The management of organizational changes discusses and examines the students by means of case studies to what extent the models can be used in practice and what conditions must apply to them.
- In addition, students plan to use IT to support corporate governance.

Content

The module has a practical and action-oriented structure and provides the student with an up-to-date overview of basic skills concepts and models of strategic management and a realistic picture of possibilities and limitations rational design approaches of the organization.

The focus is firstly on internal and external strategic analysis, concept and sources of competitive advantage, Formulation of competitive and corporate strategies as well as strategy assessment and implementation. Secondly strengths and weaknesses of organizational structures and regulations are assessed on the basis of systematic criteria. Concepts for the organization of organizational structures, the regulation of organizational processes and the control organizational changes are presented.

Workload

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

M 6.71 Module: Supply Chain Management [M-WIWI-101421]

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

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

Mandatory			
T-WIWI-109936	Platform Economy	4,5 CR	Dorner, Weinhardt
Election block: Supplementary Courses (1 item)			
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel

Competence Certificate

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

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

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

Competence Goal

The students

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

Prerequisites

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

Content

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

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

Annotation

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

Workload

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

M 6.72 Module: Technical Logistics [M-MACH-101279]

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

Part of: Compulsory Elective Modules (Engineering Sciences)

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

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.

Prerequisites
none

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

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

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	3	8

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-107505	Financial Accounting for Global Firms	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-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes

Competence Certificate

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

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

Competence Goal

The student

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

Prerequisites

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

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

Content

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

Annotation

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

Workload

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

M 6.74 Module: Topics in Finance II [M-WIWI-101423]

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

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

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-107505	Financial Accounting for Global Firms	4,5 CR	Luedecke
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes

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

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

Competence Goal
The student

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

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

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

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

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

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

7 Courses

T 7.1 Course: Advanced Lab Blockchain Hackathon (Bachelor) [T-WIWI-111127]

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

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

Events					
WT 20/21	2512402	Practical Course Blockchain Hackathon (Bachelor)		Practical course / ⚙	Sunyaev, Kannengießer
Exams					
WT 20/21	7900036	Advanced Lab Blockchain Hackathon (Bachelor)			Sunyaev

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

T 7.2 Course: Advanced Lab Informatics (Master) [T-WIWI-110541]

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

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

Events

WT 20/21	2512402	Practical Course Blockchain Hackathon (Bachelor)		Practical course / 🧩	Sunyaev, Kannengießer
WT 20/21	2512501	Practical Course Cognitive Automobiles and Robots (Master)	3 SWS	Practical course / ▤	Zöllner
WT 20/21	2512600	Project lab Information Service Engineering (Master)	2 SWS	Practical course / 🧩	Sack
WT 20/21	2513312	Seminar Linked Data and the Semantic Web (Bachelor)	2 SWS	Seminar / ▤	Färber, Käfer, Heling, Bartscherer
WT 20/21	2513313	Seminar Linked Data and the Semantic Web (Master)	2 SWS	Seminar / ▤	Färber, Käfer, Heling, Bartscherer
ST 2021	2512204	Lab Realisation of innovative services (Bachelor)	3 SWS	Practical course / 🧩	Oberweis, Schiefer, Schüler, Toussaint
ST 2021	2512400	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	3 SWS	Practical course / ▤	Sunyaev, Pandl
ST 2021	2512402	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course / ▤	Sunyaev, Beyene, Kannengießer
ST 2021	2612554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course / ▤	Strufe, Mayer, Arias Cabarcos, Berens, Mossano, Beckmann

Exams

WT 20/21	7900047	Advanced Lab Implementation of Innovative Services (Bachelor)	Oberweis
WT 20/21	7900115	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	Sunyaev
WT 20/21	7900116	Advanced Lab Security, Usability and Society (Bachelor)	Volkamer
ST 2021	7900016	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	Sunyaev
ST 2021	7900029	Practical lab Security, Usability and Society (Bachelor)	Volkamer
ST 2021	7900085	Advanced Lab Realization of innovative services (Bachelor)	Oberweis
ST 2021	7900096	Advanced Lab Blockchain Hackathon (Bachelor)	Sunyaev

Legend: ▤ Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

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 | **Practical Course Cognitive Automobiles and Robots (Master)**
2512501, WS 20/21, 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 | **Project lab Information Service Engineering (Master)**
2512600, WS 20/21, 2 SWS, Language: English, Open in study portal | **Practical course (P)**
Blended (On-Site/Online) |

Content

The **ISE project course** is based on the summer semester lecture **"Information Service Engineering"**. The topics of the ISE project course focus on artificial intelligence based applications. In particular, we are covering the following:

- Natural Language Processing
- Knowledge Graphs
- Deep Learning

Goal of the course is to work on a 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 ISEproject course can also be credited as a **seminar**.

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

The project course will be restricted to 15 participants.

Participation in the lecture "Information Service Engineering" (summer semester) is required.

ISE Tutor Team:

- Dr. Mehwish Alam
- Dr. Danilo Dessi
- M. Sc. Genet Asefa Gesese
- M. Sc. Fabian Hoppe
- M. Sc. Zahra Rezaie
- M. Sc. Sasha Vsesviatska
- B. Sc. Tabea Tietz

Organizational issues

Projektpraktikum Information Service Engineering can also be credited as a **seminar**.

V	**Seminar Linked Data and the Semantic Web (Bachelor)** 2513312, WS 20/21, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Online**

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this 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 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 Linked Data and the Semantic Web (Master)** 2513313, WS 20/21, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Online**

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this 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 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	**Lab Realisation of innovative services (Bachelor)** 2512204, SS 2021, 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	**Advanced Lab Development of Sociotechnical Information Systems (Bachelor)** 2512400, SS 2021, 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	**Practical lab Security, Usability and Society (Bachelor)** 2612554, SS 2021, 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. This internship will be only in English. The kick-off, the presentations, and every written material to be graded must be in English. Communications with supervisors can be in German.
WiWi portal: https://portal.wiwi.kit.edu/ys/4628

Important dates:

Kick-off: 06.04.2021, 10:00-11:00 CET in Microsoft Teams - Link

Report + code submission : 07.09.2021, 23:59 CET

Presentation deadline : 20.09.2021, 23:59 CET

Presentation day: 24.09.2021, 09:00 CET

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
- Visualization app to explore Facebook behavioral data collection

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.

- Neurotechnologies, Neuroprivacy, and User Acceptance
- Expert feedback for an anti-phishing webpage template (English only)
- "Your website has been hacked" - How to inform business owners about security issues on their webpages in more sensitive ways

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 7.3 Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

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

Type Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
WT 20/21	2512554	Practical Course Security, Usability and Society (Bachelor)	3 SWS	Practical course / 🖥	Volkamer, Strufe, Mayer, Arias Cabarcos, Aldag, Berens, Düzgün, Mossano, Beckmann
WT 20/21	2512555	Practical Course Security, Usability and Society (Master)	3 SWS	Practical course / 🖥	Volkamer, Strufe, Mayer, Arias Cabarcos, Aldag, Berens, Düzgün, Mossano, Beckmann
ST 2021	2612554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course / 🖥	Strufe, Mayer, Arias Cabarcos, Berens, Mossano, Beckmann
Exams					
WT 20/21	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
WT 20/21	7900138	Advanced Lab Security, Usability and Society (Master)			Volkamer
ST 2021	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 | **Practical Course Security, Usability and Society (Bachelor)**
 2512554, WS 20/21, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**
 Online |

Content

The internship "Security, Usability, and Society" covers topics such as user-friendly security and data protection programs as well as the implementation of user studies. The kick-off and the final presentations will be in English. The language of communication with the supervisor can - depending on the topic / supervisor - be German.

Important dates:

Kick-off: (mandatory) 3.11.2020, 10:00-11:30, online. Link: Microsoft Teams

Final submission: 14.03.2021, 23:59

Presentation: March 14, 2021

Topics:

Privacy-friendly apps

In this topic area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps (PFA). 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.

- NoPhish 2.0
- Notes 2.0

Programming usable security measures

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. Some examples are TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) orPassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as for PFA, 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
- Visualization app to explore Facebook behavioral data collection
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Implementation of an anti-phishing browser extension (English only)

Usable security user studies (online studies only)

These topics relate to setting up or analysing the results of user studies of various kinds. This year, due to the Corona outbreak, we decided to only run online studies. Otherwise interviews and laboratory tests would have been possible. At the end of the semester, the students present a report / work and a lecture in which they present their results.

- Investigating user reaction to password data breaches
- Expert feedback for an anti-phishing webpage template (English only)

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 Course Security, Usability and Society (Master)**
 2512555, WS 20/21, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**
 Online |

Content

The internship "Security, Usability, and Society" covers topics such as user-friendly security and data protection programs as well as the implementation of user studies. The kick-off and the final presentations will be in English. The language of communication with the supervisor can - depending on the topic / supervisor - be German.

Important dates:

Kick-off: (mandatory) 3.11.2020, 10:00-11:30, online. Link: Microsoft Teams

Final submission: 14.03.2021, 23:59

Presentation: March 14, 2021

Topics:

Privacy-friendly apps

In this topic area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps (PFA). 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.

- NoPhish 2.0
- Notes 2.0

Programming usable security measures

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. Some examples are TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) orPassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as for PFA, 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
- Visualization app to explore Facebook behavioral data collection
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Implementation of an anti-phishing browser extension (English only)

Execution of usable security user studies (online studies only)

These topics relate to setting up or analysing the results of user studies of various kinds. This year, due to the Corona outbreak, we decided to only run online studies. Otherwise interviews and laboratory tests would have been possible. At the end of the semester, the students present a report / work and a lecture in which they present their results.

- Investigating user reaction to password data breaches
- Expert feedback for an anti-phishing webpage template (English only)
- Implementing Zero-Trust Authentication Schemes

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 2021, 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. This internship will be only in English. The kick-off, the presentations, and every written material to be graded must be in English. Communications with supervisors can be in German.

WiWi portal: https://portal.wiwi.kit.edu/ys/4628

Important dates:

Kick-off: 06.04.2021, 10:00-11:00 CET in Microsoft Teams - Link

Report + code submission : 07.09.2021, 23:59 CET

Presentation deadline : 20.09.2021, 23:59 CET

Presentation day: 24.09.2021, 09:00 CET

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
- Visualization app to explore Facebook behavioral data collection

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.

- Neurotechnologies, Neuroprivacy, and User Acceptance
- Expert feedback for an anti-phishing webpage template (English only)
- "Your website has been hacked" - How to inform business owners about security issues on their webpages in more sensitive ways

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 7.4 Course: Advanced Lab Sociotechnical Information Systems Development (Bachelor) [T-WIWI-111124]

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

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

Events					
WT 20/21	2512400	Practical Course Sociotechnical Information Systems Development (Bachelor)	3 SWS	Practical course / 🖥	Sunyaev, Pandl

Exams			
WT 20/21	7900115	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	Sunyaev

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Practical Course Sociotechnical Information Systems Development (Bachelor)
2512400, WS 20/21, 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

T   7.5 Course: Advanced Programming - Application of Business Software [T-WIWI-102748]

Responsible:	Prof. Dr. Stefan Klink
	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105112 - Applied Informatics

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 20/21	2511026	Advanced Programming - Application of Business Software	2 SWS	Lecture / 🖵	Klink
WT 20/21	2511027	Exercises Advanced Programming - Application of Business Software	1 SWS	Practice / 🖵	Klink, Forell, Schreiber
WT 20/21	2511028	Computer lab Advanced Programming - Application of Business Software	2 SWS	Practice / 🖵	Forell, Schreiber
Exams					
WT 20/21	7900019	Advanced Programming - Application of Business Software (Registration until 24 February 2021)			Klink
ST 2021	7900049	Advanced Programming - Application of Business Software (Registration until 17 June 2021)			Klink

Legend: 🖵 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The success control takes place in the form of a written examination. The duration of the exam is 60 minutes in the winter semester 2020/21 and in the summer semester 2021. The examination is offered every semester and can be repeated at any regular examination date.

The prerequisite for taking the exam is successful participation in a computer lab. Attendance is compulsory for individual dates of the lab. More detailed information on participation in the exercises and labs will be announced in the first lecture hour and on the lecture homepage.

Admission can only be acquired in the winter semester and is valid indefinitely.

Prerequisites

This course cannot be taken together with *Advanced Programming - Java Network Programming*.

Recommendation

Knowledge of the course "Grundlagen der Informatik I und II" are helpful.

Below you will find excerpts from events related to this course:

V	**Advanced Programming - Application of Business Software** 2511026, WS 20/21, 2 SWS, Language: German, Open in study portal	Lecture (V) Online

Content

Business information systems enable, support, and accelerate new forms of business processes and forms of organisation. They are the central infrastucture of the economy in the age of eBusiness. Thus, basic knowledge is given in lectures, in excersises and in the computer lab which deals with installation, configuration and parameterization of busines information systems. The course communicates profund knowledge in following topics:

- Analysis of cooperation scenarios and business process scenarios
- Selection of modelling methods according to defined criteria
- Implementation of business process modells and cooperation modells with the help of standard software
- Identification and assessment of challenges during the installation of information systems
- Economical evaluation of business information systems.

This course cannot be taken together with *Advanced Programming - Java Network Programming* [2511020].

Learning objectives:

Students

- explain basic concepts and principles of enterprise information systems,
- describe the components of enterprise information systems,
- assess economical aspects of such systems,
- asseapply standard software for modelling busines processes and for analysing them to given criteria.

Recommendations:

Knowledge of the course "Grundlagen der Informatik I und II" are helpful.

Workload:

- Lecture 30h
- Exercise course 17h
- Review and preparation of lectures 23h
- Review and preparation of exercises 10h
- Computer Lab 30h
- Exam preparation 26h
- Exam 1h
- Total 150 h
- Exercise courses are done by student tutors (size about 50 students)

Literature

- Schönthaler, Vossen, Oberweis, Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.
- Hasenkamp, Stahlknecht: Einführung in die Wirtschaftsinformatik. Springer 2012.
- Hansen, Neumann: Wirtschaftsinformatik I. Grundlagen betrieblicher Informationsverarbeitung. UTB 2009.
- Mertens et al.: Grundzüge der Wirtschaftsinformatik. Springer 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.6 Course: Advanced Programming - Java Network Programming [T-WIWI-102747]

Responsible:	Prof. Dr. Dietmar Ratz
	Prof. Dr.-Ing. Johann Marius Zöllner
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2021	2511020	Advanced Programming - Java Network Programming	2 SWS	Lecture / 📱	Ratz, Hüneberg
ST 2021	2511021	Tutorium zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	1 SWS	Tutorial (/ 📱	Ratz, Hermann, Hüneberg
ST 2021	2511023	Rechnerpraktikum zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	2 SWS	/ 📱	Ratz, Hermann, Hüneberg
Exams					
WT 20/21	7900020	Advanced Programming - Java Network Programming			Ratz
ST 2021	7900041	Advanced Programming - Java Network Programming (Registration until 15 July 2021)			Ratz

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

At the end of the lecture period, a written examination (90 min.) (according to §4(2), 1 SPO) will be held for which admission must be granted during the semester after successful participation in the practices. The exact details will be announced in the lecture.

The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

This course cannot be taken together with *Advanced Programming - Application of Business Software* [2511026].

Annotation

The registration for the participation in the computer lab (precondition for the exam participation) already takes place in the first lecture week!

Below you will find excerpts from events related to this course:

V	**Advanced Programming - Java Network Programming**	Lecture (V)
	2511020, SS 2021, 2 SWS, Language: German, Open in study portal	**Online**

Content

In the lecture, the exercises and computer labs to this course the practical handling with the programming language Java dominating within the range of economical applications is obtained. The basis for this is the current language standard. The knowledge from the lecture Introduction to Programming with Java will be deepened and extended. This is done, among other things, by addressing commercially relevant topics such as object-oriented modeling and programming, class hierarchy and inheritance, threads, applications and applets, AWT and Swing components for graphical user interfaces, exception and event processing, lambda expressions, input/output via streams, applications in networks, Internet communication, client and server programming, remote method invocation, servlets, Java Server Pages and Enterprise Java Beans.

This course cannot be taken together with *Advanced Programming - Application of Business Software* [2540886/2590886].

Learning objectives:

- Students learn the practical use of the object-oriented programming language Java and are enabled to design and implement component-based Internet applications using the latest technologies and tools.
- The ability to select and design these methods and systems appropriate to the situation and to use them for solving problems is imparted.
- Students are empowered to find strategic and creative answers in the search for solutions to well-defined, concrete and abstract problems.

Workload:

The total workload for this course is approximately 150 hours.

Organizational issues

Die Anmeldung zur Teilnahme am Rechnerpraktikum (Vorbedingung zur Klausurteilnahme) findet bereits in der ersten Vorlesungswoche statt!

Literature

Ratz, D. Schulmeister-Zimolong, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 8. Aktualisierte und erweiterte Auflage, Hanser 2018.

Weiterführende Literatur:

- S. Zakhour, S. Hommel, J. Royal. Das Java Tutorial. Addison Wesley 2007
- W. Eberling, J. Lessner. Enterprise JavaBeans 3. Hanser Verlag 2007.
- R. Oechsle. Parallele und verteilte Anwendungen. 2. Auflage. Hanser Verlag 2007.
- Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.7 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-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2021	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture / 📱	Mitusch, Brumm
ST 2021	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice / 📱	Pegorari

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 2021, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **Online**

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 **7.8 Course: Agile Product Innovation Management - Value-driven Planning of New Products [T-MACH-106744]**

Responsible: Hon.-Prof. Dr. Roland Kläger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
WT 20/21	2122300	Agile product innovation management - value-driven planning of new products		Lecture / Practice (/ ✗	Kläger
ST 2021	2122300	Agile product innovation management - value-driven planning of new products		Lecture / Practice (/ ✗	Kläger

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 **Agile product innovation management - value-driven planning of new products**
2122300, WS 20/21, SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Cancelled

Content
Students are able to

- replicate the essential correlations, procedures and structure elements for the product / innovation planning and to use it as a guideline for the planning of new products
- describe agile innovation processes and the essential prerequisites
- demonstrate the added value of a product in consideration of a system-oriented approach. In addition, they are able to interpret unique selling points (USP)
- deduce the correlation between the added value of superior products and the creativity/innovation
- to apply methods and tools for digital product planning on specific use cases
- explain elements and methods of computer-based ideas management and requirements modeling
- describe the support of the product planning process by RP systems accompanying the development process and select 3D printing processes suitable for specific applications

Literature
Vorlesungsfolien / Lecture slides

V **Agile product innovation management - value-driven planning of new products**
2122300, SS 2021, SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Cancelled

Content

Students are able to

- replicate the essential correlations, procedures and structure elements for the product / innovation planning and to use it as a guideline for the planning of new products
- describe agile innovation processes and the essential prerequisites
- demonstrate the added value of a product in consideration of a system-oriented approach. In addition, they are able to interpret unique selling points (USP)
- deduce the correlation between the added value of superior products and the creativity/innovation
- to apply methods and tools for digital product planning on specific use cases
- explain elements and methods of computer-based ideas management and requirements modeling
- describe the support of the product planning process by RP systems accompanying the development process and select 3D printing processes suitable for specific applications

Literature

Vorlesungsfolien / Lecture slides

T   7.9 Course: Analalysis of Social Structurs (WiWi) [T-GEISTSOZ-109047]

Responsible:	Prof. Dr. Gerd Nollmann
Organisation:	KIT Department of Humanities and Social Sciences
Part of:	M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 20/21	5011007	Analysis of Social Structures	2 SWS	Practice	Nollmann
Exams					
WT 20/21	7400029	Analalysis of Social Structurs (WiWi)			Nollmann

T   7.10 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 2021	2134150	Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines	2 SWS	Lecture / ⚙	Gohl

Exams			
WT 20/21	76-T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	Koch
ST 2021	76--T-Mach-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	Gohl

Legend: ▯ Online, ⚙ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
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   Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines
2134150, SS 2021, 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   7.11 Course: Analysis of Multivariate Data [T-WIWI-103063]

Responsible:	Prof. Dr. Oliver Grothe
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101420 - Econometrics and Economics
	M-WIWI-101608 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Irregular	**Version** 1

Exams				
WT 20/21	7900355	Analysis of Multivariate Data		Grothe

Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites

None

Recommendation

Attendance of the courses Statistics 1 [2600008] and Statistics 2 [2610020] is recommended.

Annotation

The lecture is not offered regularly. The courses planned for three years in advance can be found online.

T 7.12 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 Oral examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2021	2134134	Analysis tools for combustion diagnostics	2 SWS	Lecture / ⚙	Pfeil
Exams					
WT 20/21	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Koch
ST 2021	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 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Literature
Skript, erhältlich in der Vorlesung

T 7.13 Course: Applied Informatics – Applications of Artificial Intelligence [T-WIWI-110340]

Responsible:	Michael Färber
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101426 - Electives in Informatics
	M-WIWI-105112 - Applied Informatics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 20/21	2511314	Applied Informatics - Applications of Artificial Intelligence	2 SWS	Lecture / ▯	Färber, Käfer
WT 20/21	2511315	Exercises to Applied Informatics - Applications of Artificial Intelligence	1 SWS	Practice / ▯	Färber, Käfer, Nguyen
Exams					
WT 20/21	7900091	Applied Informatics - Applications of Artificial Intelligence (Registration until 08 February 2021)			Sure-Vetter
ST 2021	7900009	Applied Informatics - Applications of AI (Registration until 12 July 2021)			Färber

Legend: ▯ Online, ❊ Blended (On-Site/Online), ❧ On-Site, ✗ Cancelled

Competence Certificate
Written Examination (60 min) according to §4, Abs. 2, 1 of the examination regulations or oral examination of 20 minutes according to §4, Abs. 2, 2 of the examination regulations. The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Recommendation
Basics in logic, e.g. from lecture Foundations of Informatics 1 are important.

Annotation
Replaces from winter semester 2019/2020 T-WIWI-109263 "Applications of Artificial Intelligence".

Below you will find excerpts from events related to this course:

V	**Applied Informatics - Applications of Artificial Intelligence** 2511314, WS 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

The lecture provides insights into the fundamentals of artificial intelligence. Basic methods of artificial intelligence and their applications in industry are presented.

Applications of the AI is a sub-area of computer science dealing with the automation of intelligent behavior. In general, it is a question of mapping human intelligence. Methods of artificial intelligence are presented in various areas such as, for example, question answering systems, speech recognition and image recognition.

The lecture gives an introduction to the basic concepts of artificial intelligence. Essential theoretical foundations, methods and their applications are presented and explained.

This lecture aims to provide students with a basic knowledge and understanding of the structure, analysis and application of selected methods and technologies on artificial intelligence. The topics include, among others, knowledge modeling, machine learning, text mining, uninformed search, and intelligent agents.

Learning objectives:

The students

- consider current research topics in the field of artificial intelligence and in particular learn about the topics of knowledge modeling, machine learning, text mining and uninformed search.
- interdisciplinary thinking.
- technological approaches to current problems.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

V	**Exercises to Applied Informatics - Applications of Artificial Intelligence** 2511315, WS 20/21, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **Online**

Content

The exercises are oriented on the lecture applications of AI.

Multiple exercises are held that capture the topics, held in the lecture Applications of AI and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

This lecture aims to provide students with a basic knowledge and understanding of the structure, analysis and application of selected methods and technologies on artificial intelligence. The topics include, among others, knowledge modeling, machine learning, text mining, uninformed search, and intelligent agents.

Learning objectives:

The students

- consider current research topics in the field of artificial intelligence and in particular learn about the topics of knowledge modeling, machine learning, text mining and uninformed search.
- interdisciplinary thinking.
- technological approaches to current problems.

| T | **7.14 Course: Applied Informatics – Database Systems [T-WIWI-110341]** |

Responsible:	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101426 - Electives in Informatics
	M-WIWI-105112 - Applied Informatics

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2021	2511200	Applied Informatics - Database Systems	2 SWS	Lecture / 🖥	Sommer
ST 2021	2511201	Exercises Applied Informatics - Database Systems	1 SWS	Practice / 🖥	Sommer
Exams					
WT 20/21	7900006	Applied Informatics - Database Systems (Registration until 08 February 2021)			Oberweis
ST 2021	7900037	Applied Informatics - Database Systems (Registration until 12 July 2021)			Oberweis

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) in the first week after lecture period.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102660 - Database Systems must not have been started.

Annotation
Replaces from summer semester 2020 T-WIWI-102660 "Database Systems".

Below you will find excerpts from events related to this course:

| V | **Applied Informatics - Database Systems**
2511200, SS 2021, 2 SWS, Language: German, Open in study portal | **Lecture (V)**
Online |

Content

Database systems (DBS) play an important role in today's companies. Internal and external data is stored and processed in databases in every company. The proper management and organization of data helps to solve many problems, enables simultaneous queries from multiple users and is the organizational and operational base for the entire working procedures and processes of the company. The lecture leads in the area of the database theory, covers the basics of database languages and database systems, considers basic concepts of object-oriented and XML databases, conveys the principles of multi-user control of databases and physical data organization. In addition, it gives an overview of business problems often encountered in practice such as:

- Correctness of data (operational, semantic integrity)
- Restore of a consistent database state
- Synchronization of parallel transactions (phantom problem).

Learning objectives:

Students

- are familiar with the concepts and principles of data base models, languages and systems and their applications and explain it,
- design and model relational data bases on the basis of theoretical foundations,
- create queries for relational databases,
- know how to handle enhanced data base problems occurring in the enterprises.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Schlageter, Stucky. Datenbanksysteme: Konzepte und Modelle. Teubner 1983.
- S. M. Lang, P. C. Lockemann. Datenbankeinsatz. Springer-Verlag 1995.
- Jim Gray, Andreas Reuter. Transaction Processing: Concepts and Techniques. Morgan Kaufmann 1993.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

V	**Exercises Applied Informatics - Database Systems** 2511201, SS 2021, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **Online**

Content

Database systems (DBS) play an enormously important role in today's companies. The internal and external data is stored and processed in the database of the respective company. The correct management and organization of this data helps to solve numerous problems, enables simultaneous queries by several users and is the organizational and operational basis for the entire workflows and processes of the company.

The lecture introduces the field of database theory, covers the basics of database languages and database systems, teaches the principles of multi-user database control and physical data organization. In addition, it provides an overview of database problems often encountered in business practice, such as the correctness of data (operational, semantic integrity), the recovery of a consistent database state, and the synchronization of parallel transactions.

Literature

Schlageter / Stucky: Datenbanksysteme: Konzepte und Modelle, 2. Auflage, Teubner, Stuttgart, 1983 P. C. Lockemann / J. W. Schmidt (Hrsg.): Datenbank-Handbuch, Springer-Verlag, 1987 S. Cannan / G. Otten: SQL - The Standard Handbook, McGraw-Hill, 1993 Jim Gray / Andreas Reuter: Transaction Processing: Concepts and Techniques, Morgan Kaufmann, 1993 S. M. Lang / P. C. Lockemann: Datenbankeinsatz, Springer-Verlag, 1995 Ramez Elmasri / Shamkant B. Navathe: Fundamentals of Database Systems, Addison-Wesley, 1994 und 2000

T 7.15 Course: Applied Informatics – Information Security [T-WIWI-110342]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
                   M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2021	2511550	Applied Informatics - Information Security	2 SWS	Lecture / 📱	Ghiglieri , Mayer
ST 2021	2511551	Exercise Applied Informatics - Information Security	1 SWS	Practice / 📱	Berens
Exams					
WT 20/21	7900074	Applied Informatics - Information Security (Registration until 08 February 2021)			Volkamer
ST 2021	7900064	Applied Informatics - Information Security (Registration until 12 July 2021)			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.

The exam takes place every semester and can be repeated at every regular examination date.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-108387 - Information Security must not have been started.

Annotation
Replaces from summer term 2020 T-WIWI-108387 "Information Security".

Below you will find excerpts from events related to this course:

V	**Applied Informatics - Information Security** 2511550, SS 2021, 2 SWS, Open in study portal	**Lecture (V)** **Online**

Content

- Basics and concepts of information security
- Understanding the protection objectives of information security and various attack models (including associated assumptions)
- introduction of measures to achieve the respective protection goals, taking into account different attack models
- Note: In contrast to the IT Security lecture, measures such as encryption algorithms are treated only abstractly, i. e. the idea of the measure, assumptions to the attacker and the deployment environment.
- Presentation and analysis of problems of information security arising from human-machine interaction and presentation of the Human Centered Security by Design approach.
- Introduction into organisational protective measures and standards to be observed for companies

Learing objectives:

The student

- can explain the basics of information security
- knows suitable measures to achieve different protection goals
- can assess the quality of organisational protective measures, i. e. among other things knows what has to be taken into account when using the individual measures
- understands the differences between information security in the organisational and in the private context
- knows the areas of application of different standards and knows their weaknesses
- knows and can explain the problems of information security that which arise from human-machine interaction
- is able to deal with messages concerning found security problems in a critical way.

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

Literature

- P. Gerber, M. Ghiglieri, B. Henhapl, O. Kulyk, K. Marky, P. Mayer, B. Reinheimer, and M. Volkamer, *Human Factors in Security*. Springer, Jan. 2018, pp. 83–98.
- C. Eckert, *IT-Sicherheit: Konzepte-Verfahren-Protokolle*. Walter de Gruyter, 2013

V	**Exercise Applied Informatics - Information Security** 2511551, SS 2021, 1 SWS, Open in study portal	**Practice (Ü)** **Online**

Content

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

T 7.16 Course: Applied Informatics – Modelling [T-WIWI-110338]

Responsible:	Michael Färber
	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101426 - Electives in Informatics
	M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2511030	Applied Informatics - Modelling	2 SWS	Lecture / 📱	Oberweis, Käfer, Schiefer
WT 20/21	2511031	Exercises to Applied Informatics - Modelling	1 SWS	Practice / 📱	Oberweis, Käfer, Schiefer
Exams					
WT 20/21	7900003	Applied Informatics - Modelling (Registration until 08 February 2021)			Oberweis, Sure-Vetter
ST 2021	7900018	Applied Informatics - Modelling (Registration until 12 July 2021)			Oberweis, Färber

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written examination (60 min) in the first week after lecture period (according to Section 4 (2),1 of the examination regulation).

Prerequisites

None

Annotation

Replaces from winter semester 2019/2020 T-WIWI-102652 "Applied Informatics I - Modeling".

Below you will find excerpts from events related to this course:

V	**Applied Informatics - Modelling**	Lecture (V)
	2511030, WS 20/21, 2 SWS, Language: German, Open in study portal	Online

Content

In the context of complex information systems, modelling is of central importance, e.g. – in the context of systems to be developed – for a better understanding of their functionality or in the context of existing systems for supporting maintenance and further development.

Modelling, in particular modelling of information systems, forms the core part of this lecture. The lecture is organized in two parts. The first part mainly covers the modelling of static aspectes, the second part covers the modelling of dynamic aspects of information systems.

The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and description logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets together with their respective analysis techniques will be introduced.

Learning objectives:

Students

- explain the strengths and weaknesses of various modeling approachesfor Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- model given problems in Description Logics and apply description logic rules,
- describe the main ontology concepts and languages and explain SPARQL queries,
- create and evaluate a relational database schema and express queries in relational algebra.

Workload:

- Total effort: 120-135 hours
- Online time: 45 hours
- Self study: 75-90 hours

Organizational issues

Im WS 20/21 gibt es keine festen Vorlesungszeiten, die Vorlesungsinhalte werden in Ilias bereitgestellt.

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

Weiterführende Literatur:

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- Staab, Studer: Handbook on Ontologies, Springer, 2003
- J.L. Peterson: Petri Net Theory and Modeling of Systems, Prentice Hall, 1981.
- Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi, Peter Patel-Schneider. The Description Logic Handbook - Theory, Implementation and Applications, Cambridge 2003.

V	**Exercises to Applied Informatics - Modelling** 2511031, WS 20/21, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **Online**

Content

The exercises are related to the lecture Applied Informatics I - Modelling.

Multiple exercises are held that capture the topics, held in the lectureApplied Informatics I - Modelling, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and description logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets together with their respective analysis techniques will be introduced.

Learning objectives:

Students

- explain the strengths and weaknesses of various modeling approaches for Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- model given problems in Description Logics and apply description logic rules,
- describe the main ontology concepts and languages and explain SPARQL queries,
- create and evaluate a relational database schema and express queries in relational algebra.

Organizational issues
Siehe zugehörige Vorlesung

- Online-Tutorium Dienstag   12-13:30 unter http://s.kit.edu/ai-m-dienstag
- Online-Tutorium Mittwoch   10-11:30 unter http://s.kit.edu/ai-m-mittwoch
- Online-Tutorium Donnerstag 10-11:30 unter http://s.kit.edu/ai-m-donnerstag

Beitritt zum Team unter http://connect.studium.kit.edu/teams/join/CC30tqrgen

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

Weiterführende Literatur:

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- Staab, Studer: Handbook on Ontologies, Springer, 2003
- J.L. Peterson: Petri Net Theory and Modeling of Systems, Prentice Hall, 1981.
- Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi, Peter Patel-Schneider. The Description Logic Handbook - Theory, Implementation and Applications, Cambridge 2003.

7 COURSES

Course: Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-110339]

T 7.17 Course: Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-110339]

Responsible:	Prof. Dr. Ali Sunyaev
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101426 - Electives in Informatics
	M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2511032	Applied Informatics - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	2 SWS	Lecture / ▯	Sunyaev
ST 2021	2511033	Übungen zu Angewandte Informatik - Internet Computing	1 SWS	Practice / ▯	Sunyaev, Teigeler, Beyene
Exams					
WT 20/21	7900004	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services (Registration until 08 February 2021)		Sunyaev	
ST 2021	7900025	Applied Informatics - Internet Computing (Registration until 12 July 2021)		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.

By successful processing the exercises a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites

None

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 2021, 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 II 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 7.18 Course: Applied Informatics – Software Engineering [T-WIWI-110343]

Responsible:	Prof. Dr. Andreas Oberweis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101426 - Electives in Informatics
	M-WIWI-105112 - Applied Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2511206	Applied Informatics - Software Engineering	2 SWS	Lecture / 🖥	Oberweis
ST 2021	2511207	Übungen zu Angewandte Informatik - Software Engineering	1 SWS	Practice / 🖥	Oberweis, Forell
Exams					
WT 20/21	7900026	Applied Informatics - Software Engineering (Registration until 08 February 2021)			Oberweis
ST 2021	7900027	Applied Informatics - Software Engineering (Registration until 12 July 2021)			Oberweis

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an 1h written exam in the first week after lecture period.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-100809 - Software Engineering must not have been started.

Annotation
Replaces T-WIWI-100809 "Software Engineering" as of summer semester 2020.

Below you will find excerpts from events related to this course:

V	**Applied Informatics - Software Engineering**	**Lecture (V)**
	2511206, SS 2021, 2 SWS, Language: German, Open in study portal	**Online**

Content

The course deals with fundamental aspects of the systematically development of huge software systems. The course covers topics such as:

- software developing process models
- methods and tools for the development phases: requirements analysis, system specification, system design, programming and testing.

Learning objectives:

Students

- are familiar with the concepts and principles of software engineering and can discuss it,
- know common software development process models and their strengths and weaknesses and can discuss it,
- know methods for requirements analysis and can use it and can model and evaluate use case models,
- know models for systems structuring and controling as well as architecture principles of software systems and can discuss it.
- can model and evaluate component diagrams
- are familiar with basic concepts of software quality management and are able to apply software test and evaluation methods in concrete situations.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- H. Balzert. Lehrbuch der Software-Technik. Spektrum Verlag 2008.
- I. Sommerville. Software Engineering. Pearson Studium 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T   7.19 Course: Auction & Mechanism Design [T-WIWI-102876]

Responsible:	Prof. Dr. Nora Szech
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2560550	Auction and Mechanism Design	2 SWS	Lecture / 🖥	Szech
ST 2021	2560551	Übung zu Auction and Mechanism Design	1 SWS	Practice / 🖥	Szech, Huber
Exams					
WT 20/21	7900299	Exam Auction & Mechanism Design			Szech

Legend: 🖥 Online, ⨳ Blended (On-Site/Online), 🌑 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A bonus can be earned through successful participation in the excercise. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Annotation
The lecture will be held in English.

Below you will find excerpts from events related to this course:

V	**Auction and Mechanism Design**	**Lecture (V)**
	2560550, SS 2021, 2 SWS, Language: English, Open in study portal	**Online**

Content

The course starts with the basic theory of equilibrium behavior and revenue management in one object standard auctions. The revenue equivalence theorem for standard auctions is introduced. Thereafter, the course focuses on mechanism design and its applications to one object auctions and bilateral trade.

The students

- learn to analyze strategic behavior in auctions;
- learn to compare auction formats with regard to efficiency and revenue;
- are familiarized with the basic theory of (Bayesian) mechanism design;
- learn to master the revenue equivalence theorem for standard auctions;
- learn to apply mechanism design to one object auctions and bilateral trade.

The lecture will be held in English.

It depends on the future pandemic development if the assessment will be in the form of an open-book-exam (Prüfungsleistung *anderer Art*, *SPO § 4 Abs. 2*, *Pkt. 3*) or in the form of a written exam (60 minutes) (SPO §4 (2), 1).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Through successful participation in the Exercise, students can earn a bonus. If the grade on the written exam is between 4,0 and 1,3 the bonus improves the grade by one step (0,3 or 0,4). Details will be announced during the lecture.

The total workload for this course is approximately 135.0 hours. For further information see German version.

Recommendations:

Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Literature

Krishna, V.: Auction Theory, Academic Press, 2009.

Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2010.

Mathews, S.: A Technical Primer on Auction Theory I: Independent Private Values No. 1096. Northwestern University, Center for Mathematical Studies in Economics and Management Science, 1995.

T 7.20 Course: B2B Sales Management [T-WIWI-111367]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

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

Competence Certificate
The assessment is carried out (according to §4(2), 3 of the examination regulation) by the preparation and presentation of a sales presentation based on a use case (max 30 points) and a written open book exam (max 60 points). In total, a maximum of 90 points can be achieved during the course.

Further details on the case study and open book exam will be announced in the lecture.

Prerequisites
None.

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

T   7.21 Course: Bachelor Thesis [T-WIWI-103096]

Responsible:	Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101612 - Module Bachelor Thesis

Type	Credits	Grading scale	Version
Final Thesis	12	Grade to a third	1

Competence Certificate
See module description

Prerequisites
See module description

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline	6 months
Maximum extension period	1 months
Correction period	6 weeks

Recommendation
See module description

Annotation
See module description

T 7.22 Course: Basic Principles of Economic Policy [T-WIWI-103213]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Events					
ST 2021	2560280	Basic Principles of Economic Policy	2 SWS	Lecture / ✘	Ott
ST 2021	2560281	Exercises of Basic Principles of Economic Policy	1 SWS	Practice / ✘	Ott, Scheu
Exams					
WT 20/21	7900079	Basic Principles of Economic Policy			Ott

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🌓 On-Site, ✘ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

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

Annotation
Please note that the lecture will not be held in summer semester 2021. The exam is offered.

Description:
Theory of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:
Students learn:

- To apply basic concepts of micro- and macroeconomic theories to economic policy issues.
- to develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- to derive theory-based policy recommendations.

Learning content:

- Market interventions: microeconomic perspective
- Market interventions: macroeconomic perspective
- Institutional economic aspects
- Economic policy and welfare economics
- Economic policy makers: Political-economic aspects

Workload:

- Total effort at 4.5 LP: approx. 135 hours
- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Media:
See course announcement

References:
See course announcement

Below you will find excerpts from events related to this course:

V	**Basic Principles of Economic Policy** 2560280, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Cancelled**

Content

The lecture deals with theories of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:

Students shall be given the ability to

- apply basic concepts of micro- and macroeconomic theories to economic policy issues
- develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- derive theory-based policy recommendations

Recommendations:

Basic micro- and macroeconomic knowledge is required, especially as taught in the courses Economics I [2610012] and Economics II [2600014].

Workload:

Total effort at 4.5 LP is approx. 135 hours and consists of:

- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Assessment:

The examination takes place in the form of a written examination (60min) (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

Organizational issues

Zugehörige Veranstaltung: Übungen zur Einführung in die Wirtschaftspolitik [2560281]
Die Vorlesung wird im SoSe 2021 nicht gelesen. Die Prüfung findet statt. Vorbereitungsmaterialien finden Sie im Ilias.

Literature

- Klump, Rainer (2013): Wirtschaftspolitik. Pearson Studium
- Baldwin, Richard und Charles Wyplosz (2019): The Economics of European Integration, 6. Edition, McGraw-Hill Education, London
- Foliensatz zur Vorlesung
- Übungsaufgaben

V	**Exercises of Basic Principles of Economic Policy** 2560281, SS 2021, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **Cancelled**

Organizational issues

Zugehörige Veranstaltung: [2560280] Einführung in die Wirtschaftspolitik
Die Vorlesung und Übung wird im SoSe 2021 nicht gelesen. Die Prüfung findet statt. Vorbereitungsunterlagen finden Sie im Ilias - insbesondere die Video Übungsaufzeichnungen vom SoSe 2020 sind zur Verfügung gestellt.

Literature

- Klump, Rainer (2013): Wirtschaftspolitik. Pearson Studium
- Baldwin, Richard und Charles Wyplosz (2019): The Economics of European Integration, 6. Edition, McGraw-Hill Education, London
- Foliensatz zur Vorlesung
- Übungsaufgaben

T 7.23 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-101403 - Public Finance
	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 20/21	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture / 🖥	Wigger, Gutekunst
Exams					
WT 20/21	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 in the summer semester 2021 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 20/21, 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.

Organizational issues
Montag 17:30:00-19:00 Uhr per MS-Teams-Livestream

(Achtung: In der ersten Vorlesungswoche beginnt die Veranstaltung um 18:00 Uhr)

T 7.24 Course: Basics of Technical Logistics I [T-MACH-109919]

Responsible:	Dr.-Ing. Martin Mittwollen
	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 20/21	2117095	Basics of Technical Logistics	3 SWS	Lecture / Practice (/ ⊠	Mittwollen, Oellerich
Exams					
WT 20/21	76-T-MACH-109001	Basics of Technical Logistics I			Mittwollen
WT 20/21	76-T-MACH-109919	Basics of Technical Logistics I			Mittwollen
ST 2021	76-T-MACH-109919	Basics of Technical Logistics I			Mittwollen

Legend: 📱 Online, ⊠ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge of the basics of technical mechanics preconditioned.

Below you will find excerpts from events related to this course:

V Basics of Technical Logistics
2117095, WS 20/21, 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 mündlichen oder schriftlichen Prüfung (nach §4 (2), 1 bzw. 2SPO).

The assessment consistsof an oral or a written 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	**7.25 Course: Basics of Technical Logistics II [T-MACH-109920]**

Responsible: Maximilian Hochstein
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 20/21	2117098	Basics of Technical Logistics II	3 SWS	Lecture / Practice (/ ❄	Hochstein, Oellerich
Exams					
WT 20/21	76-T-MACH-109002	Basics of Technical Logistics II			Mittwollen, Hochstein
WT 20/21	76-T-MACH-109920	Basics of Technical Logistics II			Hochstein, Mittwollen
ST 2021	76-T-MACH-109920	Basics of Technical Logistics II			Hochstein, 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   7.26 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2021	2142883	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	2 SWS	Lecture / 🖥	Guber
Exams					
WT 20/21	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber
ST 2021	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 2021, 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

T 7.27 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III [T-MACH-100968]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2021	2142879	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	2 SWS	Lecture / 📱	Guber
Exams					
WT 20/21	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber
ST 2021	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 2021, 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 7.28 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-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2021	2142140	Bionics for Engineers and Natural Scientists	2 SWS	Lecture / 🖥	Hölscher
Exams					
WT 20/21	76-T-MACH-102172	Bionics for Engineers and Natural Scientists			Hölscher
ST 2021	76-T-MACH-102172	Bionics for Engineers and Natural Scientists			Hölscher

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
written or oral exam

Prerequisites
none

Below you will find excerpts from events related to this course:

V Bionics for Engineers and Natural Scientists
2142140, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.

The students should be able analyze, judge, plan and develop biomimetic strategies and products.

Basic knowledge in physics and chemistry

The successfull attandence of the lecture is controlled by a written examination.

Organizational issues
Die Vorlesung findet im Sommersemester 2021 aufgrund der aktuellen Situation voraussichtlich **online** statt. Dabei werden unter anderem Methoden wie „Flipped Classroom" genutzt und im ILIAS Materialien (Videos, Originalliteratur, Übungen) zum Selbststudium zur Verfügung gestellt. Zusätzlich wird zu den jeweiligen Vorlesungsterminen ein Online-Seminar mit der Software ZOOM durchgeführt, in dem Aufgaben, Übungen und Fragen besprochen werden. Nähere Informationen werden Anfang April 2021 im ILIAS zur Verfügung gestellt.

Die Prüfung findet als Klausur statt und es werden zwei Termine angeboten werden (voraussichtlich in der ersten Woche nach Vorlesungsende im Sommersemester und in der ersten Woche vor Vorlesungsbeginn im Wintersemester).

Literature
Folien und Literatur werden in ILIAS zur Verfügung gestellt.

T 7.29 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 20/21	2134153	Boosting of Combustion Engines	2 SWS	/ ❁	Kech
ST 2021	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 7.30 Course: Business Administration: Finance and Accounting [T-WIWI-102819]

Responsible:	Prof. Dr. Martin Ruckes
	Prof. Dr. Marliese Uhrig-Homburg
	Prof. Dr. Marcus Wouters
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101494 - Fundamentals of Business Administration 1

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 20/21	2610026	Business Administration: Finance and Accounting	2 SWS	Lecture / 👤	Ruckes, Wouters
WT 20/21	2610029		2 SWS	Tutorial (/ 🧩	Strych
Exams					
WT 20/21	7900368	Business Administration: Finance and Accounting			Wouters, Ruckes

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation.

The assessment 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 Business Administration: Finance and Accounting
2610026, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture covers the following topics:

- Investment and Finance
    - Valuation of Bonds and Stocks
    - Capital Budgeting
    - Portfolio Theory
- Financial Accounting
- Management Accounting

Literature
Ausführliche Literaturhinweise werden in den Materialen zur Vorlesung gegeben.

T	**7.31 Course: Business Administration: Production Economics and Marketing [T-WIWI-102818]**

Responsible:	Prof. Dr. Wolf Fichtner
	Prof. Dr. Martin Klarmann
	Prof. Dr.-Ing. Thomas Lützkendorf
	Prof. Dr. Martin Ruckes
	Prof. Dr. Frank Schultmann
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101578 - Fundamentals of Business Administration 2

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2021	2500025	Tutorien zu BWL PM	2 SWS	Tutorial (/ 🖥	Klarmann, Strych, Assistenten
ST 2021	2600024	Business Administration: Production Economics and Marketing	2 SWS	Lecture / 🖥	Klarmann, Schultmann, Fichtner
Exams					
WT 20/21	7900317	Business Administration: Production Economics and Marketing			Schultmann, Klarmann

Legend: 🖥 Online, 🌃 Blended (On-Site/Online), 🍴 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) according to Section 4(2), 1 of the examination regulation.

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Business Administration: Production Economics and Marketing** 2600024, SS 2021, 2 SWS, Language: German, Open in study portal	Lecture (V) Online

Content

The course is composed of the sub-areas:

1. Marketing:

Marketing aims at the optimal design of situations that arise in the context of economic activity in the satisfaction of needs and desires (e.g. marketing of company services, soliciting understanding of group interests, distribution of public funds, implementation of economic policy goals).

Topics dealt with in detail:

- Market research (e.g. product positioning, market segmentation)
- behavioural research (e.g. influence of socio-cultural and physical environmental aspects)
- Marketing policy instruments (e.g. product, price, communication and distribution policy),
- Special features of international marketing activities (e.g. advantages and risks in international exchange relations),
- Entrepreneurship and intrapreneurship (e.g. marketing of innovations by company founders vs. established companies)

2. Production Economy:

This subfield provides an initial introduction to all operational tasks related to the production of tangible and intangible goods. In addition to the manufacturing industry (basic and capital goods, capital goods and consumer goods, food and beverages, i.e. production industry in the broadest sense), the energy industry, construction and real estate industry and labour sciences are also considered.

Topics dealt with in detail:

- Introduction to the subfield (system theoretical classification, general tasks, cross-sectional topics)
- Industrial production (location planning, transport planning, procurement, plant management, production management)
- Electricity industry (energy demand and supply, energy system planning, technological foresight, cost structures)
- Construction and real estate industry

3. Information Systems:

Information represents a competitive factor in today's economy, which requires an interdisciplinary view of the research fields of economics, information technology and law. In this subfield, selected fundamentals of Business Information Systems and their role in today's competition are presented.
Examples from practice motivate and complement the topics.

Treated topics in detail:

- Trends in Information Systems
- Definition of terms data, information, knowledge
- Information in companies: Production and competitive factor
- Information processing: from agent to corporate network
- Company networks
- Service Value Networks
- market engineering
- social networks and services

Literature

Ausführliche Literaturhinweise werden gegeben in den Materialen zur Vorlesung.

T 7.32 Course: Business Administration: Strategic Management and Information Engineering and Management [T-WIWI-102817]

Responsible:	Prof. Dr. Petra Nieken Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101494 - Fundamentals of Business Administration 1

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 20/21	2600023	Betriebswirtschaftslehre: Unternehmensführung und Informationswirtschaft	2 SWS	Lecture / 🖥	Weinhardt, Strych, Lindstädt
Exams					
WT 20/21	7900370	Business Administration: Strategic Management and Information Engineering and Management			Weinhardt, Lindstädt

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation.
The assessment 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	**Betriebswirtschaftslehre: Unternehmensführung und Informationswirtschaft** 2600023, WS 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content
Foundations of Business Administration

- Economic Principle
- Business administration as science
- Firm and company
- Functions in firms
- Constitutional decisions in firms
- Die curraxit AG - a case study for the core program

Strategic Management

- Mangarial decisions in firms
- Corporate Governance
- Organization of the firm
- Foundations of strategic management

Information Engineering and Management

- Digital economies and services
- Auctions
- Service markets und network effects
- Information processing on financial markets

Learning Outcomes
This lecture introduces the student to the discipline of business administration and management science. Due to this the student is equipped to become familiar with all their different fields very efficiently and effectively. Moreover, this lecture gives some kind of orientation among these fields.

After this, foundations of management and organization as well as information engineering and management are taught.

Literature
Ausführliche Literaturhinweise werden in den Materialen zur Vorlesung gegeben.

T 7.33 Course: Business Strategies of Banks [T-WIWI-102626]

Responsible:	Prof. Dr. Wolfgang Müller
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 20/21	2530299	Business Strategies of Banks	2 SWS	Lecture / 🎤	Müller
ST 2021	2530299	Business Strategies of Banks	2 SWS	Lecture / 🎤	Müller
Exams					
WT 20/21	7900064	Business Strategies of Banks			Müller, 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 Business Strategies of Banks
2530299, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Learning outcomes:

Students are are in a position to discuss the principles of commercial banking. They are familiar with fundamental concepts of bank management and are able to apply them.

Workload:

The total workload for this course is approximately 90 hours. For further information see the German version.

Literature
Weiterführende Literatur:

- Ein Skript wird im Verlauf der Veranstaltung kapitelweise ausgeteilt.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2014, Bankbetriebslehre, 6. Auflage, Springer

| V | **Business Strategies of Banks**
2530299, SS 2021, 2 SWS, Language: German, Open in study portal | **Lecture (V)**
On-Site |

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   7.34 Course: CAD-NX Training Course [T-MACH-102187]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type Completed coursework (practical)	Credits 2	Grading scale pass/fail	Recurrence Each term	Version 2

Events					
WT 20/21	2123357	CAD-NX training course	2 SWS	Practical course / 🖥	Ovtcharova, Mitarbeiter
ST 2021	2123357	CAD-NX training course	2 SWS	Practical course / ⚙	Ovtcharova, Mitarbeiter
Exams					
WT 20/21	76-T-MACH-102187	CAD-NX 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 compulsory attendance exists.

Below you will find excerpts from events related to this course:

V   CAD-NX training course
2123357, WS 20/21, 2 SWS, Language: German, Open in study portal

**Practical course (P)
Online**

Content

- Overview of the functional range
- Introduction to the work environment of NX
- Basics of 3D-CAD modelling
- Feature-based modelling
- Freeform modelling
- Generation of technical drawings
- Assembly modelling
- Finite element method (FEM) and multi-body simulation (MBS) with NX

Students are able to:

- create their own 3D geometric models in the CAD system NX 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 NX to automate the creation of geometry and thus to ensure the reusability of the models.

Organizational issues
Siehe ILIAS

Literature
Praktikumsskript

V	**CAD-NX training course** 2123357, SS 2021, 2 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

- Overview of the functional range
- Introduction to the work environment of NX
- Basics of 3D-CAD modelling
- Feature-based modelling
- Freeform modelling
- Generation of technical drawings
- Assembly modelling
- Finite element method (FEM) and multi-body simulation (MBS) with NX

Students are able to:

- create their own 3D geometric models in the CAD system NX 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 NX to automate the creation of geometry and thus to ensure the reusability of the models.

Organizational issues
Das Praktikum wird mehrmals in der vorlesungsfreien Zeit als einwöchige Blockveranstaltung angeboten. Weitere Informationen siehe ILIAS.

Literature
Praktikumsskript

T   7.35 Course: Civil Law for Beginners [T-INFO-103339]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-101190 - Introduction to Civil Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	3

Events					
WT 20/21	24012	Civil Law for Beginners	4 SWS	Lecture / 🖥	Matz
Exams					
WT 20/21	7500012	Civil Law for Beginners			Matz, Dreier
ST 2021	7500041	Civil Law for Beginners			Dreier, Matz

Legend: 🖥 Online, 🗗 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 7.36 Course: Climatology [T-PHYS-101092]

Responsible:	Prof. Dr. Joaquim José Ginete Werner Pinto
Organisation:	KIT Department of Physics
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type Completed coursework	Credits 1	Grading scale pass/fail	Recurrence Each summer term	Version 4

Events					
ST 2021	4051111	Klimatologie	3 SWS	Lecture / ▤	Ginete Werner Pinto
ST 2021	4051112	Übungen zu Klimatologie	1 SWS	Practice / ▤	Ginete Werner Pinto, Ludwig, Mömken

Legend: ▤ Online, ⬡ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Prerequisites

T 7.37 Course: Combustion Engines I [T-MACH-102194]

Responsible:	Prof. Dr. Thomas Koch
	Dr.-Ing. Heiko Kubach
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101275 - Combustion Engines I

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	1

Events					
WT 20/21	2133113	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels I	4 SWS	Lecture / Practice (/ 👥	Koch
Exams					
WT 20/21	76-T-MACH-102194	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels I			Kubach, Koch
ST 2021	76-T-MACH-102194	Combustion Engines I			Koch, Kubach

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 Combustion Engines, Hydrogen Engines and CO2 neutral Fuels I

2133113, WS 20/21, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Introduction of IFKM and lecture topics

Working Principle and Applications

Characteristic Parameters

Engine Parts

Drive Train

Conventional, alternative and CO2-neutral Fuels

Gasoline Engines

Diesel Engines

Hydrogen Engines

Exhaust Gas Aftertreatment

T 7.38 Course: Combustion Engines II [T-MACH-104609]

Responsible: Dr.-Ing. Rainer Koch
                      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	5	Grade to a third	Each summer term	1

Events					
ST 2021	2134151	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II	3 SWS	Lecture / Practice (/ 🧩	Koch
Exams					
WT 20/21	76-T-MACH-104609	Combustion Engines II			Kubach, Koch
ST 2021	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Koch, Kubach

Legend: 📱 Online, 🧩 Blended (On-Site/Online), ✊ On-Site, ✗ Cancelled

Competence Certificate
oral examination, duration: 25 minutes, no auxiliary means

Prerequisites
none

Recommendation
Fundamentals of Combustion Engines I helpful

Below you will find excerpts from events related to this course:

V	**Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II**	**Lecture / Practice (VÜ)**
	2134151, SS 2021, 3 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

T   7.39 Course: Competition in Networks [T-WIWI-100005]

Responsible:	Prof. Dr. Kay Mitusch
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Exams			
WT 20/21	7900335	Competition in Networks	Mitusch

Competence Certificate
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None.

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

Annotation
Due to the research semester of Prof. Mitusch the course will not be offered in the winter semester 20/21. An examination will be offered in each semester.

T 7.40 Course: Computer Contract Law [T-INFO-102036]

Responsible: Michael Bartsch
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 20/21	2411604	Computer Contract Law	2 SWS	Lecture / ▤	Menk
Exams					
WT 20/21	7500065	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 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

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.

Organizational issues
Die Veranstaltung findet im **WS 2020/2021** in Form eines **Online-Stream live** statt.

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 7.41 Course: Construction Technology [T-BGU-101691]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-101004 - Fundamentals of Construction

Type Written examination	Credits 6	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2021	6200410	Construction Technology	3 SWS	Lecture / ▊	Gentes, Haghsheno, Schneider
ST 2021	6200411	Exercises to Construction Technology	1 SWS	Practice / ▊	Gentes, Haghsheno, Schneider, Waleczko
Exams					
WT 20/21	8230101691	Construction Technology			Haghsheno, Gentes, Schneider

Legend: ▊ Online, ⊗ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
written exam with 90 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T   7.42 Course: Consumer Behavior [T-WIWI-106569]

Responsible:	Prof. Dr. Benjamin Scheibehenne
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-104911 - Information Systems & Digital Business: Interaction

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Once	2

Competence Certificate

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites

None.

Annotation

For further information, please contact the research group Marketing and Sales (http://marketing.iism.kit.edu/).

T   7.43 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	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	2

Events					
ST 2021	2150683	Control Technology	2 SWS	Lecture / 🖥	Gönnheimer
Exams					
WT 20/21	76-T-MACH-105185	Control Technology			Gönnheimer
ST 2021	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 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **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	**7.44 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-101816 - Seminar Module

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
WT 20/21	2119100	Fördertechnik und Logistiksysteme		Seminar / ⚙	Furmans, Pagani
ST 2021	2119100	Fördertechnik und Logistiksysteme		Seminar / ⚙	Furmans, Pagani
Exams					
WT 20/21	76-T-MACH-102135	Conveying Technology and Logistics			Furmans
ST 2021	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 2021, SWS, 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. The students can work on the topic either alone or in a group work. At the end the results are presented and discussed with a final presentation. The 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 7.45 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 term	1

Events					
WT 20/21	24121	Copyright	2 SWS	Lecture / 📱	Dreier
Exams					
WT 20/21	7500064	Copyright			Dreier, Matz

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

T	**7.46 Course: Data Mining and Applications [T-WIWI-103066]**

Responsible:	Rheza Nakhaeizadeh
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101608 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

Type Oral examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** see Annotations	**Version** 2

Events					
ST 2021	2520375	Data Mining and Applications	2 SWS	Lecture / 🖥	Nakhaeizadeh

Legend: 🖥 Online, ⚃ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The course will be held for the last time in the summer semester 2021. The last exam opportunity for first-timers will be in the summer semester 2021. A last exam opportunity (for repeaters only) will be offered in the winter semester 2021/2022.

- Conduction of a larger emprical study in groups
- reporting of milestones
- final presentation (app. 45 minutes)

Prerequisites

None

Annotation

The course will be held for the last time in the summer semester of 2021.

Below you will find excerpts from events related to this course:

V	**Data Mining and Applications** 2520375, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content
Learning objectives:

Students

- know the definition of Data Mining
- are familiar with the CRISP-DM
- are familiar with the most important Data Mining Algorithms like Decision Tree, K-Means, Artificial Neural Networks, Association Rules, Regression Analysis
- will be able to use a DM-Tool

Content:

Part one: Data Mining:

What is Data Mining?; History of Data Mining; Conferences and Journals on Data Mining; Potential Applications; Data Mining Process; Business Understanding; Data Understanding; Data Preparation; Modeling; Evaluation; Deployment; Interdisciplinary aspects of Data Mining; Data Mining tasks; Data Mining Algorithms (Decision Trees, Association Rules, Regression, Clustering, Neural Networks); Fuzzy Mining; OLAP and Data Warehouse; Data Mining Tools; Trends in Data Mining

Part two: Examples of application of Data Mining

Success parameters of Data Mining Projects; Application in industry; Application in Commerce

Workload:

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 bekannt gegeben

Literature
U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, R. Uthurusamy, editors, Advances in Knowledge Discovery and Data Mining, AAAI/MIT Press, 1996 (order online from Amazon.com or from MIT Press).

Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016 , 2006.

David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000

Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.

Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367

Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.

Ian Witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070 , 2005.

T 7.47 Course: Data Protection Law [T-INFO-101303]

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 20/21	24018	Datenschutzrecht	2 SWS	Lecture / 📱	Eichenhofer
Exams					
WT 20/21	7500162	Data Protection Law			Eichenhofer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✕ Cancelled

T 7.48 Course: Decision Theory [T-WIWI-102792]

Responsible:	Prof. Dr. Karl-Martin Ehrhart
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101420 - Econometrics and Economics
	M-WIWI-101499 - Applied Microeconomics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2520365	Decision Theory	2 SWS	Lecture / 📱	Ehrhart
ST 2021	2520366	Übungen zu Entscheidungstheorie	1 SWS	Practice / 📱	Ehrhart
Exams					
WT 20/21	7900348	Decision Theory			Ehrhart

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
Knowledge in mathematics and statistics is required.

Below you will find excerpts from events related to this course:

V	**Decision Theory**	**Lecture (V)**
	2520365, SS 2021, 2 SWS, Language: German, Open in study portal	**Online**

Literature

- Ehrhart, K.-M. und S.K. Berninghaus (2012): Skript zur Vorlesung Entscheidungstheorie, KIT.
- Hirshleifer und Riley (1997): The Analytics of Uncertainty and Information. London: Cambridge University Press, 4. Aufl.
- Berninghaus, S.K., K.-M. Ehrhart und W. Güth (2006): Strategische Spiele. Berlin u.a.: Springer, 2., überarbeitete und erweiterte Aufl. (oder erste Auflage, 2002)

T 7.49 Course: Derivatives [T-WIWI-102643]

Responsible:	Prof. Dr. Marliese Uhrig-Homburg
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101402 - eFinance
	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2530550	Derivatives	2 SWS	Lecture / 📱	Uhrig-Homburg
ST 2021	2530551	Übung zu Derivate	1 SWS	Practice / 📱	Uhrig-Homburg, Eska
Exams					
WT 20/21	7900051	Derivatives			Uhrig-Homburg

Legend: 📱 Online, ⚜ Blended (On-Site/Online), ♟ On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered in the summer semester 2021 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

Below you will find excerpts from events related to this course:

V	**Derivatives**	**Lecture (V)**
	2530550, SS 2021, 2 SWS, Language: German, Open in study portal	**Online**

Organizational issues
Veranstaltungskonzept umfasst vollständige Aufzeichnungen von Vorlesung und Übung. Ergänzend bieten wir zweiwöchig freiwillige Live-Fragerunden zum fachlichen und organisatorischen Austausch an.

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Weiterführende Literatur:

Cox/Rubinstein (1985): Option Markets, Prentice Hall

T	**7.50 Course: Design, Construction and Sustainability Assessment of Buildings I [T-WIWI-102742]**

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 20/21	2586404	Design and Construction of Buildings	2 SWS	Lecture / 📱	Lützkendorf
WT 20/21	2586405	Übung zu Bauökologie I	1 SWS	Practice / 📱	N.N.
Exams					
WT 20/21	7900247	Design, Construction and Sustainability Assessment of Buildings I			Lützkendorf
WT 20/21	7900248	Design, Construction and Sustainability Assessment of Buildings I			Lützkendorf

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 two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
A combination with the module *Real Estate Management* and with engineering science modules in the area of building physics and structural design is recommended.

Below you will find excerpts from events related to this course:

V	**Design and Construction of Buildings** 2586404, WS 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

Taking low-energy buildings as an example the course is an introduction to cheap, energy-efficient, resource-saving and health-supporting design, construction and operation of buildings. Questions of the implementation of the principles of a sustainable development within the building sector are discussed on the levels of the whole building, its components, building equipment as well as the materials. Besides technical interrelationships basics dimensioning and various approaches to ecological and economical assessment play a role during the lectures, as well as the different roles of people involved into the building process. Topics are the integration of economical and ecological aspects into the design process, strategies of energy supply, low-energy and passive buildings, active and passive use of solar energy, selection and assessment of construction details, selection and assessment of insulation materials, greened roofs plus health and comfort.

Recommendations:

A combination with the module *Real Estate Management* [WW3BWLUO1] and with engineering science modules in the area of building physics and structural design is recommended.

The student

- has an in-depth knowledge of aspects of energy-saving, resource-saving and health-oriented design, construction and operation of buildings (design for environment)
- has a critical understanding of the essential requirements, concepts and technical solutions for green buildings
- is able to integrate aspects of energy-saving, resource-saving and health-conscious construction into a holistic environmental design approach and to assess the advantages and disadvantages of different individual solutions.

The total workload for this course is approximately 135.0 hours. For further information see German version.

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Umweltbundesamt (Hrsg.): "Leitfaden zum ökologisch orientierten Bauen". C.F.Müller 1997
- IBO (Hrsg.): "Ökologie der Dämmstoffe". Springer 2000
- Feist (Hrsg.): "Das Niedrigenergiehaus – Standard für energiebewusstes Bauen". C.F.Müller 1998
- Bundesarchitektenkammer (Hrsg.): "Energiegerechtes Bauen und Modernisieren". Birkhäuser 1996
- Schulze-Darup: "Bauökologie". Bauverlag 1996

T 7.51 Course: Design, Construction and Sustainability Assessment of Buildings II [T-WIWI-102743]

Responsible:	Prof. Dr.-Ing. Thomas Lützkendorf
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2585403	Übung zu Bauökologie II	1 SWS	Practice / 🖥	Rochlitzer
ST 2021	2585404	Sustainability Assessment of Buildings	2 SWS	Lecture / 🖥	Lützkendorf

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the exam will be offered in the summer semester 2021 either as a 60-minute upload exam (Open Book Exam @ Home), or as a 60-minute exam (written exam according to SPO § 4 Abs. 2, Pkt. 1).

Prerequisites

None

Recommendation

A combination with the module *Real Estate Management* and with engineering science modules from the areas building physics and structural designis recommended.

Below you will find excerpts from events related to this course:

V Sustainability Assessment of Buildings

2585404, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

The course identifies problems concerning the economical and environmental assessment of buildings along their lifecycle and discusses suitable procedures and tools supporting the decision making process. For example, the course addresses topics like operating costs, heat cost allocation, comparisons of heating costs, applied economical assessment methods, life cycle assessment as well as related design and assessment tools (e.g. element catalogues, databases, emblems, tools) and assessment procedures (e.g. carbon footprint, MIPS, KEA), which are currently available.

Recommendations:

A combination with the module *Real Estate Management* [WW3BWLOOW2] and with engineering science modules from the areas building physics and structural designis recommended.

The student

- has an in-depth knowledge of the classification of environmental design and construction of buildings within the overall context of sustainability
- has a critical understanding of the main theories and methods of assessing the environmental performance of buildings
- is able to use methods and tools to evaluate the environmental performance in design and decision processes or to interpret existing results

The total workload for this course is approximately 135.0 hours. For further information see German version.

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Re-examinations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Schmidt-Bleek: "Das MIPS-Konzept". Droemer 1998
- Wackernagel et.al: "Unser ökologischer Fußabdruck". Birkhäuser 1997
- Braunschweig: "Methode der ökologischen Knappheit". BUWAL 1997
- Hohmeyer et al.: "Social Costs and Sustainability". Springer 1997
- Hofstetter: "Perspectives in Life Cycle Impact Assessment". Kluwer Academic Publishers 1998

T 7.52 Course: Development Methods of Technical Systems [T-MACH-111283]

Responsible:	Dipl.-Ing. Thomas Maier
	Prof. Dr.-Ing. Jivka Ovtcharova
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101270 - Product Lifecycle Management

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

Events					
ST 2021	2121002	Development methods of technical systems	4 SWS	Project (P / ⚙)	Maier

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate
Graded examination of other type weighted 50% project documentation and 50% colloquium.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Development methods of technical systems
2121002, SS 2021, 4 SWS, Language: German/English, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
Requirements, SysML, Modelica, FEM high performance computing, process modeling, VR/AR

Students can exemplarily:

- 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 simple FE meshes for simulations of structural mechanics.
- Perform general FEM analyses on mainframe computers and prepare and explain simulation results.
- As a team present the learned skills and document them continuously.

Organizational issues
Siehe ILIAS und Homepage zur Lehrveranstaltung

T 7.53 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 2021	2134155	Development of Hybrid Powertrains	2 SWS	Lecture / ⚙	Koch, Doppelbauer
Exams					
WT 20/21	76-T-MACH-110817	Development of hybrid drivetrains			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 2021, 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 7.54 Course: Digital Services: Foundations [T-WIWI-111307]

Responsible:	Prof. Dr. Gerhard Satzger
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101434 - eBusiness and Service Management
	M-WIWI-102752 - Fundamentals of Digital Service Systems
	M-WIWI-104912 - Information Systems & Digital Business: Platforms
	M-WIWI-104913 - Information Systems & Digital Business: Servitization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2595466	Digital Services: Foundations	2 SWS	Lecture / 📱	Satzger, Weinhardt, Kühl
ST 2021	2595467	Exercise Digital Services: Foundations	1 SWS	Practice / 📱	Kühl, Schöffer, Badewitz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), ⬤ On-Site, ✖ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations). 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

see below

Annotation

This course replaces T-WIWI-109938 "Digital Services".

Below you will find excerpts from events related to this course:

V Digital Services: Foundations
2595466, SS 2021, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content

The world has been moving towards "service-led" economies: In many developed countries, services already account for more than 70% of the gross domestic product. In order to design, engineer, and manage services, traditional "goods-oriented" business models are often inappropriate. At the same time, the rapid development of information and communication technology (ICT) pushes "servitization" and the economic importance of digital services and, therefore, drives competition: Increased interaction and individualization options open up new dimensions of "value co-creation" between providers and customers; dynamic and scalable service value networks replace static value chains; services can instantly be delivered anywhere across the globe.

Building on a systematic categorization of different types of services and on the general notion of "value co-creation", we cover concepts and foundations for engineering and managing ICT-based digital services, allowing for further specialization in other KSRI/IISM courses at the Master level. Topics in this course include an introduction to services, cloud and cloud labor services, web services, service innovation, service analytics, digital economics, as well as the transformation and coordination of service value networks. Additionally, case studies, hands-on exercises, and guest lectures will illustrate the relevance of digital services in today's world. This course is held in English to acquaint students with international environments.

Literature

- Beverungen, D., Müller, O., Matzner, M., Mendling, J., & Vom Brocke, J. (2019). Conceptualizing smart service systems. *Electronic Markets, 29*(1), 7-18.
- Böhmann, T., Leimeister, J. M., & Möslein, K. (2014). Service systems engineering. *Business & Information Systems Engineering, 6*(2), 73-79.
- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.). (2015). *Fundamentals of service systems* (Vol. 12). Heidelberg: Springer.
- Davenport, T., & Harris, J. (2017). *Competing on analytics: Updated, with a new introduction: The new science of winning.* Harvard Business Press.
- Fromm, H., Habryn, F., & Satzger, G. (2012). Service analytics: Leveraging data across enterprise boundaries for competitive advantage. In *Globalization of professional services* (pp. 139-149). Springer, Berlin, Heidelberg.
- Ostrom, A. L., Parasuraman, A., Bowen, D. E., Patrício, L., & Voss, C. A. (2015). Service research priorities in a rapidly changing context. *Journal of Service Research, 18*(2), 127-159.
- Schüritz, R., & Satzger, G. (2016). Patterns of data-infused business model innovation. In *2016 IEEE 18th Conference on Business Informatics (CBI)* (Vol. 1, pp. 133-142). IEEE.
- Spohrer, J., Maglio, P. P., Bailey, J., & Gruhl, D. (2007). Steps toward a science of service systems. *Computer, 40*(1), 71-77.

T 7.55 Course: Digitalization from Production to the Customer in the Optical Industry [T-MACH-110176]

Responsible: Marc Wawerla
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 2

Events					
WT 20/21	2149701	Digitalization from Production to the Customer in the Optical Industry	2 SWS	Lecture / 🗣	Wawerla
Exams					
WT 20/21	76-T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry			Wawerla
ST 2021	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):
- Processing and presentation (ca. 30 min) of a case study with weighting 50%
- Written exam (ca. 60 min) with 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 20/21, 2 SWS, Language: English, Open in study portal	Lecture (V) On-Site

Content

The lecture deals with Digitalization along the entire value chain end-to-end, with a focus on production and supply chain. Within this context, concepts, tools, methods, technologies and concrete applications in the industry are presented. Furthermore, the students get the opportunity to get first-hand insights into the digitalization journey of a German technology company.

Main topics of the lecture:

- Concepts and methods such as disruptive innovation and agile project management
- Overview on technologies at disposal
- Practical approaches in innovation
- Applications in industry
- Field trip to ZEISS

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are able to analyze and evaluate the suitability of digitalization technologies in the optical industry.
- are able to assess the applicability of methods such as disruptive innovation and agile project management.
- are able to appreciate the practical challenges to digitalization in industry.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues

Aus organisatorischen Gründen ist die 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 7.56 Course: Economics and Behavior [T-WIWI-102892]

Responsible: Prof. Dr. Nora Szech
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2560137	Economics and Behavior	2 SWS	Lecture / 🖥	Szech, Ehrlich, Zhao
WT 20/21	2560138	Übung zu Economics and Behavior	1 SWS	Practice / 🖥	Szech, Zhao, Huber
Exams					
WT 20/21	7900134	Exam Economics and Behavior			Szech
WT 20/21	7900135	Exam Economics and Behavior (2)			Szech

Legend: 🖥 Online, ⬡ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

Competence Certificate
The exam form in winter term 20/21 cannot be determined yet due to the Corona pandemic.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Annotation
The lecture will be held in English.

Below you will find excerpts from events related to this course:

V Economics and Behavior
2560137, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content

The course covers topics from behavioral economics with regard to contents and methods. In addition, the students gain insight into the design of economic experiments. Furthermore, the students will become acquainted with reading and critically evaluating current research papers in the field of behavioral economics.

The students

- gain insight into fundamental topics in behavioral economics;
- get to know different research methods in the field of behavioral economics;
- learn to critically evaluate experimental designs;
- get introduced to current research papers in behavioral economics;
- become acquainted with the technical terminology in English.

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

The grade will be determined in a final written exam. Students can earn a bonus to the final grade by successfully participating in the exercises.

The total workload for this course is approximately 135.0 hours. For further information see German version.

The lecture will be held in English.

Recommendations:

Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Literature

Kahnemann, Daniel: Thinking, Fast and Slow. Farrar, Straus and Giroux, 2011.

Ariely, Dan: Predictably Irrational. New York: HarperCollins, 2008.

Ariely, Dan: The Upside of Irrationality. New York: HarperCollins 2011.

T 7.57 Course: Economics I: Microeconomics [T-WIWI-102708]

Responsible:	Prof. Dr. Clemens Puppe
	Prof. Dr. Johannes Philipp Reiß
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101726 - Preliminary Exam
	M-WIWI-105204 - Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 20/21	2610012	Economics I: Microeconomics	3 SWS	Lecture / 🗣	Reiß
Exams					
WT 20/21	7910001	Economics I: Micro (Online Exam)			Reiß
WT 20/21	7910002	Economics I: Micro (Offline Exam)			Reiß

Legend: 📱 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.

The main exam takes place subsequent to the lectur. The re-examination is offered at the same examination period. As a rule, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Economics I: Microeconomics** 2610012, WS 20/21, 3 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

The students learn the basic concepts in Microeconomics and some basics in game theory. The student will understand the working of markets in modern economies and the role of decision making. Furthermore, she should be able to understand simple game theoretic argumentation in different fields of Economics.

In the two main parts of the course problems of microeconomic decision making (household behavior, firm behavior) and problems of commodity allocation on markets (market equilibria and efficiency of markets) as well are discussed. In the final part of the course basics of imperfect competition (oligopolistic markets) and of game theory are presented.

It is the main aim of this course to provide basic knowledge in economic modelling. In particular, the student should be able to analyze market processes and the determinants of market results. Furthermore, she should be able to evaluate the effects of economic policy measures on market behavior and propose alternative, more effective policy measures.

In particular, the student should learn

- to apply simple microeconomic concepts,
- to analyze the structure of real world economic phenomena,
- to judge the possible effects of economic policy measures on the behavior of economic agents (in simple decision problems),
- to suggest alternative policy measures,
- to analyze as a participant of a tutorial simple economic problems by solving written exercises and to present the results of the exercises on the blackboard,
- to become familiar with the basic literature on microeconomics.

The student should gain basic knowledge in order to help in practical problems

- to analyze the structure of microeconomics relationships and to present own problem solutions,
- solve simple economic decision problems.

The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation. The main exam takes place subsequent to the lecture.

The re-examination is offered at the same examination period. Usually, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

The total workload for this course is approximately 150 hours.

Literature

- H. Varian, Grundzüge der Mikroökonomik, 5. Auflage (2001), Oldenburg Verlag
- Pindyck, Robert S./Rubinfeld, Daniel L., Mikroökonomie, 6. Aufl., Pearson. Münschen, 2005
- Frank, Robert H., Microeconomics and Behavior, 5. Aufl., McGraw-Hill, New York, 2005

T 7.58 Course: Economics II: Macroeconomics [T-WIWI-102709]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105204 - Economics

Type Written examination	Credits 5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2021	2600014	Economics II: Macroeconomics	4 SWS	Lecture / 📱	Ott
ST 2021	2660015	Economics II : Macroeconomics, Tutorial	2 SWS	Tutorial (/ 📱	Scheidt, Scheu
Exams					
WT 20/21	7900349	Economics II: Macroeconomics			Brumm
ST 2021	7900215	Economics II: Macroeconomics			Wigger

Legend: 📱 Online, ⚃ Blended (On-Site/Online), ♣ On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

Below you will find excerpts from events related to this course:

V Economics II: Macroeconomics
2600014, SS 2021, 4 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

Classical Theory of Macroeconomic Production

Chapter 1: Gross domestic product

Chapter 2: Money and Inflation

Chapter 3: Open Economy I

Chapter 4: Unemployment

Growth: The economy in the long term

Chapter 5: Growth I

Chapter 6: Growth II

Business cycle: The economy in the short term

Chapter 7: Economy and aggregate demand I

Chapter 8: Economy and aggregate demand II

Chapter 9: Open Economy II

Chapter 10: Macroeconomic supply

Advanced topics of macroeconomics

Chapter 11: Dynamic model of the economy as a whole

Chapter 12: Microeconomic foundations

Chapter 13: Macroeconomic economic policy

Learning goals:

The students. . .

- can name the basic indicators, technical terms and concepts of macroeconomics.

- can use models to reduce complex relationships to their basic components.

- can analyse economic policy debates and form their own opinion on them.

Workload:

Total effort for 5 credit points: approx. 150 hours

Presence time: 45 hours

Before and after the LV: 67.5 hours

Exam and exam preparation: 37.5 hours

Literature

Als Grundlage dieser Veranstaltung dient das bekannte Lehrbuch „Makroökonomik" von Greg Mankiw vom Schäffer Poeschel Verlag in der aktuellen Fassung.

T 7.59 Course: Economics III: Introduction in Econometrics [T-WIWI-102736]

Responsible:	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-105203 - Introduction in Econometrics

Type Written examination	**Credits** 5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2021	2520016	Economics III: Introduction to Econometrics	2 SWS	Lecture / 📱	Schienle, Rüter
ST 2021	2520017	Übungen zu VWL III	2 SWS	Practice / 📱	Schienle, Rüter, Görgen

Legend: 📱 Online, ⚁ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as a 90-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

Below you will find excerpts from events related to this course:

V Economics III: Introduction to Econometrics
2520016, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
Learning objectives:

- Familiarity with the basic concepts and methods of econometrics
- Preparation of simple econometric surveys

Content:

- Simple and multiple linear regression (estimating parameters, confidence interval, testing, prognosis, testing assumptions)
- Model assessment

Requirements:

Knowledge of the lectures Statistics I + II is required.

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 30 hours

Preparation and follow-up: 120 hours

Literature

Von Auer: Ökonometrie ISBN 3-540-00593-5

Goldberger: A course in Econometrics ISBN 0-674-17544-1

Gujarati. Basic Econometrics ISBN 0-07-113964-8

Schneeweiß: Ökonometrie ISBN 3-7908-0008-2

T   7.60 Course: eFinance: Information Systems for Securities Trading [T-WIWI-110797]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101402 - eFinance
	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101434 - eBusiness and Service Management
	M-WIWI-101465 - Topics in Finance I
	M-WIWI-104912 - Information Systems & Digital Business: Platforms

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture / 📱	Weinhardt, Notheisen
WT 20/21	2540455	Übungen zu eFinance: Informationssysteme für den Wertpapierhandel	1 SWS	Practice / ⚙	Jaquart
Exams					
WT 20/21	7900182	eFinance: Information Engineering and Management for Securities Trading			Weinhardt
WT 20/21	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.

Prerequisites
see below

Annotation
The course"eFinance: Information Systems for Securities Trading" covers different actors and their function in the securities industry in-depth, highlighting key trends in modern financial markets, such as Distributed Ledger Technology, Sustainable Finance, and Artificial Intelligence. Security prices evolve through a large number of bilateral trades, performed by market participants that have specific, well-regulated and institutionalized roles. Market microstructure is the subfield of financial economics that studies the price formation process. This process is significantly impacted by regulation and driven by technological innovation. Using the lens of theoretical economic models, this course reviews insights concerning the strategic trading behaviour of individual market participants, and models are brought market data. Analytical tools and empirical methods of market microstructure help to understand many puzzling phenomena in securities markets.

Below you will find excerpts from events related to this course:

V   eFinance: Information Systems for Securities Trading
2540454, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
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.

Literature

- Maureen O'Hara: Market Microstructure Theory (1997, Blackwell Publishing)
- Larry Harris: Trading and Exchanges – Market Microstructure for Practitioners (2004, Oxford University Press)

Further Literature

- Joel Hasbrouck: Empirical Market Microstructure (2007, Oxford University Press)
- Thierry Foucault, Marco Pagano, and Ailsa Roell: Market Liquidity: Theory, Evidence, and Policy (2013, Oxford University Press)

T 7.61 Course: Electric Energy Systems [T-ETIT-101923]

Responsible:	Prof. Dr.-Ing. Thomas Leibfried
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-ETIT-102379 - Power Network

Type Written examination	Credits 5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2021	2307391	Electric Energy Systems	2 SWS	Lecture / 📱	Leibfried
ST 2021	2307393	Übungen zu 2307391 Elektroenergiesysteme	1 SWS	Practice / 📱	Steinle
Exams					
WT 20/21	7307391	Electric Energy Systems			Leibfried
ST 2021	7307391	Electric Energy Systems			Leibfried

Legend: 📱 Online, ⚬ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Prerequisites

T 7.62 Course: Employment Law I [T-INFO-101329]

Responsible: Dr. Alexander Hoff
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 20/21	24167	Employment Law I	2 SWS	Lecture / 🖥	Hoff
Exams					
WT 20/21	7500040	Employment Law I			Dreier, Matz

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T   7.63 Course: Employment Law II [T-INFO-101330]

Responsible: Dr. Alexander Hoff
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Exams				
WT 20/21	7500058	Employment Law II		Dreier, Matz

T 7.64 Course: Energy Conversion and Increased Efficiency in Internal Combustion Engines [T-MACH-105564]

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

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 20/21	2133121	Energy Conversion and Increased Efficiency in Internal Combustion Engines and Hydrogen Engines	2 SWS	Lecture / 🗣	Koch
Exams					
WT 20/21	76-T-MACH-105564	Energy Conversion and Increased Efficiency in Internal Combustion Engines			Koch
ST 2021	76-T-MACH-105564	Energy Conversion and Increased Efficiency in Internal Combustion Engines			Koch, Kubach

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam, 25 minutes, no auxillary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Energy Conversion and Increased Efficiency in Internal Combustion Engines and Hydrogen Engines
2133121, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
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 7.65 Course: Energy Policy [T-WIWI-102607]

Responsible: Prof. Dr. Martin Wietschel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	3

Events					
ST 2021	2581959	Energy Policy	2 SWS	Lecture / 🖥	Wietschel
Exams					
WT 20/21	7981959	Energy Policy			Fichtner

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy Policy
2581959, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The availability of cheap, environmentally friendly and secure energy is crucial for human welfare. However, the increasing scarcity of resources and increasing environmental pressures, with a particular focus on climate change, threaten human welfare through economic action. Energy contributes significantly to environmental pollution. The energy industry is characterised by high regulation and a significant influence of political decisions.

At the beginning of the lecture different perspectives on energy policy will be presented and the analysis of political decision-making processes will be discussed. Then the current energy policy challenges in the area of environmental pollution, regulation and the role of energy for households and industry will be discussed. Then the actors of energy policy and energy responsibilities in Europe will be discussed. The economic approaches from traditional environmental economics and sustainability as a new policy approach will then be discussed. Finally, energy policy instruments such as the promotion of renewable energies or energy efficiency are discussed in detail and how they can be evaluated.

The lecture emphasizes the relationship between theory and practice and presents some case studies.

Literature
Wird in der Vorlesung bekannt gegeben.

T 7.66 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 Oral examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2021	2134137	Engine measurement techniques	2 SWS	Lecture / 🧩	Bernhardt
Exams					
WT 20/21	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** 2134137, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **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	**7.67 Course: Environmental Law [T-BGU-111102]**

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each winter term	1 terms	1

Events					
WT 20/21	6111177	Environmental Law	2 SWS	Lecture / 🗣	Smeddinck
Exams					
WT 20/21	8262111102	Environmental Law			Smeddinck

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Written exam with 120 min

Prerequisites
None

Annotation
None

T 7.68 Course: European and International Law [T-INFO-101312]

Responsible:	Ulf Brühann
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2021	24666	Europäisches und Internationales Recht	2 SWS	Lecture / 📱	Brühann
Exams					
WT 20/21	7500048	European and International Law			Eichenhofer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T 7.69 Course: Exam on Climatology [T-PHYS-105594]

Responsible:	Prof. Dr. Joaquim José Ginete Werner Pinto
Organisation:	KIT Department of Physics
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Version
Oral examination	5	Grade to a third	5

| T | **7.70 Course: Exercises in Civil Law [T-INFO-102013]** |

Responsible:	Prof. Dr. Thomas Dreier
	Dr. Yvonne Matz
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101191 - Commercial Law

Type Examination of another type	**Credits** 9	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 2

Events					
WT 20/21	24011	Commercial and Corporate Law	2 SWS	Lecture / 📱	Wiele
WT 20/21	24017	Exercises in Civil Law	2 SWS	Lecture / 🔀	Dreier, Käde
ST 2021	24504	Advanced Civil Law	2 SWS	Lecture / 📱	Matz
ST 2021	24506	Exercises in Civil Law	2 SWS	Lecture / 📱	Dreier
ST 2021	24926	Case Studies in Civil Law	2 SWS	Practice / 📱	Käde, Hägle
Exams					
WT 20/21	7500108	Commercial Law			Dreier, Matz
ST 2021	7500099	Wirtschaftsprivatrecht			Dreier, Matz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

T 7.71 Course: Experimental Physics [T-PHYS-100278]

Responsible:	Prof. Dr. Thomas Schimmel
Organisation:	KIT Department of Physics
Part of:	M-PHYS-100283 - Experimental Physics

Type	Credits	Grading scale	Recurrence	Version
Written examination	14	Grade to a third	Each term	1

Events					
WT 20/21	4040011	Experimentalphysik A für die Studiengänge Elektrotechnik, Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	4 SWS	Lecture / ⚙	Schimmel
WT 20/21	4040112	Übungen zur Experimentalphysik A für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, technische Volkswirtschaftslehre, Lehramt Chemie, NWT Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	2 SWS	Practice / ⚙	Schimmel, Wertz
ST 2021	4040021	Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT, Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	4 SWS	Lecture / 📱	Schimmel
ST 2021	4040122	Übungen zur Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT, Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	2 SWS	Practice / 📱	Schimmel, Wertz
Exams					

WT 20/21	7800001	Experimental Physics	Schimmel
ST 2021	7800001	Experimental Physics	Schimmel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written exam (usually about 180 min)

Prerequisites
None

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 7.72 Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101413 - Applications of Operations Research
	M-WIWI-101414 - Methodical Foundations of OR
	M-WIWI-101421 - Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 20/21	2550486	Facility Location and Strategic Supply Chain Management	2 SWS	Lecture / 📱	Nickel
WT 20/21	2550487	Übungen zu Standortplanung und strategisches SCM	1 SWS	Practice / 📱	Pomes
Exams					
WT 20/21	00043	Facility Location and Strategic Supply Chain Management			Nickel

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) according to Section 4 (2), 1 of the examination regulation.
The exam takes place in every semester.
Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites

Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation

None

Annotation

The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Facility Location and Strategic Supply Chain Management
2550486, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Literature
Weiterführende Literatur:

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T 7.73 Course: Financial Accounting and Cost Accounting [T-WIWI-102816]

Responsible:	Dr. Jan-Oliver Strych
Organisation:	KIT Department of Informatics
	KIT Department of Economics and Management
Part of:	M-WIWI-101578 - Fundamentals of Business Administration 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	1

Events					
WT 20/21	2600002		2 SWS	Lecture / 📱	Strych
WT 20/21	2600003	Übung zu Rechnungswesen	2 SWS	Practice / 📱	Strych
Exams					
WT 20/21	7900369	Financial Accounting and Cost Accounting			Ruckes

Legend: 📱 Online, ⚃ Blended (On-Site/Online), ♟ On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam following §4, Abs. 2, 1 of the examination regulation.
The examination 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	2600002, WS 20/21, 2 SWS, Open in study portal	Lecture (V) Online

Literature
Coenenberg, Haller und Schultze (2014): Jahresabschluss und Jahresabschlussanalyse, 23. Auflage. Stuttgart: Schäffer-Poeschel.
Hawawini and Viallet (2011): Finance for Executives: Managing for Value Creation. South-Western Cencage Learning.

T 7.74 Course: Financial Accounting for Global Firms [T-WIWI-107505]

Responsible:	Dr. Torsten Luedecke
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2530242	Financial Accounting for Global Firms	2 SWS	Lecture / 📱	Luedecke
WT 20/21	2530243	Tutorial - Financial Accounting for Global Firms	1 SWS	Practice / 📱	Luedecke
Exams					
WT 20/21	7900142	Financial Accounting for Global Firms			Luedecke

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance and accounting.

Annotation
New lecture in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V	**Financial Accounting for Global Firms**	Lecture (V)
	2530242, WS 20/21, 2 SWS, Language: English, Open in study portal	**Online**

Content

Increasing globalization coupled with related regulations continues to put pressure on moving towards a common global accounting framework - International Financial Reporting Standards (IFRS). Currently, more than 140 countries use IFRS, so if a firm's business include global transactions, it is critical to know about the impact of IFRS on the financial reporting process and business. In the EU, IFRS are compulsory for listed companies's consolidated statements but have also gained factual significance for companies without statutory duty to use IFRS. The course introduces the conceptual framework of IFRS, discuss the primary financial statements according to IFRS and explains the underlying principles, concepts, and methods to prepare the financial statements. Special focus is given to some more complex accounting issues related to revenue recognition from contracts with customers, consolidation of different types of intercorporate investments, and foreign currency translation.

The lecture covers the following topics:

- The context of financial accounting for global firms
- The mechanics of financial accounting
- Accounting frameworks and concepts
- Content and presentation of financial statements
- Preparing financial statements
- Revenue recognition from contracts
- Tangible and intangible non-current assets
- Financial assets, liabilities, and equity
- Consolidation and the assessment of control
- Investment in associates and joint arrangements
- Business combinations
- Foreign currency translation

Learning outcomes: Students

- understand the IFRS conceptual framework and its significance for global firms,
- are able to read and interpret IFRS compliant financial statements,
- know about key differences between IFRS and U.S. GAAP and its impact on financial reporting,
- can apply the multi-step model for the recognition of revenues from contracts with customers,
- are able to evaluate alternative measurement bases for assets and liabilities,
- are able to classify intercorporate investments by the concept of control and to apply the appropriate accounting method,
- know about the impact of foreign exchange translation on financial statements.

Organizational issues

Zur Vorlesung wird eine 14-tägige Übung angeboten.

Literature

Alexander, D. and C. Nobes (2020): Financial Accounting – An International Introduction, 7th ed., Pearson.

Coenenberg, A.G., Haller, A. und W. Schultze (2018): Jahresabschluss und Jahresabschlussanalyse, 25. Auflage. Schäffer-Poeschel Verlag Stuttgart.

T 7.75 Course: Financial Data Science [T-WIWI-111238]

Responsible:	Prof. Dr. Maxim Ulrich
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105610 - Financial Data Science

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	see Annotations	1

Competence Certificate

The module examination is an alternative exam assessment and consists of two parts in which a maximum of 100 points can be achieved:

In the first part of the examination, a maximum of 30 points can be achieved, which are distributed equally weighted over eight worksheets to be submitted during the semester. The worksheets of the first three weeks are representative for all following worksheets in terms of scope and degree of difficulty. With the beginning of the 4th week of the course, the handing in of the worksheets is considered to be part of the alternative exam assessment.

A maximum of 70 points can be achieved in the second part of the examination. For this part of the examination, the student write a "Final Exam" in the last week of the lecture period, which takes 2 hours.

Detailed information about the course schedule and the module exam will be announced at the first course date.

A retake opportunity for those who do not pass the module exam will take place at the end of the fourth September calendar week of the same year. The registration for the examination must be made at least 1 day before the beginning of the examination. The following applies to deregistration for the examination: Deregistration can be made online in the student portal up to 1 day before the start of the examination.

Prerequisites

None.

Annotation

Please note that the course is only offered every second summer semester (SS2021, SS2023).

T　7.76 Course: Financial Econometrics [T-WIWI-103064]

Responsible:	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101608 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Annotation
The course takes place each second summer term: 2018/2020....

T 7.77 Course: Financial Econometrics II [T-WIWI-110939]

Responsible:	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	see Annotations	2

Events					
WT 20/21	2521302	Financial Econometrics II	2 SWS	Lecture / ▯	Schienle, Buse
WT 20/21	2521303	Übung zu Financial Econometrics II	1 SWS	Practice / ▯	Görgen, Buse, Schienle
Exams					
WT 20/21	7900274	Financial Econometrics II			Schienle

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ◈ On-Site, ✗ Cancelled

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 course takes place each second winter term starting in WS2020/21

T   7.78 Course: Financial Intermediation [T-WIWI-102623]

Responsible:	Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2530232	Financial Intermediation	2 SWS	Lecture / 🖥	Ruckes
WT 20/21	2530233	Übung zu Finanzintermediation	1 SWS	Practice / 🖥	Ruckes, Hoang, Benz
Exams					
WT 20/21	7900063	Financial Intermediation			Ruckes

Legend: 🖥 Online, ⚃ Blended (On-Site/Online), ♟ On-Site, ✘ Cancelled

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V   Financial Intermediation
2530232, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The lecture covers the following topics:

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Stability of the financial system
- The macroeconomic role of financial intermediation
- Principles of the prudential regulation of banks

Learning outcomes: Students

- are in a position to describe the arguments for the existence of financial intermediaries,
- are able of discuss and analyze both static and dynamic aspects of contractual relationships between banks and borrowers,
- are able to discuss the macroeconomic role of the banking system,
- are in a position to explain the fundamental principles of the prudential regulation of banks and are able to recognize and evaluate the implications of specific regulations.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see the German version.

Literature
Weiterführende Literatur:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

T 7.79 Course: Financial Management [T-WIWI-102605]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101435 - Essentials of Finance

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2021	2530216	Financial Management	2 SWS	Lecture / 🖥	Ruckes
ST 2021	2530217	Übung zu Financial Management	1 SWS	Practice / 🖥	Ruckes, Wiegratz
Exams					
WT 20/21	7900060	Financial Management			Ruckes

Legend: 🖥 Online, ⊗ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to Section 4 (2), 1 of the examination regulation.
The exam takes place at every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Knowledge of the content of the course Business Administration: Finance and Accounting [25026/25027] is recommended.

Below you will find excerpts from events related to this course:

V	**Financial Management** 2530216, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V) Online**

Literature
Weiterführende Literatur:

- Ross, Westerfield, Jaffe, Jordan (2009): Modern Financial Management, McGraw-Hill International Edition
- Berk, De Marzo (2016): Corporate Finance, 4. Edition, Pearson Addison Wesley

T 7.80 Course: Foundations of Informatics I [T-WIWI-102749]

Responsible:	Michael Färber
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101417 - Foundations of Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	2

Events					
ST 2021	2511010	Foundations of Informatics I	2 SWS	Lecture / ▯	Färber
ST 2021	2511011	Exercises to Foundations of Informatics I		Practice / ▯	Färber, Nguyen, Noullet
Exams					
WT 20/21	7900011	Foundations of Informatics I (Registration until 07 March 2021)			Sure-Vetter
ST 2021	7900035	Foundations of Informatics I (Registration until 12 July 2021)			Sure-Vetter

Legend: ▯ Online, ⚄ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an 1h written exam according to Section 4 (2), 1 of the examination regulation.

The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Foundations of Informatics I** 2511010, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

The lecture provides an introduction to basic concepts of computer science and software engineering. Essential theoretical foundations and problem-solving approaches, which are relevant in all areas of computer science, are presented and explained, as well as shown in practical implementations.

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:

The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Workload:

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

V	**Exercises to Foundations of Informatics I** 2511011, SS 2021, SWS, Language: German, Open in study portal	**Practice (Ü)** **Online**

Content

The exercises are related to the lecture Foundations of Informatics I.

Multiple exercises are held that capture the topics, held in the lecture Foundations of Informatics I, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:

The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

T 7.81 Course: Foundations of Informatics II [T-WIWI-102707]

Responsible:	PD Dr. Steffen Herbold
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101417 - Foundations of Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events

WT 20/21	2511012	Foundations of Informatics II	3 SWS	Lecture / ▇	Herbold
WT 20/21	2511013	Tutorien zu Grundlagen der Informatik II	1 SWS	Tutorial (/ ▇	Herbold

Exams

WT 20/21	7900012	Foundations of Informatics II (Registration until 14 March 2021)	Herbold
ST 2021	7900050	Foundations of Informatics II (Registration until 12 July 2021)	Sure-Vetter

Legend: ▇ Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation. The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Please note: due to corona, there will be no possibility to improve the grade of the exam in the winter semester 2020/21 by successfully participating in the excercises.

Prerequisites
None

Recommendation

It is recommended to attend the course "Foundations of Informatics I" beforehand.

Active participation in the practical lessons is strongly recommended.

Below you will find excerpts from events related to this course:

V Foundations of Informatics II
2511012, WS 20/21, 3 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

The lecture deals with formal models for automata, languages and algorithms as well as real instances of these models, i.e. computer architecture and organization (hardware development, computer arithmetic, architecture models), programing languages (different language levels, from microprogramming to higher programming languages, as well as compiling and execution), operating systems and modes (architecture and properties of operating systems, operating system tasks, client-server systems), data organization and management (types of data organization, primary and secondary organization).

Learning objectives:

- Students acquire vast knowledge of methods and concepts in theoretical computer science and computer architectures.
- Based on the acquired knowledge and skills, students are capable of choosing and applying the appropriate methods and concepts for well-defined problem instances.
- Active participation in the tutorials enables students to acquire the necessary knowledge for developing appropriate solutions cooperatively.

Recommendations:

It is recommended to attend the course *Foundations of Informatics I* [2511010] beforehand.

Active participation in the practical lessons is strongly recommended.

Workload:

The total workload for this course is approximately 150 hours.

Organizational issues
Die Vorlesung wird zu Beginn des Semesters 4-stündig und am Ende 2-stündig gelesen, um eine bessere Abdeckung des Inhalts in den Übungen zu gewährleisten.

Literature
Weiterführende Literatur:
Literatur wird in der Vorlesung bekannt gegeben.

T   7.82 Course: Foundations of Interactive Systems [T-WIWI-109816]

Responsible:	Prof. Dr. Alexander Mädche
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101434 - eBusiness and Service Management
	M-WIWI-102752 - Fundamentals of Digital Service Systems
	M-WIWI-104911 - Information Systems & Digital Business: Interaction
	M-WIWI-104913 - Information Systems & Digital Business: Servitization

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2021	2540560	Foundations of Interactive Systems	3 SWS	Lecture / 📱	Mädche
Exams					
WT 20/21	7900326	Foundations of Interactive Systems			Mädche
ST 2021	7900247	Foundations of Interactive Systems			Mädche

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ✊ On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment. The assessment is carried out in the form of a one-hour written examination and by carrying out a Capstone project.

Details on the assessment will be announced during the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V	Foundations of Interactive Systems	Lecture (V)
	2540560, SS 2021, 3 SWS, Language: English, Open in study portal	Online

Content

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.

This lecture introduces key concepts and principles of interactive systems from a human and computer perspective. Furthermore, it describes core development processes for interactive systems as well as provides insights on the use & contexts of interactive systems with a specific focus on selected application areas in organizations and society. With this lecture, students acquire foundational knowledge to successfully design of the interaction between human and computers in business and private life.

The course is complemented with a design capstone project, where students in a team apply design methods & techniques in order to create an interactive prototype

Learning Objectives

The students

- have a basic understanding of key conceptual and theoretical foundations of interactive systems from a human and computer perspective
- are aware of important design principles for the design of important classes of interactive systems
- know design processes and techniques for developing interactive systems
- know how to apply the knowledge and skills gathered in the lecture for a real-world problem (as part of design-oriented capstone project)

Prerequisites

No specific prerequisites are required for the lecture

Literature

Alan Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale. 2003. Human-Computer Interaction (3rd Edition). Prentice-Hall, Inc., USA.

Further literature will be made available in the lecture.

T   7.83 Course: Foundations of Mobile Business [T-WIWI-104679]

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

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 4

Events					
ST 2021	2511226	Grundlagen für mobile Business	2 SWS	Lecture / ▤	Schiefer, Frister
ST 2021	2511227	Übungen zu Grundlagen für mobile Business	1 SWS	Practice / ▤	Schiefer, Frister
Exams					
ST 2021	7900001	Foundations of mobile Business (Registration until 12 July 2021)			Oberweis

Legend: ▤ Online, ⚙ Blended (On-Site/Online), ◉ On-Site, ✘ Cancelled

Competence Certificate
The assessment of this course is a written (60 min.) or (if necessary) oral examination according to §4(2) of the examination regulation.

Prerequisites
None

Annotation
Lecture and exercises are integrated.

Below you will find excerpts from events related to this course:

V   Grundlagen für mobile Business
2511226, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The lecture covers the basics of mobile business with a focus on (information) technical basics. These are interlinked with the economic background in Germany.
Contents are:

1. organizational matters
2. introduction & definitions
3. mobile devices
4. mobile radio technologies
5. mobile communications market
6. mobile applications
7. digital radio technologies
8. location & context

Note: The teaching units listed above each have a different scope.

Learning objectives:

If you are confronted with a question in your job which affects "Mobile Business", you should be able to provide answers quickly and competently:

Market structures
technique
Possibilities for applications
lawsuits
issues

Workload:

The total workload for this course unit is approx. 135 hours (4.5 credit points).

Organizational issues
Vorlesung und Übung werden integriert angeboten.

Literature

- Jochen Schiller: Mobilkommunikation (2. Aufl. 2003)
  http://www.mi.fu-berlin.de/inf/groups/ag-tech/teaching/resources/ Mobile_Communications/course_Material/index.html
- Martin Sauter: Grundkurs Mobile Kommunikationssysteme (6. Aufl. 2015)
  http://link.springer.com/book/10.1007%2F978-3-658-08342-7
- Küpper, A.: Location-based Services. Fundamentals and Operation. Wiley & Sons, 2005.
- Roth, J.: Mobile Computing. Grundlagen, Technik, Konzepte. Dpunkt.verlag, 2. Auflage, 2005.
- Mansfeld, W.: Satellitenortung und Navigation:
  Grundlagen, Wirkungsweise und Anwendung globaler Satellitennavigationssysteme
- Dodel, H., Häupler, D.: Satellitennavigation

Einige relevante Informationen im Web

- Bundesnetzagentur http://www.bundesnetzagentur.de
  u.a. Jahresbericht und Marktbeobachtung
- VATM-Marktstudien
  http://www.vatm.de/vatm-marktstudien.html
- Verbände, bspw. BITKOM (bitkom.org), eco e.V. (eco.de)
- Presse, bspw. Teltarif, Heise, Golem, ...
- Statistiken (Statista Lizenz des KIT)

T	**7.84 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 Oral examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 20/21	2133109	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture / 👄	Kehrwald
Exams					
WT 20/21	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald
ST 2021	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** 2133109, WS 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content
Introduction and basics

Fuels for Gasoline and Diesel engines

Hydrogen

Lubricants for Gasoline and Diesel engines

Coolants for combustion engines

Literature
Skript

T 7.85 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					
WT 20/21	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture / ⚙	Lox, Grunwaldt, Deutschmann
ST 2021	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture / ⚙	Lox, Grunwaldt, Deutschmann
Exams					
WT 20/21	76-T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment			Lox
ST 2021	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, WS 20/21, 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

V Fundamentals of catalytic exhaust gas aftertreatment
2134138, SS 2021, 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 7.86 Course: Fundamentals of Production Management [T-WIWI-102606]

Responsible:	Prof. Dr. Frank Schultmann
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	1

Events					
ST 2021	2581950	Fundamentals of Production Management	2 SWS	Lecture / 🖥	Schultmann
ST 2021	2581951	Übungen Grundlagen der Produktionswirtschaft	2 SWS	Practice / 🖥	Stallkamp, Steins
Exams					
WT 20/21	7981950	Fundamentals of Production Management			Schultmann

Legend: 🖥 Online, ⚒ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. 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 Fundamentals of Production Management
2581950, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
This lecture focuses on strategic production management with respect to various economic aspects. Interdisciplinary approaches of systems theory will be used to describe the challenges of industrial production. This course will emphasize the importance of R&D as the central step in strategic corporate planning to ensure future long-term success. In the field of site selection and planning for firms and factories, attention will be drawn upon individual aspects of existing and greenfield sites as well as existing distribution and supply centres. Students will obtain knowledge in solving internal and external transport and storage problems.

Organizational issues
Blockveranstaltung, siehe Institutsaushang

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.87 Course: Gear Cutting Technology [T-MACH-102148]

Responsible:	DrIng. 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 20/21	2149655	Gear Technology	2 SWS	Lecture / 🗣	Klaiber
Exams					
WT 20/21	76-T-MACH-102148	Gear Technology			Klaiber
ST 2021	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**	Lecture (V)
	2149655, WS 20/21, 2 SWS, Language: German, Open in study portal	On-Site

Content

The objective of the lecture is the introduction into modern gear technology. In this respect, the basics of gear and transmission technology are reviewed in detail. The load of gears and process chains are derived through the requirements of modern drive systems. For comprehensive understanding of gear manufacturing different processes, machine technologies, tools and applications are introduced with the help of a wide range of sample components. Furthermore, current research projects are presented. Demonstrations in the production laboratory of the institute and an excursion to an industrial gear manufacturing company round off the lecture.

The following topics will be covered:

- Sample applications and the need for gearboxes
- Basics of gear and transmission technology
- Loads of gears and process chains
- Manufacturing techniques
- Heat Treatment
- Quality assurance
- Simulation techniques

Learning Outcomes:

The students …

- know the basic terms of gearings and are able to explain the imparted basics of gear and transmission technology.
- are able to specify the different manufacturing processes and machine technologies for gear manufacturing. Furthermore, they are able to explain the functional principles and the dis-/advantages of these manufacturing processes.
- are able to read and interpret measuring records for gearings.
- are able to make an appropriate selection of a process chain for a given application. Hereby, they can determine the main impact factors of the different process steps.

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 7.88 Course: General and Inorganic Chemistry [T-CHEMBIO-101866]

Responsible:	Prof. Dr. Mario Ruben
Organisation:	KIT Department of Chemistry and Biosciences
Part of:	M-CHEMBIO-102335 - General and Inorganic Chemistry

Type	Credits	Grading scale	Recurrence	Version
Written examination	7	Grade to a third	Each winter term	1

Events					
WT 20/21	5004	Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens)	3 SWS	Lecture / 🖥	Ruben
WT 20/21	5005	Seminar zur Vorlesung Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens)	2 SWS	Seminar / 🖥	Scheiba
Exams					
WT 20/21	7100003	General and Inorganic Chemistry			Anson, Ruben
WT 20/21	7100004	General and Inorganic Chemistry			Ruben, Anson

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T 7.89 Course: Geological Hazards and Risk [T-PHYS-103525]

Responsible:	Dr. Ellen Gottschämmer
Organisation:	KIT Department of Physics
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type Examination of another type	Credits 8	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 20/21	4060121	Geological Hazards and Risk	2 SWS	Lecture / ✿	Gottschämmer, Daniell
WT 20/21	4060122	Exercises on Geological Hazards and Risk	2 SWS	Practice / ✿	Gottschämmer, Daniell
Exams					
WT 20/21	7800114	Geological Hazards and Risk			Gottschämmer

Legend: 📱 Online, ✿ Blended (On-Site/Online), ⬤ On-Site, ✗ Cancelled

T 7.90 Course: Global Optimization I [T-WIWI-102726]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101413 - Applications of Operations Research
	M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2550134	Globale Optimierung I	2 SWS	Lecture / 📱	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 Globale Optimierung I
2550134, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

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 7.91 Course: Global Optimization I and II [T-WIWI-103638]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR

Type Written examination	Credits 9	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2021	2550134	Globale Optimierung I	2 SWS	Lecture / 🖳	Stein
ST 2021	2550135	Übung zu Globale Optimierung I und II	2 SWS	Practice / 🖳	Stein, Schwarze, Beck
ST 2021	2550136	Globale Optimierung II	2 SWS	Lecture / 🖳	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	**Globale Optimierung I** 2550134, SS 2021, 2 SWS, Language: German, Open in study portal	Lecture (V) Online

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	**Globale Optimierung II** 2550136, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

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	**7.92 Course: Global Optimization II [T-WIWI-102727]**

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 2

Events					
ST 2021	2550136	Globale Optimierung II	2 SWS	Lecture / 🖥	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	**Globale Optimierung II** 2550136, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

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	7.93 Course: Global Production [T-MACH-110991]

Responsible: Prof. Dr.-Ing. Gisela Lanza
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 winter term	Version 2

Events					
WT 20/21	2149613	Global Production	2 SWS	Lecture / 📱	Lanza
Exams					
WT 20/21	76-T-MACH-110991	Global Production			Lanza
ST 2021	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 20/21, 2 SWS, Language: German, Open in study portal	Lecture (V) 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
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   7.94 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					
WT 20/21	2134154	Large Diesel and Gas Engines for Ship Propulsions	2 SWS	Lecture / 🎙	Kubach
ST 2021	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, WS 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

- Introduction and History
- Types of Ships amd Propulsion Systems
- Thermodynamic
- Boosting
- Design
- Fuels
- Lubricants
- Injection of liquid Fuels
- Combustions Processes for liquid Fuels
- Injection of Gaseous Fuels
- Combustion Processes for Gaseous Fuels
- Emissions
- Integration of Engines in Ships
- Large Engines in other Applications

V	**Large Diesel and Gas Engines for Ship Propulsions** 2134154, SS 2021, 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 7.95 Course: Human Resource Management [T-WIWI-102909]

Responsible:	Prof. Dr. Petra Nieken
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101513 - Human Resources and Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2573005	Human Resource Management	2 SWS	Lecture / 🖳	Nieken
WT 20/21	2573006	Übung zu Human Resource Management	1 SWS	Practice / 🖳	Nieken, Mitarbeiter
Exams					
WT 20/21	7900200	Human Resource Management			Nieken

Legend: 🖳 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is a written examination of 1 hour. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites

None

Recommendation

Completion of module Business Administration is recommended.

Basic knowledge of microeconomics, game theory, and statistics is recommended.

Below you will find excerpts from events related to this course:

V Human Resource Management

2573005, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

The students acquire basic knowledge in the fields of human resource planning, selection and talent management. Different processes and instruments and their link to corporate strategy are evaluated based on microeconomic and behavioral approaches. The results are tested and discussed based on empirical data.

Aim

The student

- understands the processes and instruments of human resource management.
- analyzes different methods of human resource planning and selection and evaluates their usefulness.
- analyzes different processes of talent management and evaluates the strengths and weaknesses.
- understands the challenges of human resource management and its link to 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

- Personnel Economics in Practice, Lazear & Gibbs, John Wiley & Sons, 2014
- Strategic Human Resources. Frameworks for General Managers, Baron & Kreps, John Wiley & Sons, 1999

T   7.96 Course: Hydraulic Engineering and Water Management [T-BGU-101667]

Responsible:	Prof. Dr. Franz Nestmann
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	1

Events					
WT 20/21	6200511	Wasserbau und Wasserwirtschaft	2 SWS	Lecture / 📱	Nestmann
WT 20/21	6200512	Übungen zu Wasserbau und Wasserwirtschaft	1 SWS	Practice / 📱	Seidel
Exams					
WT 20/21	8230101667	Hydraulic Engineering and Water Management			Nestmann

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 👆 On-Site, ✗ Cancelled

Competence Certificate
written exam with 60 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T   7.97 Course: Hydrology [T-BGU-101693]

Responsible:	Prof. Dr.-Ing. Erwin Zehe
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 20/21	6200513	Hydrology	2 SWS	Lecture / ▯	Zehe, Wienhöfer
WT 20/21	6200514	Übungen zu Hydrologie	1 SWS	Practice / ▯	Zehe, Wienhöfer
Exams					
WT 20/21	8230101693	Hydrology			Wienhöfer, Zehe

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	**Hydrology** 6200513, WS 20/21, 2 SWS, Language: German, Open in study portal	Lecture (V) Online

Content

- processes in the water cycle and the water budget: fundamentals, observation, process descriptions
- precipitation and evapotranspiration
- runoff and runoff generation
- soil hydrology
- concepts for modeling and design

T   7.98 Course: I4.0 Systems Platform [T-MACH-106457]

Responsible:	Dipl.-Ing. Thomas Maier
	Prof. Dr.-Ing. Jivka Ovtcharova
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101270 - Product Lifecycle Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
WT 20/21	2123900	I4.0 Systems platform	4 SWS	Project (P / 🎲	Ovtcharova, Maier
ST 2021	2123900	I4.0 Systems platform	4 SWS	Project (P / 🎲	Ovtcharova, Maier
Exams					
WT 20/21	76-T-MACH-106457	I4.0 Systems platform			Ovtcharova

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (project work)

Prerequisites
None

Annotation
Limited number of participants.

Below you will find excerpts from events related to this course:

V   I4.0 Systems platform
2123900, WS 20/21, 4 SWS, Language: German, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
Industry 4.0, IT systems for fabrication (e.g.: CAx, PDM, CAM, ERP, MES), process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- describe the fundamental concepts, challenges, and objectives of Industrie 4.0 and name the essential terms in context of information management
- explain the necessary information flow between the different IT systems. They get practically knowledge about using current IT systems in context of I4.0, from order to production.
- 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

Organizational issues
Veranstaltungsort: CAIT am IMI in der Kriegsstraße 77. Zeit siehe ILIAS zur Lehrveranstaltung.

Literature
Keine / None

V   I4.0 Systems platform
2123900, SS 2021, 4 SWS, Language: German, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
Industry 4.0, IT systems for fabrication (e.g.: CAx, PDM, CAM, ERP, MES), process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- describe the fundamental concepts, challenges, and objectives of Industrie 4.0 and name the essential terms in context of information management
- explain the necessary information flow between the different IT systems. They get practically knowledge about using current IT systems in context of I4.0, from order to production.
- 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

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Keine / None

T	**7.99 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 Oral examination	**Credits** 4	**Grading scale** Grade to a third	**Version** 1

Events					
WT 20/21	2133125	Ignition systems	2 SWS	Lecture / 🔊	Toedter
Exams					
WT 20/21	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 20/21, 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   7.100 Course: Industrial Organization [T-WIWI-102844]

Responsible:	Prof. Dr. Johannes Philipp Reiß
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101420 - Econometrics and Economics
	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-101501 - Economic Theory

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Written examination	4,5	Grade to a third	Irregular	1

Exams			
WT 20/21	7900296	Industrial Organization	Reiß

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Completion of the module Economics [WW1VWL] is assumed.

Annotation
This course is not given in summer 2017.

T   7.101 Course: Information Engineering [T-MACH-102209]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	2

Events					
ST 2021	2122014	Information Engineering	2 SWS	Seminar / 🧩	Ovtcharova, Mitarbeiter
Exams					
WT 20/21	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 2021, 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 7.102 Course: Integrated Information Systems for Engineers [T-MACH-102083]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type Oral examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 2

Events					
WT 20/21	2121001	Integrated Information Systems for engineers	3 SWS	Lecture / Practice (/ 📱	Ovtcharova, Elstermann
ST 2021	2121001	Integrated Information Systems for engineers	3 SWS	Lecture / Practice (/ 📱	Ovtcharova, Elstermann
Exams					
WT 20/21	76-T-MACH-102083	Integrated Information Systems for Engineers			Ovtcharova, Elstermann

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 Integrated Information Systems for engineers
2121001, WS 20/21, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ) Online

Content

- Information systems, information management
- CAD, CAP and CAM systems
- PPS, ERP and PDM systems
- Knowledge management and ontology
- Process modeling

Students can:

- illustrate the structure and operating mode of information systems
- describe the structure of relational databases
- describe the fundamentals of knowledge management and its application in engineering and deploy ontology as knowledge representation
- describe different types of process modelling and their application and illustrate and execute simple work flows and processes with selected tools
- explain different goals of specific IT systems in product development (CAD, CAP, CAM, PPS, ERP, PDM) and assign product development processes

Literature
Vorlesungsfolien / lecture slides

V Integrated Information Systems for engineers
2121001, SS 2021, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ) Online

Content

- Information systems, information management
- CAD, CAP and CAM systems
- PPS, ERP and PDM systems
- Knowledge management and ontology
- Process modeling

Students can:

- illustrate the structure and operating mode of information systems
- describe the structure of relational databases
- describe the fundamentals of knowledge management and its application in engineering and deploy ontology as knowledge representation
- describe different types of process modelling and their application and illustrate and execute simple work flows and processes with selected tools
- explain different goals of specific IT systems in product development (CAD, CAP, CAM, PPS, ERP, PDM) and assign product development processes

Literature
Vorlesungsfolien / lecture slides

T   7.103 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 2021	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (/ ▯	Lanza
Exams					
WT 20/21	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza
ST 2021	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 2021, 6 SWS, Language: German, Open in study portal	Lecture / Practice (VÜ) 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 7.104 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Responsible: Dr. Karl-Hubert Schlichtenmayer
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 1

Events					
WT 20/21	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / 📱	Schlichtenmayer
ST 2021	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / 📱	Schlichtenmayer
Exams					
WT 20/21	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer
ST 2021	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** 2150601, WS 20/21, 2 SWS, Language: German, Open in study portal	Lecture (V) 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

Organizational issues
Die LV wurde wegen der Coronapandemie vom SS 20 ins WS 20/21 verschoben.

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/).

V	**Integrative Strategies in Production and Development of High Performance Cars** 2150601, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **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

Organizational issues

Die Vorlesung wird wöchentlich dienstags, 10:00 – 11:30 Uhr per Zoom stattfinden.
Alle weiteren Informationen inkl. Link zur Zoom-Vorlesung finden Sie im ILIAS-Kurs.

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 7.105 Course: International Finance [T-WIWI-102646]

Responsible:	Prof. Dr. Marliese Uhrig-Homburg
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101402 - eFinance
	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** see Annotations	**Version** 1

Events					
WT 20/21	2530570	International Finance	2 SWS	Lecture / 🗣	Walter, Uhrig-Homburg
ST 2021	2530570	International Finance	2 SWS	Lecture / 🖥	Walter, Uhrig-Homburg
Exams					
WT 20/21	7900052	International Finance			Uhrig-Homburg

Legend: 🖥 Online, ⚁ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered in the summer semester 2021 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 will not be offered in the summer semester 2020 as originally planned, but only in the winter semester 2020/2021.

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, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Blockveranstaltung

Literature
Weiterführende Literatur:

- Eiteman, D. et al., Multinational Business Finance, 13. Auflage, 2012.
- Solnik, B. und D. McLeavey, Global Investments, 6. Auflage, 2008.

V International Finance
2530570, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Organizational issues
nach dem 21.04. 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 7.106 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 20/21	24354	Internet Law	2 SWS	Lecture / 🖥	Dreier
Exams					
WT 20/21	7500060	Internet Law			Dreier, Matz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

T 7.107 Course: Internship [T-WIWI-102756]

Responsible:	Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101610 - Internship

Type	Credits	Grading scale	Version
Completed coursework	10	pass/fail	1

Competence Certificate
See module description

Prerequisites
See module description

Recommendation
See module description

Annotation
See module description

T   7.108 Course: Introduction to Energy Economics [T-WIWI-102746]

Responsible:	Prof. Dr. Wolf Fichtner
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101464 - Energy Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	4

Events					
ST 2021	2581010	Introduction to Energy Economics	2 SWS	Lecture / 🖥	Fichtner
ST 2021	2581011	Übungen zu Einführung in die Energiewirtschaft	2 SWS	Practice / 🖥	Lehmann, Sandmeier, Ardone, Fichtner
Exams					
WT 20/21	7981010	Introduction to Energy Economics			Fichtner

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites

None.

Below you will find excerpts from events related to this course:

V   Introduction to Energy Economics   Lecture (V)
2581010, SS 2021, 2 SWS, Language: German, Open in study portal   Online

Content

1. Introduction: terms, units, conversions
2. The energy carrier gas (reserves, resources, technologies)
3. The energy carrier oil (reserves, resources, technologies)
4. The energy carrier hard coal (reserves, resources, technologies)
5. The energy carrier lignite (reserves, resources, technologies)
6. The energy carrier uranium (reserves, resources, technologies)
7. The final carrier source electricity
8. The final carrier source heat
9. Other final energy carriers (cooling energy, hydrogen, compressed air)

The student is able to

- characterize and judge the different energy carriers and their peculiarities,
- understand contexts related to energy economics.

Literature
Weiterführende Literatur:

Pfaffenberger, Wolfgang. Energiewirtschaft. ISBN 3-486-24315-2

Feess, Eberhard. Umweltökonomie und Umweltpolitik. ISBN 3-8006-2187-8

Müller, Leonhard. Handbuch der Elektrizitätswirtschaft. ISBN 3-540-67637-6

Stoft, Steven. Power System Economics. ISBN 0-471-15040-1

Erdmann, Georg. Energieökonomik. ISBN 3-7281-2135-5

T   7.109 Course: Introduction to Engineering Geology [T-BGU-101500]

Responsible:	Prof. Dr. Philipp Blum
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 20/21	6339057	Einführung in die Ingenieurgeologie	4 SWS	Lecture / Practice (/ 🔈	Blum
Exams					
WT 20/21	8210_101500	Introduction to Engineering Geology			Blum

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🔈 On-Site, ✗ Cancelled

Prerequisites

T   7.110 Course: Introduction to Game Theory [T-WIWI-102850]

Responsible:	Prof. Dr. Clemens Puppe Prof. Dr. Johannes Philipp Reiß
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101499 - Applied Microeconomics M-WIWI-101501 - Economic Theory

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2021	2520525	Introduction to Game Theory	2 SWS	Lecture / 🖥	Reiß
ST 2021	2520526	Übungen zu Einführung in die Spieltheorie	1 SWS	Practice / 🖥	Peters, Reiß

Exams				
WT 20/21	7900346	Introduction to Game Theory		Puppe

Legend: 🖥 Online, ⚒ Blended (On-Site/Online), ✊ On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes) according to Section 4(2),1 of the examination regulation.

The exam takes place in the recess period and can be resited at every ordinary examination date.

Prerequisites

The course Economics I: Microeconomics [2610012] must have been successfully completed.

Recommendation

Basic knowledge of mathematics and statistics is assumed.

Below you will find excerpts from events related to this course:

V	**Introduction to Game Theory** 2520525, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

The course focusses on non-cooperative game theory. It discusses models, solution concepts, and applications for simultaneous games as well as sequential games. Various solution concepts, e.g., Nash equilibrium and subgame-perfect equilibrium, are introduced along with more advanced concepts. A short introduction to cooperative game theory is given if there is sufficient time.

The assessment consists of a written exam (60 minutes) according to Section 4(2),1 of the examination regulation.

The exam takes place in the recess period and can be resited at every ordinary examination date.

The module [M-WIWI-101398] *Introduction to Economics* must have been passed.

Recommendations:

Basic knowledge of mathematics and statistics is assumed.

The total workload for this course is approximately 135.0 hours. For further information see German version.

This course offers an introduction to the theoretical analysis of strategic interaction situations. At the end of the course, students shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings.

Compulsory textbook:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Additional Literature:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

Literature
Verpflichtende Literatur:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Ergänzende Literatur:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

T 7.111 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-101681]

Responsible:	Dr.-Ing. Norbert Rösch
	Dr.-Ing. Sven Wursthorn
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 20/21	6071101	Einführung in GIS für Studierende natur-, ingenieur- und geowissenschaftlicher Fachrichtungen, V/Ü	4 SWS	Lecture / Practice (/ 📱	Wursthorn

Exams			
WT 20/21	8280101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	Wursthorn

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T 7.112 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite [T-BGU-103541]

Responsible:	Dr.-Ing. Norbert Rösch
	Dr.-Ing. Sven Wursthorn
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type Completed coursework	Credits 3	Grading scale pass/fail	Recurrence Each winter term	Version 2

Events					
WT 20/21	6071101	Einführung in GIS für Studierende natur-, ingenieur- und geowissenschaftlicher Fachrichtungen, V/Ü	4 SWS	Lecture / Practice (/ 📱	Wursthorn
Exams					
WT 20/21	8280101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences			Wursthorn
WT 20/21	8280103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences			Wursthorn

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✕ Cancelled

T 7.113 Course: Introduction to Machine Learning [T-WIWI-111028]

Responsible:	Prof. Dr. Andreas Geyer-Schulz Dr. Abdolreza Nazemi
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105482 - Machine Learning and Data Science

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Expansion 1 terms	Version 1

Events					
WT 20/21	2540539	Introduction to Machine Learning	2 SWS	Lecture	Nazemi
WT 20/21	2540540	Übung zu Introduction to Machine Learning	1 SWS	Practice	Nazemi
Exams					
WT 20/21	7900311	Introduction to 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-point-steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Below you will find excerpts from events related to this course:

V Introduction to Machine Learning
2540539, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content

- Introduction
- Data Cleaning
- Data Visualization
- Linear Regression
- Logistic Regression
- Tree-based Algorithms
- Support Vector Machine
- Shrinkage Models
- Dimensionality Reduction
- Clustering

Literature

- Alpaydin, E. (2014). *Introduction to Machine Learning*. Third Edition, MIT Press.
- Hall, J. (2020). *Machine Learning in Business: An Introduction to the World of Data Science.*Independently published.
- James, G., Witten, D., Hastie, T., and R. Tibshirani (2013). *An Introduction to Statistical Learning: with Applications in R.* Springer.
- Tan, P. N., Steinbach, M., Karpatne, A., & Kumar, V. (2018). *Introduction to data mining*. Pearson

T 7.114 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-101287 - Microsystem Technology

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 20/21	2141861	Introduction to Microsystem Technology I	2 SWS	Lecture	Korvink, Badilita
Exams					
WT 20/21	76-T-MACH-105182	Introduction to Microsystem Technology I			Korvink, Badilita
ST 2021	76-T-MACH-105182	Introduction to Microsystem Technology I			Korvink, Badilita

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 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)

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	**7.115 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-101287 - Microsystem Technology

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2021	2142874	Introduction to Microsystem Technology II	2 SWS	Lecture / 📱	Korvink, Badilita
Exams					
WT 20/21	76-T-MACH-105183	Introduction to Microsystem Technology II			Korvink, Badilita
ST 2021	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 2021, 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

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 | **7.116 Course: Introduction to Neural Networks and Genetic Algorithms [T-WIWI-111029]** |

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
          Part of: M-WIWI-105482 - Machine Learning and Data Science

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Expansion** 1 terms	**Version** 1

Competence Certificate

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five-point-steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

T	**7.117 Course: Introduction to Operations Research I and II [T-WIWI-102758]**

Responsible:	Prof. Dr. Stefan Nickel
	Prof. Dr. Steffen Rebennack
	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101418 - Introduction to Operations Research

Type Written examination	**Credits** 9	**Grading scale** Grade to a third	**Recurrence** see Annotations	**Version** 1

Events					
WT 20/21	2530043	Introduction to Operations Research II	2 SWS	Lecture / 📱	Rebennack
WT 20/21	2530044			Tutorial (/ 📱	Rebennack, Sinske
ST 2021	2550040	Introduction to Operations Research I	2 SWS	Lecture / 📱	Nickel
Exams					
WT 20/21	7900290	Introduction to Operations Research I and II			Rebennack
ST 2021	7900237	Introduction to Operations Research I and II			Rebennack

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment of the module is carried out by a written examination (120 minutes) according to Section 4(2), 1 of the examination regulation.

In each term (usually in March and July), one examination is held for both courses.

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

Prerequisites

None

Recommendation

Mathematics I und II. Programming knowledge for computing exercises.

It is strongly recommended to attend the course *Introduction to Operations Research I* [2550040] before attending the course *Introduction to Operations Research II* [2530043].

Below you will find excerpts from events related to this course:

V	**Introduction to Operations Research II** 2530043, WS 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

Integer and Combinatorial Programming: Basic notions, cutting plane metehods, branch and bound methods, branch and cut methods, heuristics.

Nonlinear Programming: Basic notions, optimality conditions, solution methods for convex and nonconvex optimization problems.

Dynamic and stochastic models and methods: dynamical programming, Bellman method, lot sizing models, dyanical and stochastic inventory models, queuing theory.

Learning objectives:

The student

- names and describes basic notions of integer and combinatorial optimization, nonlinear programming, and dynamic programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Literature

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

V	**Introduction to Operations Research I** 2550040, SS 2021, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

Examples for typical OR problems.

Linear Programming: Basic notions, simplex method, duality, special versions of the simplex method (dual simplex method, three phase method), sensitivity analysis, parametric optimization, game theory.

Graphs and Networks: Basic notions of graph theory, shortest paths in networks, project scheduling, maximal and minimal cost flows in networks.

Learning objectives:

The student

- names and describes basic notions of linear programming as well as graphs and networks,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Literature

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

T	7.118 Course: Introduction to Programming with Java [T-WIWI-102735]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101581 - Introduction to Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 20/21	2511000	Introduction to Programming with Java	3 SWS	Lecture / 🖳	Zöllner, Struppek, Hermann, Hüneberg
WT 20/21	2511002	Tutorien zu Programmieren I: Java	1 SWS	Tutorial (/ ♻	Zöllner, Struppek, Ulrich, Hüneberg
WT 20/21	2511003	Computer lab Introduction to Programming with Java	2 SWS	/ 🔊	Zöllner, Struppek, Ulrich, Hüneberg
Exams					
WT 20/21	7900018	Introduction to Programming with Java (Registration until 14 March 2021)			Zöllner
ST 2021	7900042	Introduction to Programming with Java (Registration until 4 July 2021)			Zöllner

Legend: 🖳 Online, ♻ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation.

The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.

The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Annotation
see german version

Below you will find excerpts from events related to this course:

V	**Introduction to Programming with Java** 2511000, WS 20/21, 3 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

The lecture "Introduction to Programming with Java " introduces systematic programming and provides essential practical basics for all advanced computer science lectures.

Based on considerations of the structured and systematic design of algorithms, the most important constructs of modern higher programming languages as well as programming methods are explained and illustrated with examples. One focus of the lecture is on teaching the concepts of object-oriented Programming. Java is used as the programming language. Knowledge of this language is required in advanced computer science lectures.

At the end of the lecture period, a written examination will be held for which admission must be granted during the semester after successful participation in the practices. The exact details will be announced in the lecture.

Learning objectives:

- Knowledge of the fundamentals, methods and systems of computer science.
- The students acquire the ability to independently solve algorithmic problems in the programming language Java, which dominates in business applications.
- In doing so, they will be able to find strategic and creative answers in finding solutions to well-defined, concrete and abstract problems.

Workload:

The total workload for this course is approximately 150 hours. For further information see German version.

Literature

Ratz, D. Schulmeister-Zimolong, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 8. Aktualisierte und erweiterte Auflage, Hanser 2018

T 7.119 Course: Introduction to Public Finance [T-WIWI-102877]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101403 - Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2560131	Introduction to Public Finance	3 SWS	Lecture / 📱	Wigger
Exams					
WT 20/21	790fiwi	Introduction to Public Finance			Wigger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

Depending on the further pandemic development in the summer semester 2021 the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites

None

Below you will find excerpts from events related to this course:

V Introduction to Public Finance

2560131, WS 20/21, 3 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

The course *Introduction to Public Finance* provides an overview of the fundamental issues in public economics. The first part of the course deals with normative theories about the economic role of the state in a market economy. Welfare economics theory is offered as a base model, with which alternative normative theories are compared and contrasted. Within this theoretical framework, arguments concerning efficiency and equity are developed as justification for varying degrees of economic intervention by the state. The second part of the course deals with the positivist theory of public economics. Processes of public decision making are examined and the conditions that lead to market failures resulting from collective action problems are discussed. The third part of the course examines a variety of public spending programs, including social security systems, the public education system, and programs aimed at reducing poverty. The fifth part of the course addresses the key theoretical and political issues associated with fiscal federalism.

Learning goals:

Students are able to:

- critically assess the economic role of the state in a market economy
- explain and discuss key concepts in public finance, including: public goods; economic externalities; and market failure
- explain and critically discuss competing theoretical approaches to public finance, including welfare economics and public choice theory
- explain the theory of bureaucracy according to Weber and critically assess its strengths and weaknesses
- evaluate the incentives inherent in the bureaucratic model, as well as the more recent introduction of market-oriented incentives associated with public-sector reform

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Organizational issues

Donnerstag 14:00-15:30 Uhr per Zoom-Livestream

Literature

Literatur:

Wigger, B. U. 2006. *Grundzüge der Finanzwissenschaft*. Springer: Berlin.

T 7.120 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible:	Prof. Dr. Steffen Rebennack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR
	M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2021	2550470	Einführung in die Stochastische Optimierung	2 SWS	Lecture / 📱	Rebennack
ST 2021	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice / 📱	Rebennack, Sinske
ST 2021	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	2 SWS	Practice / 📱	Rebennack, Sinske
Exams					
WT 20/21	7900242	Introduction to Stochastic Optimization			Rebennack

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (open book exam). The exam takes place in every semester.

Prerequisites
None.

T 7.121 Course: Investments [T-WIWI-102604]

Responsible:	Prof. Dr. Marliese Uhrig-Homburg
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101435 - Essentials of Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2530575	Investments	2 SWS	Lecture / 🖥	Uhrig-Homburg
ST 2021	2530576	Übung zu Investments	1 SWS	Practice / 🖥	Uhrig-Homburg, Eberbach
Exams					
WT 20/21	7900054	Investments			Uhrig-Homburg

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 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

Knowledge of Business Administration: Finance and Accounting [2610026] is recommended.

Below you will find excerpts from events related to this course:

V Investments
2530575, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Organizational issues

Veranstaltungskonzept umfasst vollständige Aufzeichnungen von Vorlesung und Übung. Ergänzend bieten wir zweiwöchig freiwillige Live-Fragerunden zum fachlichen und organisatorischen Austausch an.

Literature
Weiterführende Literatur:

Bodie/Kane/Marcus (2010): Essentials of Investments, 8. Aufl., McGraw-Hill Irwin, Boston

T 7.122 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 2021	2150550	Laboratory Production Metrology	3 SWS	Practical course / 🎤	Häfner
Exams					
ST 2021	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 2021, 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   7.123 Course: Laboratory Work in General and Inorganic Chemistry [T-CHEMBIO-108287]

Organisation: KIT Department of Chemistry and Biosciences

Part of: M-CHEMBIO-104026 - Laboratory Work in Inorganic Chemistry

Type	Credits	Grading scale	Version
Examination of another type	7	Grade to a third	1

Exams			
ST 2021	7100014	Laboratory Work in General and Inorganic Chemistry	Anson

Prerequisites

T	**7.124 Course: Law of Contracts [T-INFO-101316]**

Responsible: Dr. Alexander Hoff
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2021	24671	Law of Contracts	2 SWS	Lecture / 🖳	Leipert
Exams					
WT 20/21	7500059	Law of Contracts			Dreier, Matz

Legend: 🖳 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

| T | **7.125 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

Type Examination of another type	**Credits** 6	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 4

Events					
WT 20/21	2149612	Learning Factory "Global Production"	4 SWS	/ 🗣	Lanza
Exams					
WT 20/21	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 20/21, 4 SWS, Language: German, Open in study portal | **On-Site** |

Content

The learning factory "Global Production" serves as a modern teaching environment for the challenges of global production. These are made tangible using the example of the manufacture of electric motors under real production conditions.

The course is characterized by its interactive hands-on sessions, which are theoretically supported by e-learning units. The e-learning units serve to convey essential basics as well as to deepen specific topics from the classroom units (e.g. site selection, supplier selection and planning of production networks). The focus of the hands-on sessions is the case-specific application of relevant methods for planning and managing global production networks.

First, classical methods and tools of Lean Management for the site-specific design of the production system (e.g. Kanban and JIT/ JIS, Line Balancing) are learned and extended by methods of Industry 4.0. Within the scope of site-specific quality assurance, essential methods for data-driven quality assurance in complex production systems are taught and made practically tangible by means of a Six Sigma project. The focus is especially on methods of data mining with an excursus on artificial intelligence. 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. Finally, the view of the entire value chain network will be broadened by the integration of partners from the value chain. Thereby selected methods of supplier management (e.g. make-or-buy) and network design are learned and implemented. In the field of network management, collaboration between value chain partners and locations is considered a tool for increasing efficiency and avoiding disruptions. The special importance of digitisation as an enabler of collaboration is illustrated by the implementation of a traceability concept.

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
- Lean Management and Industry 4.0
- Six Sigma 4.0 - Data Mining for Site-Specific Quality Assurance
- Scalable Automation and Human-Robot Collaboration
- Supplier Management
- Network Planning and Design
- Collaboration and Traceability

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.
- Derive automation potentials and systematically decide on a suitable degree of automation of production plants under given constraints.
- 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.
- understand general interactions in the production network and effectively develop collaboration in the production Environment
- 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: ~ 36 h
regular attendance: ~ 64 h
self-study: ~ 80 h

Organizational issues

Termine werden über die Institutshomepage bekanntgegeben.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 15 Teilnehmer begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/lernfabrik.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

Dates will be announced on the homepage of the institute.

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

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 7.126 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 2021	2118078	Logistics and Supply Chain Management	4 SWS	Lecture / 🖥	Furmans
Exams					
WT 20/21	76-T-MACH-110771	Logistics and Supply Chain Management			Furmans, Mittwollen
ST 2021	76-T-MACH-110771	Logistics and Supply Chain Management			Furmans, Mittwollen

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

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

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 2021, 4 SWS, Language: English, Open in study portal

Lecture (V)
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   7.127 Course: Logistics and Supply Chain Management [T-WIWI-102870]

Responsible:	Prof. Dr. Frank Schultmann
	Dr. Marcus Wiens
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2021	2581996	Logistics and Supply Chain Management	2 SWS	Lecture / 📱	Wiens, Schultmann
ST 2021	2581997	Übung zu Logistics and Supply Chain Management	1 SWS	Practice / 📱	Diehlmann, Lüttenberg
Exams					
WT 20/21	7981996	Logistics and Supply Chain Management			Schultmann

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. 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   Logistics and Supply Chain Management
2581996, SS 2021, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
Students are introduced to the methods and tools of logistics and supply chain management. They students learn the key terms and components of supply chains together with key economic trade-offs. In detail, students gain knowledge of decisions in supply chain management, such as facility location, supply chain planning, inventory management, pricing and supply chain cooperation. In this manner, students will gain knowledge in analyzing, designing and steering of decisions in the domain of logistics and supply chain management.

- Introduction: Basic terms and concepts
- Facility location and network optimization
- Supply chain planning I: flexibility
- Supply chain planning II: forecasting
- Inventory management & pricing
- Supply chain coordination I: the Bullwhip-effect
- Supply chain coordination II: double marginalization
- Supply chain risk management

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.128 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 20/21	2149910	Machine Tools and High-Precision Manufacturing Systems	6 SWS	Lecture / Practice (/ 🖥	Fleischer

Exams			
WT 20/21	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems	Fleischer
ST 2021	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**	**Lecture / Practice (VÜ)**
	2149910, WS 20/21, 6 SWS, Language: German, Open in study portal	**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.

The individual topics are:

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

Learning Outcomes:

The students …

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

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING/TVWL:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine montags und mittwochs, Übungstermine donnerstags.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Lectures on Mondays and Wednesdays, tutorial on Thursdays.
The tutorial dates will announced in the first lecture.

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 7.129 Course: Macroeconomic Theory [T-WIWI-109121]

Responsible:	Prof. Dr. Johannes Brumm
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101501 - Economic Theory
	M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 20/21	2560404	Macroeconomic Theory	2 SWS	Lecture / ▤	Scheffel
WT 20/21	2560405	Übung zu Macroeconomic Theory	1 SWS	Practice / ▤	Pegorari
Exams					
WT 20/21	7900264	Macroeconomic Theory			Scheffel

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.

Below you will find excerpts from events related to this course:

V Macroeconomic Theory
2560404, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

## T   7.130 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 2021	2579900	Management Accounting 1	2 SWS	Lecture / 🖥	Wouters
ST 2021	2579901	Übung zu Management Accounting 1 (Bachelor)	2 SWS	Practice / 🖥	Riar
ST 2021	2579902		2 SWS	Practice / 🖥	Riar

Exams

WT 20/21	79-2579900-B	Management Accounting 1 (Bachelor)	Wouters
WT 20/21	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 in the summer semester 2021 either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

Annotation

Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V	**Management Accounting 1** 2579900, SS 2021, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **Online**

Content

The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics.
- They can use financial information for various purposes in organizations.

Examination:

- The assessment consists of a written exam (120 minutes) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

V	**Übung zu Management Accounting 1 (Bachelor)** 2579901, SS 2021, 2 SWS, Language: English, Open in study portal	**Practice (Ü)** **Online**

Content
see Module Handbook

V	2579902, SS 2021, 2 SWS, Language: English, Open in study portal	**Practice (Ü)** **Online**

Content
see Module Handbook

T	**7.131 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 Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 2

Events					
WT 20/21	2579903	Management Accounting 2	2 SWS	Lecture / 🖥	Wouters
WT 20/21	2579904		2 SWS	Practice / 🖥	Ebinger
WT 20/21	2579905		2 SWS	Practice / 🖥	Ebinger
Exams					
WT 20/21	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
WT 20/21	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 in the summer semester 2021 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** 2579903, WS 20/21, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **Online**

Content

The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Recommendations:

- It is recommended to take part in the course "Management Accounting 1" before this course.

Examination:

- The assessment consists of a written exam (120 min) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Verlag: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- Zusätzlich werden Artikel auf ILIAS zur Vergügung gestellt.

V	2579904, WS 20/21, 2 SWS, Language: English, Open in study portal	**Practice (Ü) Online**

Content
see ILIAS

V	2579905, WS 20/21, 2 SWS, Language: English, Open in study portal	**Practice (Ü) Online**

Content
see ILIAS

| T | **7.132 Course: Management and Strategy [T-WIWI-102629]** |

Responsible:	Prof. Dr. Hagen Lindstädt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101425 - Strategy and Organization

| **Type** Written examination | **Credits** 3,5 | **Grading scale** Grade to a third | **Recurrence** Each summer term | **Version** 1 |

Events					
ST 2021	2577900	Management and Strategy	2 SWS	Lecture / 🖥	Lindstädt
Exams					
WT 20/21	7900199	Management and Strategy			Lindstädt
ST 2021	7900067	Management and Strategy			Lindstädt

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) taking place at the beginn of the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

None

Below you will find excerpts from events related to this course:

| V | **Management and Strategy** 2577900, SS 2021, 2 SWS, Language: German, Open in study portal | **Lecture (V)** **Online** |

Content

The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration. Thereby a focus is on imparting knowledge about how price developments in oligopolistic markets can be understood, modeled and forecasted based on game theory.

Content in brief:

- Corporate management principles
- Strategic management principles
- Strategic analysis
- Competitive strategy: modelling and selection on a divisional level
- Strategies for oligopolies and networks: anticipation of dependencies
- Corporate strategy: modelling and evaluation on a corporate level
- Strategy implementation

Learning Objectives:

After passing this course students are able to

- prepare strategic decisions along the ideal-typical strategy process in practice ("strategic analysis").
- assess strategic options.
- explain the portfolio management (Parental advantage and best owner of business entities).
- discuss price and capacity decisions in oligopolies and explain them in examples.

Recommendations:

None.

Workload:

The total workload for this course is approximately 105.0 hours. For further information see German version.

Assessment:

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as an open-book examination (examination performance of a different kind according to SPO § 4 para. 2, item 3), or as a 60-minute written examination (written examination according to SPO § 4 para. 2, item 1).

It is expected that the exam will take place at the beginning of the semester's lecture-free period.

The examination is offered every semester and can be repeated at any regular examination date.

Literature

- Pidun, U.: *Corporate Strategy: Theory and Practice*. Springer-Gabler, Wiesbaden 2019.
- Lindstädt, H.; Hauser, R.: *Strategische Wirkungsbereiche des Unternehmens*. Gabler, Wiesbaden 2004.
- Grant, R.M.: *Strategisches Management*. Pearson Studium, 5., aktualisierte Aufl., München 2006.

Die relevanten Auszüge und zusätzliche Quellen werden in der Veranstaltung bekannt gegeben.

T   7.133 Course: Managing Organizations [T-WIWI-102630]

Responsible:	Prof. Dr. Hagen Lindstädt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101425 - Strategy and Organization
	M-WIWI-101513 - Human Resources and Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	3

Events					
WT 20/21	2577902	Managing Organizations	2 SWS	Lecture / 🗔	Lindstädt
Exams					
WT 20/21	7900049	Managing Organizations			Lindstädt
ST 2021	7900066	Managing Organizations			Lindstädt

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Managing Organizations**	Lecture (V)
	2577902, WS 20/21, 2 SWS, Language: German, Open in study portal	**Online**

Content

The course should enable the participants to assess the strengths and weaknesses of existing organisational structures and rules using systematic criteria. Here concepts and models for designing organisation structures, regulating organizational processes and managing organisational changes are presented and discussed using case studies. The course is structured to relate to actions and aims to give students a realistic view of the opportunities and limits of rational design approaches.

Content in brief:

- Principles of organisational management
- Managing organisational structures and processes: the selection of design parameters
- Ideal-typical organisational structures: choice and effect of parameter combinations
- Managing organisational changes

Learning Objectives:

After passing this course students are able to

- evaluate strengths and weaknesses of existing organisational structures and rules.
- compare alternatives of organisational structure in practice and assess and interpret them regarding their effectiveness and efficiency.
- assess the management of organisational changes.

Recommendations:

None.

Workload:

The total workload for this course is approximately 105.0 hours. For further information see German version.

Assessment:

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as an open-book examination (examination performance of a different kind according to SPO § 4 para. 2, item 3), or as a 60-minute written examination (written examination according to SPO § 4 para. 2, item 1).

It is expected that the exam will take place at the beginning of the semester's lecture-free period.

The examination is offered every semester and can be repeated at any regular examination date.

A bonus can be acquired through successful participation in the exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for the award of a bonus will be announced at the beginning of the lecture.

Literature

- Laux, H.; Liermann, F.: *Grundlagen der Organisation*, Springer. 6. Aufl. Berlin 2005.
- Lindstädt, H.: *Organisation*, in Scholz, C. (Hrsg.): Vahlens Großes Personallexikon, Verlag Franz Vahlen. 1. Aufl. München, 2009.
- Schreyögg, G.: *Organisation. Grundlagen moderner Organisationsgestaltung*, Gabler. 4. Aufl. Wiesbaden 2003.

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

T 7.134 Course: Managing the Marketing Mix [T-WIWI-102805]

Responsible:	Prof. Dr. Martin Klarmann
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101424 - Foundations of Marketing

Type Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2021	2571152	Managing the Marketing Mix	2 SWS	Lecture / 🖥	Klarmann
ST 2021	2571153	Übung zu Marketing Mix (Bachelor)	1 SWS	Practice / 🖥	Pade
Exams					
ST 2021	7900023	Managing the Marketing Mix			Klarmann

Legend: 🖥 Online, 🕸 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment is carried out (according to §4(2), 3 of the examination regulation) through the preparation and presentation of a case study (max. 30 points) and a written open book exam (max. 60 points). In total, a maximum of 90 points can be earned during the course. In the summer term 2021, the written open book exam will either take place in the lecture hall or online, depending on further pandemic developments.
Further details on the case study and open book exam will be announced in the lecture.

Prerequisites
None

Annotation
The course is compulsory in the module "Foundations of Marketing".
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Below you will find excerpts from events related to this course:

V Managing the Marketing Mix
2571152, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The content of this course concentrates on the elements of the marketing mix. Therefore the main chapters are brand management, pricing, promotion and sales management.
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

This course is compulsory within or the module "Foundations of Marketing" and must be examined.

Learning objectives:

student

- know the meaning of the branding, the brand positioning and the possibilities of the brand value calculation
- understand the price behavior of customers and can apply this knowledge to the practice
  know different methods for price determination (conjoint analysis, cost-plus determination, target costing, customer surveys, bidding procedures) and price differentiation
- are able to name and explain the relevant communication theories
- can identify crisis situations and formulate appropriate response strategies
- can name and judge different possibilities of the Intermediaplanung
- know various design elements of advertising communication
- understand the measurement of advertising impact and can apply it
- know the basics of sales organization
- are able to evaluate basic sales channel decisions

Workload:

The total workload for this course is approximately 135.0 hours.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

## T 7.135 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 20/21	2149657	Manufacturing Technology	6 SWS	Lecture / Practice (/ 📱	Schulze, Gerstenmeyer
Exams					
WT 20/21	76-T-MACH-102105	Manufacturing Technology			Schulze
ST 2021	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** 2149657, WS 20/21, 6 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **Online**

Content

The objective of the lecture is to look at manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to impart detailed process knowledge of the common processes. The lecture covers the basic principles of manufacturing technology and deals with the manufacturing processes according to their classification into main groups regarding technical and economic aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Quality control
- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming, plastics engineering)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing

This lucture provides an excursion to an industry company.

Learning Outcomes:

The students ...

- are capable to specify the different manufacturing processes and to explain their functions.
- are able to classify the manufacturing processes by their general structure and functionality according to the specific main groups.
- have the ability to perform a process selection based on their specific characteristics.
- are enabled to identify correlations between different processes and to select a process regarding possible applications.
- are qualified to evaluate different processes regarding specific applications based on technical and economic aspects.
- are experienced to classify manufacturing processes in a process chain and to evaluate their specific influence on surface integrity of workpieces regarding the entire process chain.

Workload:

regular attendance: 63 hours
self-study: 177 hours

Organizational issues

Vorlesungstermine montags und dienstags, Übungstermine mittwochs.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Start der Vorlesung am 03.11.2020 auf Zoom. Zugangsdaten werden über ILIAS zur Verfügung gestellt.

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 7.136 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 20/21	2117051	Material flow in logistic systems	6 SWS	Others (sons / ♻	Furmans, Jacobi, Klein
Exams					
WT 20/21	76-T-MACH-102151	Material Flow in Logistic Systems			Furmans, Mittwollen

Legend: 🖳 Online, ♻ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

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
none

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 20/21, 6 SWS, Language: German, Open in study portal	Others (sonst.) Blended (On-Site/Online)

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, 2009

Description:

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. 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 at 02.11.2020. In this session, the teaching concept of "Materialfluss in Logistiksysteme" is explained and outstanding issues are clarified.

Registration for the course including group allocation via ILIAS is mandatory. The registration will be activated for several days after the introductory session (registration period: 02.11.2020 08:00 h - 08.11.2020 18:00 h).

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.

Organizational issues
Die Advance Organizer und Übungen werden im Online-Format angeboten. Die Kolloquien finden in Präsenz im Institutsgebäude des IFL (Geb. 50.38) statt.

T 7.137 Course: Mathematics I - Final Exam [T-MATH-102261]

Responsible:	Dr. Martin Folkers
	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-101676 - Mathematics 1

Type Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Version** 1

Exams			
WT 20/21	6700013	Mathematics I - Final Exam	Last, Winter, Nestmann

T	**7.138 Course: Mathematics I - Midterm Exam [T-MATH-102260]**

Responsible:	Dr. Martin Folkers
	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-101676 - Mathematics 1

Type Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Version** 1

Events					
WT 20/21	0135000	Mathematik 1 für die Fachrichtung Wirtschaftswissenschaften	4 SWS	Lecture / ✿	Nestmann
WT 20/21	0135100	Übungen zu 0135000	2 SWS	Practice / ✿	Nestmann
Exams					
WT 20/21	6700040	Mathematics I - Midterm Exam			Nestmann, Winter, Last

Legend: ▯ Online, ✿ Blended (On-Site/Online), ◆ On-Site, ✕ Cancelled

T 7.139 Course: Mathematics II - Final Exam [T-MATH-102263]

Responsible:	Dr. Martin Folkers
	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-101677 - Mathematics 2

Type Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Version** 1

Exams			
ST 2021	6700021	Mathematics II - Final Exam	Winter, Last, Folkers
ST 2021	6700040	Mathematics II - Final Exam	Last, Winter, Folkers

T 7.140 Course: Mathematics II - Midterm Exam [T-MATH-102262]

Responsible:	Dr. Martin Folkers
	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-101677 - Mathematics 2

Type	Credits	Grading scale	Version
Written examination	3,5	Grade to a third	1

Events					
ST 2021	0183000	Mathematik 2 für die Fachrichtung Wirtschaftswissenschaft	4 SWS	Lecture / 🖳	Nestmann
ST 2021	0183100	Übungen zu 0183000	2 SWS	Practice / 🖳	Nestmann
Exams					
ST 2021	6700039	Mathematics II - Midterm Exam			Folkers, Last, Winter

Legend: 🖳 Online, ⚅ Blended (On-Site/Online), 🖤 On-Site, ✗ Cancelled

| T | **7.141 Course: Mathematics III - Final Exam [T-MATH-102264]** |

Responsible:	Dr. Martin Folkers
	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-101679 - Mathematics 3

| **Type** Written examination | **Credits** 7 | **Grading scale** Grade to a third | **Version** 1 |

Events					
WT 20/21	0135200	Mathematik 3 für die Fachrichtung Wirtschaftswissenschaften	4 SWS	Lecture / ⚙	Last
WT 20/21	0135300	Übungen zu 0135200	2 SWS	Practice / ⚙	Last
Exams					
WT 20/21	7700090	Mathematics III - Final Exam			Last

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

T 7.142 Course: Mechanical Design Basics I and II [T-MACH-110363]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101299 - Mechanical Design

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 20/21	2145131	Mechanical Design Basics I	2 SWS	Lecture / �֎	Albers, Matthiesen, Behrendt
ST 2021	2146131	Mechanical Design Basics II	2 SWS	Lecture / ✖	Albers, Matthiesen, Behrendt
Exams					
WT 20/21	76-T-MACH-104739	Mechanical Design Basics I and II			Albers, Matthiesen
ST 2021	76-T-MACH-104739	Mechanical Design Basics I and II			Matthiesen, Albers

Legend: 📱 Online, ✖ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (90min) on the topics of MKLGI and MKLGII.

Prerequisites
The bricks "T-MACH-110364 - Mechanical Design Basics I, Tutorial" and "T-MACH-110365 - Mechanical Design Basics II, Tutorial" must be passed successfully.

Below you will find excerpts from events related to this course:

V Mechanical Design Basics I
2145131, WS 20/21, 2 SWS, Language: German, Open in study portal
Lecture (V)
Blended (On-Site/Online)

Literature
Vorlesungsumdruck:

Der Umdruck zur Vorlesung kann über die eLearning-Plattform Ilias bezogen werden.

Literatur:

Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von
Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

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

V Mechanical Design Basics II
2146131, SS 2021, 2 SWS, Language: German, Open in study portal
Lecture (V)
Blended (On-Site/Online)

Content

Design

Dimensioning

Component connections

Bolted connection

Prerequisites:

MIT:

In a workshop with 3 project sessions the students will be divided into groups and their knowledge will be tested. Attendance in all 3 project sessions is compulsory and is checked. In colloquia the knowledge from the lecture will be tested at the beginning of the project sessions. The successful completion of the colloquia as well as the completion of the workshop task is a prerequisite for successful participation.

CIW/ VT/ IP-M/ WiING / MATH/ MWT:

During the lecture, students must apply the knowledge from MKL I and II to a design task. This is then evaluated and must be passed for successful participation.

NWT:

For students of the subject area NwT, the creation of a teaching video for the teaching of a technical system must be completed instead as a preliminary examination.

Workload:

Presence time: 21 h

Self study: 51 h

Literature
Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von
Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

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

T   7.143 Course: Mechanical Design Basics I, Tutorial [T-MACH-110364]

Responsible:	Prof. Dr.-Ing. Sven Matthiesen
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101299 - Mechanical Design

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each winter term	1

Events					
WT 20/21	2145132	Tutorials Mechanical Design Basics I	1 SWS	Practice / 🖥	Albers, Matthiesen, Behrendt, Mitarbeiter
Exams					
WT 20/21	76-T-MACH-110364	Mechanical Design Basics I, Tutorial			Matthiesen, Albers

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🔵 On-Site, ✗ Cancelled

Competence Certificate
To pass the preliminary work, attendance at 3 workshop sessions of the MKL1 transmission workshop and the passing of a colloquium at the beginning of each workshop are prerequisites.

Prerequisites
None

Below you will find excerpts from events related to this course:

V   Tutorials Mechanical Design Basics I
2145132, WS 20/21, 1 SWS, Language: German, Open in study portal

Practice (Ü)
Online

Literature
Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von
Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

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

CAD:

3D-Konstruktion mit Pro/Engineer - Wildfire, Paul Wyndorps, Europa Lehrmittel, ISBN: 978-3-8085-8948-9

Pro/Engineer Tipps und Techniken, Wolfgang Berg, Hanser Verlag, ISBN: 3-446-22711-3 (für Fortgeschrittene)

T 7.144 Course: Mechanical Design Basics II, Tutorial [T-MACH-110365]

Responsible:	Prof. Dr.-Ing. Sven Matthiesen
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101299 - Mechanical Design

Type Completed coursework	Credits 1	Grading scale pass/fail	Recurrence Each summer term	Version 1

Events					
ST 2021	2146132	Tutorials Mechanical Design Basics II	2 SWS	Practice / 🔀	Albers, Matthiesen, Mitarbeiter
Exams					
ST 2021	76-T-MACH-102133	Mechanical Design Basics II, Tutorial			Albers, Matthiesen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔵 On-Site, ✗ Cancelled

Competence Certificate

CIW/ VT/ IP-M/ WiING / MATH/ MWT: For passing the prerequisite it is necessary that a design task is successfully completed as a technical hand drawing

MIT: To pass the preliminary examination, attendance at workshop sessions and a colloquium at the beginning of each workshop are required.

NWT:

For students of the subject area NwT, the creation of a teaching video for the teaching of a technical system must be completed instead as a preliminary examination.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Tutorials Mechanical Design Basics II** 2146132, SS 2021, 2 SWS, Language: German, Open in study portal	**Practice (Ü)** **Blended (On-Site/Online)**

Content

Design

Dimensioning

Component connections

Bolted connection

Prerequisites:

MIT:

In a workshop with 3 project sessions the students will be divided into groups and their knowledge will be tested. Attendance in all 3 project sessions is compulsory and is checked. In colloquia the knowledge from the lecture will be tested at the beginning of the project sessions. The successful completion of the colloquia as well as the completion of the workshop task is a prerequisite for successful participation.

CIW/ VT/ IP-M/ WiING / MATH/ MWT:

During the lecture, students must apply the knowledge from MKL I and II to a design task. This is then evaluated and must be passed for successful participation.

NWT:

For students of the subject area NwT, the creation of a teaching video for the teaching of a technical system must be completed instead as a preliminary examination.

Workload:

MIT Students:

Presence time: 18 h

Self study: 30 h

CIW/ VT/ IP-M/ WiING / NWT/ MATH/ MWT

Presence time: 10,5 h

Self study: 37,5 h

Literature

Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von
Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

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

CAD:

3D-Konstruktion mit Pro/Engineer - Wildfire, Paul Wyndorps, Europa Lehrmittel, ISBN: 978-3-8085-8948-9

Pro/Engineer Tipps und Techniken, Wolfgang Berg, Hanser Verlag, ISBN: 3-446-22711-3 (für Fortgeschrittene)

T   7.145 Course: Metal Forming [T-MACH-105177]

Responsible: Dr. Thomas Herlan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2021	2150681	Metal Forming	2 SWS	Lecture / 🖥	Herlan
Exams					
ST 2021	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**	Lecture (V)
	2150681, SS 2021, 2 SWS, Language: German, Open in study portal	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   7.146 Course: Microactuators [T-MACH-101910]

Responsible: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2021	2142881	Microactuators	2 SWS	Lecture / 🖥	Kohl
Exams					
WT 20/21	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 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
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:

- Microelectromechanical 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 7.147 Course: Mobility and Infrastructure [T-BGU-101791]

Responsible:	Prof. Dr.-Ing. Ralf Roos
	Prof. Dr.-Ing. Peter Vortisch
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-BGU-101067 - Mobility and Infrastructure

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each term	2

Events					
ST 2021	6200404	Spatial Planning and Planning Law	2 SWS	Lecture / 🖥	Wilske
ST 2021	6200405	Exercises to Spatial Planning and Planning Law	1 SWS	Practice / 🖥	Wilske, Mitarbeiter/innen
ST 2021	6200406	Transportation Systems	2 SWS	Lecture / 🖥	Vortisch
ST 2021	6200407	Exercises to Transportation Systems		Practice / 🖥	Vortisch, Mitarbeiter/innen
ST 2021	6200408	Design Basics in Highway Engineering	2 SWS	Lecture / 🖥	Roos, Zimmermann
ST 2021	6200409	Exercises to Design Basics in Highway Engineering		Practice / 🖥	Plachkova-Dzhurova, Zimmermann
Exams					
WT 20/21	8234101791	Mobility and Infrastructure			Roos

Legend: 🖥 Online, ⚄ Blended (On-Site/Online), 💬 On-Site, ✗ Cancelled

Competence Certificate
written exam, 150 min.

Prerequisites
None

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

Annotation

T 7.148 Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101413 - Applications of Operations Research

Type Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2021	2550490	Modellieren und OR-Software: Einführung	3 SWS	Practical course / 🖥	Nickel, Pomes, Bakker, Zander
Exams					
WT 20/21	00040	Modeling and OR-Software: Introduction			Nickel
ST 2021	7900153	Modeling and OR-Software: Introduction			Nickel

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✖ Cancelled

Competence Certificate

The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the software laboratory and the following term.

Prerequisites

None

Recommendation

Firm knowledge of the contents from the lecture *Introduction to Operations Research I* [2550040] of the module *Operations Research*.

Annotation

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered in every term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Modellieren und OR-Software: Einführung
2550490, SS 2021, 3 SWS, Language: German, Open in study portal

Practical course (P)
Online

Content

After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, ...), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis. Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

T 7.149 Course: Nanotechnology with Clusterbeams [T-MACH-102080]

Responsible:	Dr. Jürgen Gspann
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

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   7.150 Course: Nonlinear Optimization I [T-WIWI-102724]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR
	M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 20/21	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🖥	Stein
WT 20/21	2550112	Exercises Nonlinear Optimization I + II		Practice / 🖥	Stein
Exams					
WT 20/21	7900086_WS2021_HK	Nonlinear Optimization I			Stein

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✖ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam. The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

Annotation
Part I and II of the lecture are held consecutively in the *same* semester.

Below you will find excerpts from events related to this course:

V   Nonlinear Optimization I
2550111, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

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, SpringerSpektrum, 2018

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 7.151 Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	6

Events					
WT 20/21	2550111	Nonlinear Optimization I	2 SWS	Lecture / 📱	Stein
WT 20/21	2550112	Exercises Nonlinear Optimization I + II		Practice / 📱	Stein
WT 20/21	2550113	Nonlinear Optimization II	2 SWS	Lecture / 📱	Stein
Exams					
WT 20/21	7900088_WS2021_HK	Nonlinear Optimization I and II			Stein

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌐 On-Site, ✕ Cancelled

Competence Certificate

The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

Prerequisites

None.

Annotation

Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization I
2550111, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

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, SpringerSpektrum, 2018

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 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

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, SpringerSpektrum, 2018

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 7.152 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 20/21	2550112	Exercises Nonlinear Optimization I + II		Practice / ▯	Stein
WT 20/21	2550113	Nonlinear Optimization II	2 SWS	Lecture / ▯	Stein
Exams					
WT 20/21	7900087_WS2021_HK	Nonlinear Optimization II			Stein

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization II
2550113, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

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, SpringerSpektrum, 2018

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   7.153 Course: Novel Actuators and Sensors [T-MACH-102152]

Responsible:	Prof. Dr. Manfred Kohl
	Dr. Martin Sommer
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101287 - Microsystem Technology

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 3

Events					
WT 20/21	2141865	Novel actuators and sensors	2 SWS	Lecture / ▯	Kohl, Sommer
Exams					
WT 20/21	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 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
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   7.154 Course: Optimization under Uncertainty [T-WIWI-106545]

Responsible:	Prof. Dr. Steffen Rebennack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101413 - Applications of Operations Research
	M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 20/21	2550464	Optimierungsansätze unter Unsicherheit		Lecture / 🖥	Rebennack
WT 20/21	2550465	Übungen zu Optimierungsansätze unter Unsicherheit		Practice / 🖥	Rebennack, Füllner
WT 20/21	2550466		2 SWS	Practice / 🖥	Rebennack, Füllner
Exams					
WT 20/21	7900240	Optimization under Uncertainty			Rebennack

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites

None.

T 7.155 Course: Optoelectronic Components [T-ETIT-101907]

Responsible: Prof. Dr. Wolfgang Freude
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2021	2309486	Optoelectronic Components	2 SWS	Lecture / 📱	Freude
ST 2021	2309487	Optoelectronic Components (Tutorial)	1 SWS	Practice / 📱	Freude
Exams					
WT 20/21	7309486	Optoelectronic Components			Freude
ST 2021	7309486	Optoelectronic Components			Freude

Legend: 📱 Online, ⚃ Blended (On-Site/Online), ✿ On-Site, ✗ Cancelled

Prerequisites

T   7.156 Course: Patent Law [T-INFO-101310]

Responsible:	Markus Hössle
	Matthias Koch
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 summer term	2

Events					
ST 2021	24656	Patent Law	2 SWS	Lecture / 🖩	Hössle
Exams					
WT 20/21	7500001	Patent Law			Dreier, Matz

Legend: 🖩 Online, ⚙ Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

T   7.157 Course: Personnel Policies and Labor Market Institutions [T-WIWI-102908]

Responsible:	Prof. Dr. Petra Nieken
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101513 - Human Resources and Organizations
	M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2573001	Personnel Policies and Labor Market Institutions	2 SWS	Lecture / 🖥	Nieken
ST 2021	2573002	Übungen zu Personalpolitik und Arbeitsmarktinstitutionen	1 SWS	Practice / 🖥	Nieken, Mitarbeiter
Exams					
WT 20/21	7900202	Personnel Policies and Labor Market Institutions			Nieken

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment of this course is a written examination of 1 hour. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendation
Completion of module Business Administration is recommended.

Basic knowledge of microeconomics, game theory, and statistics is recommended.

Below you will find excerpts from events related to this course:

V	**Personnel Policies and Labor Market Institutions**	**Lecture (V)**
	2573001, SS 2021, 2 SWS, Language: German, Open in study portal	**Online**

Content

The students acquire knowledge about the process and the strategic aspects of collective bargaining about wages. They analyze selected aspects of corporate governance and co-determination in Germany. The lecture also addresses questions of personnel politics and labor market discrimination. Microeconomic and behavioral approaches as well as empirical data is used and evaluated critically.

Aim

The student

- understands the process and role of agents in collective wage bargaining.
- analyzes strategic decisions in the context of corporate governance.
- understands the concept of co-determination in Germany.
- challenges statements that evaluate certain personnel politics.

Workload

The total workload for this course is approximately 135 hours.

Lecture 32 hours

Preparation of lecture 52 hours

Exam preparation 51 hours

Literature

Arbeitsmarktökonomik, W. Franz, Springer, 2013

Organizational issues

Die Vorlesungsinhalte sind als Aufzeichnungen verfügbar. An ausgewählten Vorlesungsterminen gibt es Live-Sessions. Diese werden zum Vorlesungsstart bekannt gegeben.

There are recordings of the lecture contents. There will be live sessions on selected lecture dates. These will be announced at the start of the lecture time.

T 7.158 Course: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Once	Version 1

Exams			
ST 2021	7500149	Context Sensitive Systems	Beigl, Riedel

| T | **7.159 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   7.160 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 7.161 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   7.162 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   7.163 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   7.164 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   7.165 Course: Physics for Engineers [T-MACH-100530]

|	
Responsible:	Prof. Dr. Martin Dienwiebel
	Prof. Dr. Peter Gumbsch
	apl. Prof. Dr. Alexander Nesterov-Müller
	Dr. Daniel Weygand
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2021	2142890	Physics for Engineers	4 SWS	Lecture / Practice (/ 📱	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch
Exams					
WT 20/21	76-T-MACH-100530	Physics for Engineers			Gumbsch, Dienwiebel, Nesterov-Müller, Weygand

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**	**Lecture / Practice (VÜ)**
	2142890, SS 2021, 4 SWS, Language: German, Open in study portal	**Online**

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

Kursbeitritt erfolgt bis zum 15.4.2021 (erste Vorlesung) ohne Passwort.

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   7.166 Course: Platform Economy [T-WIWI-109936]

Responsible:	Dr. Verena Dorner
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101421 - Supply Chain Management
	M-WIWI-101434 - eBusiness and Service Management
	M-WIWI-104911 - Information Systems & Digital Business: Interaction
	M-WIWI-104912 - Information Systems & Digital Business: Platforms

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 20/21	2540468	Platform Economy	2 SWS	Lecture / ⚙	Dann, Weinhardt
WT 20/21	2540469	Übung zu Platform Economy		Practice / 🎙	Dann, Richter
Exams					
WT 20/21	7900213	Platform Economy			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 regulation. Details of the grades will be announced at the beginning of the course.

Prerequisites
see below

Recommendation
None

Below you will find excerpts from events related to this course:

V	**Platform Economy**	Lecture (V)
	2540468, WS 20/21, 2 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Literature

- Bundesministerium für Wirtschaft und Energie (2017). „Kompetenzen für eine digitale Sourveränität"(abrufbar unter https://www.bmwi.de/Redaktion/DE/Publikationen/Studien/kompetenzen-fuer-eine-digitale-souveraenitaet.html)

- Bundesministerium für Wirtschaft und Energie (2017). „Weißbuch Digitale Plattformen." (abrufbar unter https://www.bmwi.de/Redaktion/DE/Publikationen/Digitale-Welt/weissbuch-digitale-plattformen.pdf?__blob=publicationFile&v=8)

- Chuen, D.L.K., ed. 2015. "Handbook of digital currency: Bitcoin, innovation, financial instruments, and big data," Academic Press.

- Easley, D., and Kleinberg, J. 2010. "Network Effects," in Networks, Crowds, and Markets: Reasoning about a Highly Connected World, Cambridge University Press, pp. 509–542.

- Eisenmann, T., Parker, G., and Van Alstyne, M. W. 2006. "Strategies for two-sided markets," Harvard Business Review 84(10), pp. 1–11.

- Gassmann, O., Frankenberger, K., and Csik, M. 2013. Geschäftsmodelle entwickeln: 55 innovative Konzepte mit dem St. Galler Business Model Navigator, Hanser.

- Wattenhofer, R. 2016. "The science of the blockchain." CreateSpace Independent Publishing Platform.

- Roth, A. 2002. "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., 1999. "Topics in Microeconomics - Industrial Organization, Auctions, and Incentives," Cambridge, Cambridge University Press.

- Teubner, T., and Hawlitschek, F. (in press). "The economics of P2P online sharing," in The Sharing Economy: Possibilities, Challenges, and the way forward, Praeger Publishing.

T   7.167 Course: PLM-CAD Workshop [T-MACH-102153]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type Examination of another type	Credits 4	Grading scale Grade to a third	Recurrence Each term	Version 2

Events					
WT 20/21	2121357	PLM-CAD Workshop	4 SWS	Project (P / ✿	Ovtcharova, Mitarbeiter
ST 2021	2121357	PLM-CAD Workshop	4 SWS	Project (P / ✿	Ovtcharova, Mitarbeiter
Exams					
WT 20/21	76-T-MACH-102153	PLM-CAD Workshop			Ovtcharova

Legend: 📱 Online, ✿ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment (graded)

Prerequisites
None

Annotation
Number of participants is limited, compulsory attendance

Below you will find excerpts from events related to this course:

V   PLM-CAD Workshop
2121357, WS 20/21, 4 SWS, Language: German, Open in study portal

**Project (PRO)
Blended (On-Site/Online)**

Content
The aim of the workshop is to demonstrate the benefits of collaborative product development using PLM methods and to emphasize their added value compared to classical CAD development.

Students learn how to develop and produce a prototype with the help of modern PLM and CAx systems.

Organizational issues
Termine voraussichtlich Vormittags 09:45 - 13:00 . Weitere Informationen siehe ILIAS.

Literature
Workshop-Unterlagen / workshop materials

V   PLM-CAD Workshop
2121357, SS 2021, 4 SWS, Language: German, Open in study portal

**Project (PRO)
Blended (On-Site/Online)**

Content
The aim of the workshop is to demonstrate the benefits of collaborative product development using PLM methods and to emphasize their added value compared to classical CAD development.

Students learn how to develop and produce a prototype with the help of modern PLM and CAx systems.

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Workshop-Unterlagen / workshop materials

T   7.168 Course: Power Network [T-ETIT-100830]

Responsible:	Prof. Dr.-Ing. Thomas Leibfried
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-ETIT-102379 - Power Network

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 20/21	2307371	Power Network	2 SWS	Lecture / 🖥	Leibfried
WT 20/21	2307373	Tutorial for 2307371 Power Network	2 SWS	Practice / 🖥	Hirsching, Leibfried, Geis-Schroer
Exams					
WT 20/21	7307371	Power Network			Leibfried

Legend: 🖥 Online, ⚃ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T   7.169 Course: Practical Seminar Interaction [T-WIWI-109935]

Responsible:	Prof. Dr. Alexander Mädche
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-104911 - Information Systems & Digital Business: Interaction

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
WT 20/21	2540555	Practical Seminar: Digital Services (Ba)	3 SWS	Lecture	Mädche
Exams					
WT 20/21	7900363	Practical Seminar: Information Systems and Service Design			Mädche

Competence Certificate

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

Prerequisites

None.

| T | **7.170 Course: Practical Seminar Platforms [T-WIWI-109937]** |

Responsible:	Prof. Dr. Gerhard Satzger
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-104912 - Information Systems & Digital Business: Platforms

Type	**Credits**	**Grading scale**	**Recurrence**	**Version**
Examination of another type	4,5	Grade to a third	Each term	2

Competence Certificate

The assessment of this course is 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.

T 7.171 Course: Practical Seminar Servitization [T-WIWI-109939]

Responsible:	Prof. Dr. Alexander Mädche
	Prof. Dr. Gerhard Satzger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-104913 - Information Systems & Digital Business: Servitization

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

Competence Certificate

The assessment of this course is 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.

T 7.172 Course: Practical Seminar: Digital Services [T-WIWI-110888]

Responsible:	Prof. Dr. Gerhard Satzger
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-102752 - Fundamentals of Digital Service Systems

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

Events					
WT 20/21	2540555	Practical Seminar: Digital Services (Ba)	3 SWS	Lecture	Mädche
Exams					
WT 20/21	7900363	Practical Seminar: Information Systems and Service Design			Mädche

Competence Certificate

The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according

to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites

None

Recommendation

None

Annotation

The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

T 7.173 Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 20/21	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course	Last
WT 20/21	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course	Last
ST 2021	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / ▯	Last
ST 2021	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / ▯	Last
Exams					
WT 20/21	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology			Last
ST 2021	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 20/21, 2 SWS, Language: German, Open in study portal

Practical course (P)

Content
See homepage: www.imt.kit.edu/lectures.php
Date: during the semester break
Place: IMT Laboratories, North Campus, Building 307

Practical course date in the second full week of September, respectivlely in the week after Ash Wednesday. The exam takes place in the following week.

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 20/21, 2 SWS, Language: German, Open in study portal

Practical course (P)

Content
See homepage: www.imt.kit.edu/lectures.php
Date: during the semester break
Place: IMT Laboratories, North Campus, Building 307

Practical course date in the second full week of September, respectively in the week after Ash Wednesday. The exam takes place in the following week.

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 2021, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **Online**

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 2021, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **Online**

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'

T	7.174 Course: Problem Solving, Communication and Leadership [T-WIWI-102871]

Responsible:	Prof. Dr. Hagen Lindstädt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101425 - Strategy and Organization
	M-WIWI-101513 - Human Resources and Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	2	Grade to a third	Each summer term	1

Events					
ST 2021	2577910	Problem solving, communication and leadership	1 SWS	Lecture / 🖥	Lindstädt
Exams					
WT 20/21	7900070	Problem Solving, Communication and Leadership			Lindstädt
ST 2021	7900068	Problem Solving, Communication and Leadership			Lindstädt

Legend: 🖥 Online, ✪ Blended (On-Site/Online), ⬤ On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (30 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Problem solving, communication and leadership**	Lecture (V)
	2577910, SS 2021, 1 SWS, Language: German, Open in study portal	**Online**

Content

The course deals with various aspects of problem solving and communication processes and is divided into two parts. The first part of the course addresses the fundamental steps in the problem-solving process; namely, problem identification, problem structuring, problem analysis and communication of solution. Ideas for structuring problem solving processes will be discussed and the perquisites for and principles of structured communication based on charts and presentations will be explained. The second part of the course addresses important concepts in leadership, including the context-specificity of influence, the choice of leader and the characteristics of employees. The course content reflects current issues in management and communication practice and is oriented toward the practical application of theoretical insights to these issues. In this respect, the course aims to develop interdisciplinary skills.

Learning Objectives:

After passing this course students are able to

- structure problem solving processes.
- apply the principles of focused communication based on charts and presentations.
- understand leadership in the context of situation and personality.

Recommendations:

None.

Workload:

The total workload for this course is approximately 60 hours. For further information see German version.

Assessment:

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as an open-book examination (examination performance of a different kind according to SPO § 4 para. 2, item 3), or as a 60-minute written examination (written examination according to SPO § 4 para. 2, item 1).

It is expected that the exam will take place at the beginning of the semester's lecture-free period.

The examination is offered every semester and can be repeated at any regular examination date.

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

Literature

Verpflichtende Literatur:

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

Ergänzende Literatur:

- Hungenberg, Harlad: Problemlösung und Kommunikation, 3. Aufl. München 2010

- Zelazny, Gene; Delker, Christel: Wie aus zahlen Bilder werden, 6. Aufl. Wiesbaden 2008

- Minto, Barbara: Das Prinzip der Pyramide: Ideen klar, verständlich und erfolgreich kommunizieren. 2005

T　7.175 Course: Procedures of Remote Sensing [T-BGU-103542]

Responsible:	Dr.-Ing. Uwe Weidner
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type Oral examination	Credits 3	Grading scale Grade to a third	Version 2

Exams			
WT 20/21	8280103542	Procedures of Remote Sensing	Weidner

T   7.176 Course: Procedures of Remote Sensing, Prerequisite [T-BGU-101638]

Responsible:	Dr.-Ing. Uwe Weidner
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type Completed coursework	Credits 1	Grading scale pass/fail	Recurrence Each summer term	Version 1

Events					
ST 2021	6020244	Procedures of Remote Sensing, Excercise	1 SWS	Practice / ▤	Weidner

Legend: ▤ Online, ✿ Blended (On-Site/Online), ● On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.177 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

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 20/21	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture / 🗣	Steegmüller, Kienzle
Exams					
WT 20/21	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**	Lecture (V)
	2149670, WS 20/21, 2 SWS, Language: German, Open in study portal	On-Site

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 7.178 Course: Product Lifecycle Management [T-MACH-105147]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 20/21	2121350	Product Lifecycle Management	2 SWS	Lecture / 📱	Ovtcharova
Exams					
WT 20/21	76-T-MACH-105147	Product Lifecycle Management			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 Product Lifecycle Management
2121350, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The course includes:

- Basics for product data management and data exchange
- IT system solutions for Product Lifecycle Management (PLM)
- Economic viability analysis and implementation problems
- Illustrative scenario for PLM using the example of the institute's own I4.0Lab

After successful attendance of the course, students can:

- identify the challenges of data management and exchange and describe solution concepts for these challenges.
- clarify the management concept PLM and its goals and highlight the economic benefits.
- explain the processes required to support the product life cycle and describe the most important business software systems (PDM, ERP, ...) and their functions.

Literature
Vorlesungsfolien.

V. Arnold et al: Product Lifecycle Management beherrschen, Springer-Verlag, Heidelberg, 2005.

J. Stark: Product Lifecycle Management, 21st Century Paradigm for Product Realisation, Springer-Verlag, London, 2006.

A. W. Scheer et al: Prozessorientiertes Product Lifecycle Management, Springer-Verlag, Berlin, 2006.

J. Schöttner: Produktdatenmanagement in der Fertigungsindustrie, Hanser-Verlag, München, 1999.

M.Eigner, R. Stelzer: Produktdaten Management-Systeme, Springer-Verlag, Berlin, 2001.

G. Hartmann: Product Lifecycle Management with SAP, Galileo press, 2007.

K. Obermann: CAD/CAM/PLM-Handbuch, 2004.

T 7.179 Course: Product, Process and Resource Integration in the Automotive Industry [T-MACH-102155]

Responsible: Prof. Dr.-Ing. Sama Mbang
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2021	2123364	Product, Process and Resource Integration in the Automotive Industry	2 SWS	Lecture / 🖥	Mbang

Legend: 🖥 Online, ⚗ Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
Oral examination 20 min.

Prerequisites
None

Annotation
Limited number of participants.

Below you will find excerpts from events related to this course:

V Product, Process and Resource Integration in the Automotive Industry
2123364, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

- Overview of product development in the automotive sector (process- and work cycle, IT-Systems)
- Integrated product models in the automotive industry (product, process and resource)
- New CAx modeling methods (intelligent feature technology, templates & functional modeling)
- Automation and knowledge-based mechanism for product design and production planning
- Product development in accordance with defined process and requirement (3D-master principle, tolerance models)
- Concurrent Engineering, shared working
- Enhanced concepts: the digital and virtual factory (application of virtual technologies and methods in the product development)

Organizational issues
Blockveranstaltung

Literature
Vorlesungsfolien

T   7.180 Course: Production Economics and Sustainability [T-WIWI-102820]

Responsible:	Prof. Dr. Frank Schultmann
	Dr.-Ing. Rebekka Volk
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2581960	Production Economics and Sustainability	2 SWS	Lecture / 📱	Volk, Schultmann
Exams					
WT 20/21	7981960	Production Economics and Sustainability			Schultmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔵 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. 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).

Below you will find excerpts from events related to this course:

V   Production Economics and Sustainability
2581960, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The analysis and management of material flows on the company level and above will be the focus of this lecture. Herein, the discussion will be about cost-effective and environmentally acceptable steps to avoid, abate and recycle emissions and waste as well as ways of efficient resources handling. As methods material flow analysis (MFA), life cycle assessment (LCA) and OR methods, e.g. for decision support, are introduced.

Topics:
- regulations related to materials and substances
- raw materials, reserves and their availabilities/lifetimes
- material and substance flow analysis (MFA/SFA)
- material related ecoprofiles, e.g. Carbon Footprint
- LCA
- resource efficiency
- emission abatement
- waste management and closed-loop recycling
- raw material oriented production systems
- environmental management (EMAS, ISO 14001, Ecoprofit), eco-controlling

Literature
wird in der Veranstaltung bekannt gegeben

## T 7.181 Course: Production Technology for E-Mobility [T-MACH-110984]

Responsible:	Prof. Dr.-Ing. Jürgen Fleischer
	Dr.-Ing. Janna Hofmann
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	1

Events					
ST 2021	2150605	Production Technology for E-Mobility	2 SWS	Lecture / 🖥	Fleischer, Hofmann
Exams					
ST 2021	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer, Hofmann

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 Production Technology for E-Mobility
2150605, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
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

Organizational issues
Die Lehrveranstaltung wird erstmalig im Sommersemester 2021 angeboten.

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   7.182 Course: Project in Applied Remote Sensing [T-BGU-101814]

Responsible: Prof. Dr.-Ing. Stefan Hinz
Dr.-Ing. Uwe Weidner

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Version
Completed coursework	1	pass/fail	1

T 7.183 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 20/21	2149700	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	2 SWS	Practical course / 🎤	Zanger, Lubkowitz

Exams			
WT 20/21	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 20/21, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **On-Site**

Content

The lecture "Project Internship Additive Manufacturing: Development and Production of an Additive Component" combines the basics of metallic laser powder bed fusion (LPBF) with a development project in cooperation with an industrial company.

The students learn the basics of the following topics in the project-related lecture:

- Influence of different process variables on the component quality of parts produced in the LPBF process
- Preparation and simulation of the LPBF process
- Production of additive metallic components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- CAM for subtractive rewor

The topics addressed in the course will be applied practically in various workshops on the individual topics and transferred to the developmental task in self-study.

Finally, the results of the elaborations are produced additively and post-processed subtractively.

Learning Outcomes:

The students ...

- are able to describe the properties and applications of the additive manufacturing processes laser powder bed fusion (LPBF) 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 | **7.184 Course: Project Management [T-BGU-101675]** |

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-101004 - Fundamentals of Construction

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 20/21	6200106	Projektmanagement	2 SWS	Lecture / Practice (/ 📱	Haghsheno, Schneider
Exams					
WT 20/21	8230101675	Project Management (graded)			Haghsheno, Schneider

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
written exam with 60 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T   7.185 Course: Public Law I & II [T-INFO-110300]

Responsible:	Dr. Johannes Eichenhofer
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101192 - Constitutional and Administrative Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
WT 20/21	24016	Öffentliches Recht I - Grundlagen	2 SWS	Lecture / 🖥	Eichenhofer
ST 2021	24520	Öffentliches Recht II - Öffentliches Wirtschaftsrecht	2 SWS	Lecture / 🖥	Eichenhofer
Exams					
WT 20/21	7500138	Public Law I & II			Eichenhofer
ST 2021	7500298	Public Law I & II			Eichenhofer

Legend: 🖥 Online, ⬖ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

T   7.186 Course: Public Media Law [T-INFO-101311]

Responsible:	Prof. Dr. Thomas Dreier
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 20/21	24082	Public Media Law	2 SWS	Lecture / 🖥	Eichenhofer
Exams					
WT 20/21	7500062	Public Media Law			Dreier, Eichenhofer, Matz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

T 7.187 Course: Public Revenues [T-WIWI-102739]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101403 - Public Finance
	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-101668 - Economic Policy I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2560120	Public Revenues	2 SWS	Lecture / 📱	Wigger
ST 2021	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice / 📱	Wigger
Exams					
WT 20/21	790oeff	Public Revenues			Wigger

Legend: 📱 Online, ⚃ Blended (On-Site/Online), ♣ On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development in the summer semester 2021 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 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

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 7.188 Course: Public Sector Finance [T-WIWI-109590]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101403 - Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 20/21	2560136		3 SWS	Lecture / 🗣	Wigger, Groh
Exams					
WT 20/21	790oefi	Public Sector Finance			Wigger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development in the summer semester 2021 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
T-WIWI-107763 "Municipal Finance" must not be selected.

Annotation
Previous title until winter semester 2018/19 "Municipal Finance".

Below you will find excerpts from events related to this course:

V 2560136, WS 20/21, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course *Municipal Finance* addresses the theory and policy of municipal revenues and spending including grants, municipal revenue equalisation, taxation as well as municipal and public enterprises.

At the beginning of the course, fundamental concepts of taxation theory as well as key elements of the German taxation system are introduced. The allocative and distributive effects of different taxation methods are examined thereafter and are combined within the theory of optimal taxation. The following chapter is concerned with municipal borrowing and illustrates ways to acquire additional funding. After addressing the extent, structure and variety of municipal borrowing, macroeconomic theories are introduced and applied to the municipal sector. In the course of this final chapter, special attention will be paid to the long term consequences and the sustainability of municipal borrowing as a means of budgeting.

Learning goals:
The students:

- are familiar with the theory and policy of municipal revenues and spending.
- are able to evaluate the allocative and distributive effects of different kinds of municipal revenues and spending.
- understand the extent, structure and variety of municipal budgeting and are able to assess long term consequences of municipal revenues and spending.

Workload:
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Ade, K., Notheis, K. & Schmid, H. (2011). *Kommunales Wirtschaftsrecht in Baden Württemberg*. Boorberg-Verlag.
- Aker, B., Hafner, W. & Notheis, K. (2012). *Gemeindeordnung Baden-Württemberg*(Kommentar). Boorberg-Verlag.
- Groh, M. (1994).Kommunalleasing und Investorenfinanzierung als Private Public Partnership.*Stadt und Gemeinde*, 49. Jahrgang, 09/94.
- Wigger, B. U. (2006).*Grundzüge der Finanzwissenschaft*. Springer-Verlag.
- Diverse Veröffentlichungen des Innenministeriums und Finanzministeriums Baden-Württemberg.

T   7.189 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

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 20/21	2149667	Quality Management	2 SWS	Lecture / 🖥	Lanza
Exams					
WT 20/21	76-T-MACH-102107	Quality Management			Lanza
ST 2021	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 20/21, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Online**

Content

Based on the quality philosophies Total Quality Management (TQM) and Six-Sigma, the lecture will specifically address the needs of a modern quality management. The process orientation in a modern company and the process-specific fields of quality assurance are presented in detail. Preventive as well as non-preventive quality management methods, which are state of the art in operational practice today, are content of the lecture. The use of suitable measurement techniques in production engineering (production measurement technology) as well as their potential levels of integration in the production system are discussed. The use of suitable statistical methods for data analysis and their modern extension by methods of artificial intelligence are be discussed. The contents are complemented by legal aspects in the field of quality management.

Main topics of the lecture:

- The term "Quality"
- Total Quality Management (TQM)
- Six-Sigma and universal methods and tools within the DMAIC cycle
- QM in early product stages – Determination and realization of customer requirements
- QM in product development
- Production measurement technology
- QM in production - statistical methods
- Artificial intelligence and machine learning in quality management
- Operating behaviour and reliability
- Legal aspects in QM

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues

Vorlesungstermine montags 9:45 Uhr
Übung erfolgt während der Vorlesung

Literature
Medien:
Die Vorlesungsfolien inkl. Notizen zur Veranstaltung werden über ILIAS (https://ilias.studium.kit.edu/) bereitgestellt:

Media:
Lecture slides and notes will be provided in ILIAS (https://ilias.studium.kit.edu/).

T   7.190 Course: Real Estate Management I [T-WIWI-102744]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101466 - Real Estate Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2586400	Real Estate Management I	2 SWS	Lecture / 📱	Lützkendorf, Worschech
WT 20/21	2586401	Übungen zu Real Estate Management I	2 SWS	Practice / 📱	Worschech
Exams					
WT 20/21	7900249	Real Estate Management I			Lützkendorf
WT 20/21	7900316	Real Estate Management I			Lützkendorf

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 two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Annotation
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

Below you will find excerpts from events related to this course:

V	**Real Estate Management I** 2586400, WS 20/21, 2 SWS, Language: German, Open in study portal	Lecture (V) Online

Content

The course Real Estate Management I deals with questions concerning the economy of a single building througout its lifecycle. Among other topics this includes project development, location and market studies, german federal building codes as well as finance and assessment of economic efficiency.

The tutorial recesses the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

The course Real Estate Management I deals with questions concerning the economy of a single building througout its lifecycle. Among other topics this includes project development, location and market studies, german federal building codes as well as finance and assessment of economic efficiency.

The tutorial recesses the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

Recommendations:

A combination with the module *Design Construction and Assessment of Green Buildings I* [WW3BWLOOW1] is recommended.

Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

The **total workload** for this course is approximately 135.0 hours. For further information see German version.

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Gondring (Hrsg.): "Immobilienwirtschaft: Handbuch für Studium und Praxis". ISBN 3-8006-2989-5. Vahlen 2004
- Kühne-Büning (Hrsg.): "Grundlagen der Wohnungs- und Immobilienwirtschaft". ISBN 3-8314-0706-1. Knapp & Hammonia-Verlag 2005
- Schulte (Hrsg.): "Immobilienökonomie Bd. I". ISBN 3-486-25430-8. Oldenbourg 2000

T 7.191 Course: Real Estate Management II [T-WIWI-102745]

Responsible:	Prof. Dr.-Ing. Thomas Lützkendorf
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101466 - Real Estate Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2021	2585400	Real Estate Management II	2 SWS	Lecture / ▯	Lützkendorf, Worschech
ST 2021	2585401	Übung zu Real Estate Management II	2 SWS	Practice / ▯	Worschech

Legend: ▯ Online, ⚇ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the exam will be offered in the summer semester 2021 either as a 60-minute upload exam (Open Book Exam @ Home), or as a 60-minute exam (written exam according to SPO § 4 Abs. 2, Pkt. 1).

Prerequisites
None

Recommendation
A combination with the module*Design Construction and Assessment of Green Buildings I*is recommended.

Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

Annotation
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

Below you will find excerpts from events related to this course:

V **Real Estate Management II**	Lecture (V)
2585400, SS 2021, 2 SWS, Language: German, Open in study portal	**Online**

Content

The course Real Estate Management II gives special attention to topics in connection to the management of large real estate portfolios. This especially includes property valuation, market and object rating, maintenance and modernization, as well as real estate portfolio and risk management. The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems.

The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

The student

- has an in-depth knowledge on the economic classification and significance of the real estate industry
- has a critical understanding of essential theories, methods and instruments of the real estate industry
- is able to analyze and evaluate activity areas and functions in real estate companies as well as to prepare or to take decisions

Recommendations:

A combination with the module *Design Construction and Assessment of Green Buildings I* [WW3BWLOOW1] is recommended.

Furthermore it is recommed to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

The total workload for this course is approximately 135.0 hours. For further information see German version.

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Reexaminations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Gondring (Hrsg.): "Immobilienwirtschaft: Handbuch für Studium und Praxis". ISBN 3-8006-2989-5. Vahlen 2004
- Kühne-Büning (Hrsg.): "Grundlagen der Wohnungs- und Immobilienwirtschaft". ISBN 3-8314-0706-1. Knapp & Hammonia-Verlag 2005
- Schulte (Hrsg.): "Immobilienökonomie Bd. I". ISBN 3-486-25430-8. Oldenbourg 2000

T 7.192 Course: Remote Sensing, Exam [T-BGU-101636]

Responsible:	Prof. Dr.-Ing. Stefan Hinz
	Dr.-Ing. Uwe Weidner
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2021	6020241	Fernerkundungssysteme	1 SWS	Lecture /	Hinz
ST 2021	6020242	Systems of Remote Sensing, Excercise	1 SWS	Practice /	Weidner
ST 2021	6020243	Procedures of Remote Sensing	2 SWS	Lecture /	Weidner
ST 2021	6020244	Procedures of Remote Sensing, Excercise	1 SWS	Practice /	Weidner
Exams					
ST 2021	8284101636	Remote Sensing, exam			Weidner, Hinz

Legend: ▯ Online, ⬡ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

Recommendation
None

T   7.193 Course: Renewable Energy-Resources, Technologies and Economics [T-WIWI-100806]

Responsible:	PD Dr. Patrick Jochem
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101464 - Energy Economics

Type Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 4

Events					
WT 20/21	2581012	Renewable Energy – Resources, Technologies and Economics	2 SWS	Lecture / 📱	Jochem
Exams					
WT 20/21	7981012	Renewable Energy-Resources, Technologies and Economics			Fichtner

Legend: 📱 Online, ✧ Blended (On-Site/Online), ✦ On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes, in English, answers are possible in German or English) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites

None.

Below you will find excerpts from events related to this course:

V   Renewable Energy – Resources, Technologies and Economics
2581012, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content

1. General introduction: Motivation, Global situation

2. Basics of renewable energies: Energy balance of the earth, potential definition

3. Hydro

4. Wind

5. Solar

6. Biomass

7. Geothermal

8. Other renewable energies

9. Promotion of renewable energies

10. Interactions in systemic context

11. Excursion to the "Energieberg" in Mühlburg

Learning Goals:

The student

- understands the motivation and the global context of renewable energy resources.
- gains detailed knowledge about the different renewable resources and technologies as well as their potentials.
- understands the systemic context and interactions resulting from the increased share of renewable power generation.
- understands the important economic aspects of renewable energies, including electricity generation costs, political promotion and marketing of renewable electricity.
- is able to characterize and where required calculate these technologies.

Organizational issues

siehe Institutsaushang

Literature
Weiterführende Literatur:

- Kaltschmitt, M., 2006, Erneuerbare Energien : Systemtechnik, Wirtschaftlichkeit, Umweltaspekte, aktualisierte, korrigierte und ergänzte Auflage Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg.
- Kaltschmitt, M., Streicher, W., Wiese, A. (eds.), 2007, Renewable Energy: Technology, Economics and Environment, Springer, Heidelberg.
- Quaschning, V., 2010, Erneuerbare Energien und Klimaschutz : Hintergründe - Techniken - Anlagenplanung – Wirtschaftlichkeit München : Hanser, Ill.2., aktualis. Aufl.
- Harvey, D., 2010, Energy and the New Reality 2: Carbon-Free Energy Supply, Eathscan, London/Washington.
- Boyle, G. (ed.), 2004, Renewable Energy: Power for a Sustainable Future, 2nd Edition, Open University Press, Oxford.

| T | **7.194 Course: Selected Legal Isues of Internet Law [T-INFO-108462]** |

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2021	24821	Selected legal issues of Internet law	2 SWS	Colloquium (K / 🖥	Dreier
Exams					
ST 2021	7500226	Selected legal issues of Internet law			Dreier

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T 7.195 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-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Competence Certificate
Oral examination

Prerequisites

T   7.196 Course: Seminar Data-Mining in Production [T-MACH-108737]

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

Part of: M-WIWI-101816 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 20/21	2151643	Seminar Data Mining in Production	2 SWS	Seminar / ✿	Lanza
ST 2021	2151643	Seminar Data Mining in Production	2 SWS	Seminar / ▯	Lanza
Exams					
WT 20/21	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza
ST 2021	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 20/21, 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 2021, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **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 7.197 Course: Seminar in Business Administration (Bachelor) [T-WIWI-103486]

Responsible:	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 20/21	2500019	Digital Citizen Science	2 SWS	Seminar / 🖥	Weinhardt, Volkamer, Mayer
WT 20/21	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / ⚙	Mädche
WT 20/21	2530374	Machine Learning for Business Applications	2 SWS	Seminar / 🖥	Ulrich
WT 20/21	2530580	Seminar in Finance	2 SWS	Seminar	Uhrig-Homburg
WT 20/21	2530610	Seminar in Financial Economics	2 SWS	Seminar / 🖥	Thimme
WT 20/21	2540473	Data Science in Service Management	2 SWS	Seminar / 🖥	Haubner, Dann, Badewitz, Stoeckel
WT 20/21	2540475	Electronic Markets & User behavior	2 SWS	Seminar / 🖥	Knierim
WT 20/21	2540477	Digital Experience and Participation	2 SWS	Seminar / 🖥	Straub, Peukert, Hoffmann, Pusmaz, Willrich, Kloepper, Fegert, Greif-Winzrieth
WT 20/21	2540478	Smart Grids and Energy Markets	2 SWS	Seminar / 🖥	Staudt, Richter, Huber, vom Scheidt, Golla, Schmidt, Henni, Meinke
WT 20/21	2540524	Bachelor Seminar aus Data Science	2 SWS	Seminar	Geyer-Schulz, Schweizer, Nazemi
WT 20/21	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar	Mädche
WT 20/21	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar / 🖥	Terzidis, Tittel
WT 20/21	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar / 🖥	Böhrer, Terzidis
WT 20/21	2573010	Seminar: Human Resources and Organizations (Bachelor)	2 SWS	Seminar / 🖥	Nieken, Mitarbeiter
WT 20/21	2573011	Seminar: Human Resource Management (Bachelor)	2 SWS	Seminar / 🖥	Nieken, Mitarbeiter
WT 20/21	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar / 🍃	Riar, Wouters, Ebinger
WT 20/21	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar / 🖥	Glöser-Chahoud, Schultmann
WT 20/21	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar / 🖥	Volk, Schultmann
WT 20/21	2581978	Seminar in Production and Operations Management III	2 SWS	Seminar / 🖥	Wiens, Schultmann
WT 20/21	2581980		2 SWS	Seminar / 🖥	Yilmaz, Fraunholz, Dehler-Holland, Kraft
WT 20/21	2581981		2 SWS	Seminar / 🖥	Ardone, Sandmeier, Scharnhorst
WT 20/21	2581990		2 SWS	Seminar	Schumacher, Schultmann

ST 2021	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / ⚙	Mädche
ST 2021	2530293	Seminar in Finance (Bachelor, Prof. Ruckes)	2 SWS	Seminar / ▯	Ruckes, Luedecke, Hoang, Benz, Wiegratz, Strych, Silbereis
ST 2021	2530374	Machine Learning for Business Applications	2 SWS	Seminar / ▯	Ulrich
ST 2021	2530610	Seminar Financial Economics		Seminar / ▯	Thimme
ST 2021	2540473	Business Data Analytics	2 SWS	Seminar / ▯	Dann, Stoeckel, Grote, Badewitz
ST 2021	2540477	Digital Experience & Participation	2 SWS	Seminar / ▯	Peukert, Greif-Winzrieth
ST 2021	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar / ▯	Staudt, Huber, Richter, vom Scheidt, Golla, Henni, Schmidt, Meinke, Qu
ST 2021	2540524	Bachelor Seminar in Data Science and Machine Learning	2 SWS	Seminar / ▯	Geyer-Schulz, Schweigert, Schweizer
ST 2021	2540557	Information Systems and Service Design Seminar	3 SWS	Seminar / ▯	Mädche
ST 2021	2540588	Economic Psychology in Action	2 SWS	Seminar / ▯	Liu
ST 2021	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar / ▯	Eckerle, Terzidis, Hirte
ST 2021	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar / ▯	Böhrer, Terzidis
ST 2021	2571180	Seminar in Marketing und Vertrieb (Master)	2 SWS	Seminar / ▯	Klarmann, Mitarbeiter
ST 2021	2573010	Seminar Human Resources and Organizations (Bachelor)	2 SWS	Seminar / ▯	Nieken, Mitarbeiter
ST 2021	2573011	Seminar Human Resource Management (Bachelor)	2 SWS	Seminar / ▯	Nieken, Mitarbeiter
ST 2021	2579909	Seminar Management Accounting	2 SWS	Seminar / ▯	Wouters, Hammann, Disch
ST 2021	2579919	Seminar in Management Accounting - Special Topics	2 SWS	Seminar / ▯	Ebinger
ST 2021	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar / ▯	Plötz
ST 2021	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar / ▯	Volk, Schultmann
ST 2021	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar / ▯	Fichtner
ST 2021	2581990		2 SWS	Seminar / ▯	Schultmann
Exams					
WT 20/21	00042	Seminar Business Data Analytics			Weinhardt
WT 20/21	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 20/21	7900085	Entrepreneurship Basics (Track 1)			Terzidis
WT 20/21	7900087	Entrepreneurship Basics (Track 2)			Terzidis
WT 20/21	7900125	Current Topics in Digital Transformation Seminar			Mädche
WT 20/21	7900157	Seminar Human Resources and Organizations (Bachelor)			Nieken
WT 20/21	7900161	Seminar Human Resource Management (Bachelor)			Nieken
WT 20/21	7900165	Seminar Digital Experience and Participation			Weinhardt
WT 20/21	7900175	Seminar in Finance (Bachelor)			Uhrig-Homburg
WT 20/21	7900203	Seminar in Finance			Uhrig-Homburg
WT 20/21	7900220	Machine Learning for Business Applications			Ulrich
WT 20/21	7900233	Information Systems and Service Design Seminar			Mädche
WT 20/21	7900279	Seminar Financial Economics (Bachelor)			Thimme
WT 20/21	7900327	Electronic Markets & User behavior (Seminar)			Weinhardt
WT 20/21	7900330	Seminar Digital Citizen Science			Weinhardt
WT 20/21	79-2579919-B	Seminar Management Accounting - Special Topics (Bachelor)			Wouters

WT 20/21	7981976	Seminar in Production and Operations Management I	Schultmann
WT 20/21	7981977	Seminar in Production and Operations Management II	Schultmann
WT 20/21	7981978	Seminar in Production and Operations Management III	Schultmann
WT 20/21	7981979	Seminar in Business Administration A (Master)	Fichtner
WT 20/21	7981980	Seminar in Business Administration A (Master)	Fichtner
WT 20/21	7981981	Seminar in Business Administration (Bachelor)	Fichtner
ST 2021	00004	Seminar Financial Economics	Thimme
ST 2021	7900036	Collaborative Development of Conversational Agents	Mädche
ST 2021	7900056	Entrepreneurship Basics (Track 1)	Terzidis
ST 2021	7900057	Entrepreneurship Basics (Track 2)	Terzidis
ST 2021	7900093	Seminar in Business Administration A	Weinhardt
ST 2021	7900100	Seminar Human Resource Management (Bachelor)	Nieken
ST 2021	7900190	Current Topics in Digital Transformation Seminar	Mädche
ST 2021	7900261	Information Systems and Design (ISSD) Seminar	Mädche
ST 2021	7900265	Interactive Analytics Seminar	Mädche
ST 2021	79-2579909-B	Seminar Management Accounting (Bachelor)	Wouters
ST 2021	79-2579919-B	Seminar Management Accounting - Special Topics (Bachelor)	Wouters
ST 2021	79-2579929-B	Seminar Management Accounting - Entrepreneurship Topics (Bachelor)	Wouters
ST 2021	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2021	7981977	Seminar in Production and Operations Management II	Schultmann
ST 2021	7981978	Seminar in Production and Operations Management III	Schultmann
ST 2021	7981979	Seminar Energy Economics I	Fichtner
ST 2021	7981980	Seminar Energy Economics II	Fichtner
ST 2021	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 20/21, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **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	**Machine Learning for Business Applications** 2530374, WS 20/21, 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 various business applications.

Organizational issues

Blockseminar tba

V	**Data Science in Service Management** 2540473, WS 20/21, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Online**

Content

wird auf deutsch und englisch gehalten

Organizational issues

Blockveranstaltung, siehe WWW

V	**Bachelor Seminar aus Data Science** 2540524, WS 20/21, 2 SWS, Language: German, Open in study portal	**Seminar (S)**

Literature
Weiterführende Literatur:

- W. Thomson. A Guide for the Young Economist. The MIT Press, 2001
- D.J. Brauner, H.-U. Vollmer. Erfolgreiches wissenschaftliches Arbeiten. Verlag Wissenschaft & Praxis, 2004
- University of Chicago Press. The Chicago Manual of Style. University of Chicago Press, 13th ed., 1982
- American Psychological Association. Concise of Rules of APA Style. American Psychological Association, 2005
- American Psychological Association. Publication Manual of the American Psychological Association. American Psychological Association, 2001

V	**Entrepreneurship Basics (Track 1)** 2545010, WS 20/21, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Online**

Content

The seminar introduces students to basic concepts of business planning for entrepreneurs. This involves concepts for the concretization of business ideas (development of business models), market potential estimation, resource planning, etc.) as well as the creation of an executable business plan (with or without VC financing).

The primary focus of the seminar is on working with the Business Model Canvas and developing a value proposition.

Learning objectives:

After attending, students have learned how to use a structured process to take the first steps in starting a business to identify and minimize their most important risks. In particular, they have practical experience in identifying and validating 1) relevant customer issues, 2) designing and testing solutions to these problems, 3) targeting and assessing their accessibility, and 4) their willingness to pay. In doing so, they have learned to know and apply the business model canvas, methods for developing value propositions, rapid prototyping and target group interviews. In addition, they have learned to work efficiently in a team through the use of communication strategies.

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

V	**Entrepreneurship Basics (Track 2)** 2545011, WS 20/21, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Online**

Content

):

The seminar introduces students to basic concepts of business planning for entrepreneurs. This involves concepts for the concretization of business ideas (development of business models), market potential estimation, resource planning, etc.) as well as the creation of an executable business plan (with or without VC financing).

The primary focus of the seminar is on working with the Business Model Canvas and developing a value proposition.

Learning objectives:

After attending, students have learned how to use a structured process to take the first steps in starting a business to identify and minimize their most important risks. In particular, they have practical experience in identifying and validating 1) relevant customer issues, 2) designing and testing solutions to these problems, 3) targeting and assessing their accessibility, and 4) their willingness to pay. In doing so, they have learned to know and apply the business model canvas, methods for developing value propositions, rapid prototyping and target group interviews. In addition, they have learned to work efficiently in a team through the use of communication strategies.

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

V	**Seminar: Human Resources and Organizations (Bachelor)** 2573010, WS 20/21, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Online**

Content

The topics are redefined each semester on basis of current research topics.The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V	**Seminar: Human Resource Management (Bachelor)**	**Seminar (S)**
	2573011, WS 20/21, 2 SWS, Language: German, Open in study portal	**Online**

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.

V	**Seminar Management Accounting - Special Topics**	**Seminar (S)**
	2579919, WS 20/21, 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.

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.

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	**Machine Learning for Business Applications** 2530374, SS 2021, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

The digitalization is not only changing today's society but also companies' business models, in particular of the financial industry. In general, the large variety of digitalized processes and connected devices (Industry 4.0) generates a huge amount of data which can be used to extract valuable (investment) insights. For this task data science skills are essential.

In this seminar we will use modern data science techniques to analyze all kinds of financial and economic data, ranging from big data intra-day option prices to alternative datasets, like textual statements. For this empirical analysis we will use the state of the art Python programming language.

In a bi-weekly schedule you and your supervisor will first learn and discuss important data science concepts and then apply it in a practical FinTech-type analysis using real-world data. As a prerequisite students should already have basic finance knowledge.

Organizational issues

Blockseminar tba

V	**Information Systems and Service Design Seminar** 2540557, SS 2021, 3 SWS, Language: English, Open in study portal	**Seminar (S)** **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** | **Economic Psychology in Action**
2540588, SS 2021, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
Online |

Content
Description

This blocked event contains 3 stages.

In Stage 1, students meet online for one day and experience recent economic psychology research as participants. The research topics will mainly consist of novel economic games with certain level of strategic depth (i.e., we will not play simple games like rock paper scissors, nor we will play games that many people are familiar with like the prisoner's dilemma).

In Stage 2, students will receive the data from the games they played in Stage 1 along with a few journal articles assigned by the instructor on related topics. Based on reading, they choose one of the datasets from Stage 1 to write up a short report.

In Stage 3, students will try to design and conduct a study on a related topic themselves based on what they have learned in the previous stages. They will collect their own data and write a research report. The nature of this project is to be determined together by the students and instructor. It would either be ideas generated by the students themselves, or something assigned by the instructor.

English will be the language used in all discussions, course materials, and assessments.

Competence Certificate

The assessment is based on the short report in Stage 2 and the research report in Stage 3.

Workload

Students are expected to spend a total of 90 hours (30 hours per ECTS), including meeting and assignments, on this seminar.

Organizational issues
Blockveranstaltung, Temrine werden bekanntgegeben

| V | **Seminar Human Resources and Organizations (Bachelor)**
2573010, SS 2021, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
Online |

Content

The topics are redefined each semester on basis of current research topics.The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues

Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

| V | **Seminar Human Resource Management (Bachelor)**
2573011, SS 2021, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
Online |

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues

Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

| V | **Seminar Management Accounting**
2579909, SS 2021, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
Online |

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 2021, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
Online |

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   7.198 Course: Seminar in Economics (Bachelor) [T-WIWI-103487]

Responsible:	Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101816 - Seminar Module

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Events					
WT 20/21	2521310	Topics in Econometrics	2 SWS	Seminar / 💻	Schienle, Chen, Görgen, Krüger, Buse
WT 20/21	2560140	Topics in Political Economy (Bachelor)	2 SWS	Seminar / 💻	Szech, Huber
WT 20/21	2560141	Morals & Social Behavior (Bachelor)	2 SWS	Seminar / 💻	Szech, Zhao
WT 20/21	2560142	Topics in Political Economy (Master)	2 SWS	Seminar / 💻	Szech, Huber
WT 20/21	2561208	Selected aspects of European transport planning and -modelling	1 SWS	Seminar / 💻	Szimba
WT 20/21	2561281	Wirtschaftspolitisches Seminar	2 SWS	Seminar / 💻	Ott
ST 2021	2560233	Seminar zur Luftverkehrspolitik		Seminar / 💻	Mitusch, Wisotzky
ST 2021	2560553	Overcoming the Corona Crisis, Seminar Morals and Social Behavior (Bachelor)	2 SWS	Seminar / 💻	Szech, Zhao
ST 2021	2560554	Markets for Attention and the Digital Economy Seminar on Topics in Political Economy (Master)	2 SWS	Seminar / 💻	Szech, Huber
Exams					
WT 20/21	7900124	Seminar Digital Markets (Bachelor)			Szech
WT 20/21	7900139	Seminar in Economics (Bachelor/Master)			Mitusch
WT 20/21	7900212	Seminar in Macroeconomics			Brumm
WT 20/21	7900254	Topics in Econometrics. Seminar in Economics			Schienle
WT 20/21	7900256	Data Mining. Seminar in Economics (Bachelor)			Nakhaeizadeh
WT 20/21	7900259	Time and Risk Preferences: Theory and Empirics			Puppe
WT 20/21	7900289	Seminar in Economics (Bachelor): Corona			Szech
WT 20/21	7900297	Topics in Experimental Economics			Reiß
WT 20/21	79sefi1	Seminar in Economics (Bachelor)			Wigger
ST 2021	7900040	Seminar in Macroeconomics I			Brumm
ST 2021	7900060	Markets for Attention and the Digital Economy (Bachelor)			Szech
ST 2021	7900130	Overcoming the Corona Crisis (Bachelor)			Szech
ST 2021	7900220	Seminar in Macroeconomics II			Brumm
ST 2021	7900248	Social Preferences in Behavioral Economics			Szech
ST 2021	79sefi1	Seminar Death, Mistake & Fraud in Science (Bachelor)			Wigger

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 20/21, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Online**

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V	**Topics in Political Economy (Bachelor)** 2560140, WS 20/21, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **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

Seminar Papers of 8–10 pages are to be handed in.

For bachelor students, grades will be based on the quality of presentation slides (25%) and the seminar paper (50%). Additionally each student will have to hand in one individual abstract of 75-100 words. The quality of abstracts will reflect with 25% in the final grade.

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	**Morals & Social Behavior (Bachelor)** 2560141, WS 20/21, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content
For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

For bachelor students, grades will be based on the quality of presentation slides (25%) and the seminar paper (50%). Additionally each student will have to hand in one individual abstract of 75-100 words. The quality of abstracts will reflect with 25% in the final grade.

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	**Topics in Political Economy (Master)** 2560142, WS 20/21, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

For Master students, grades will be based on the quality of presentation slides (25%) and the seminar paper (50%). Additionally each student will have to hand in two individual abstracts – one with 75-100 words and one with 150-200 words. The quality of abstracts will reflect with 25% in the final grade.

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, Seminar Morals and Social Behavior (Bachelor)** 2560553, SS 2021, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

Participation will be limited to 12 students.

Organizational issues

Blockveranstaltung

V	**Markets for Attention and the Digital Economy Seminar on Topics in Political Economy (Master)** 2560554, SS 2021, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Content

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

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

T   7.199 Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

Responsible:	Fachvertreter ingenieurwissenschaftlicher Fakultäten
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101816 - Seminar Module

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Events					
WT 20/21	2119100	Fördertechnik und Logistiksysteme		Seminar / ✺	Furmans, Pagani
ST 2021	2119100	Fördertechnik und Logistiksysteme		Seminar / ✺	Furmans, Pagani
Exams					
WT 20/21	76-T-MACH-102135	Conveying Technology and Logistics			Furmans
WT 20/21	8245100014	Seminar in Transportation			Vortisch, Chlond
ST 2021	76-T-MACH-102135	Conveying Technology and Logistics			Furmans
ST 2021	76-T-MACH-2115009	Seminar for Rail System Technology			Gratzfeld

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   Fördertechnik und Logistiksysteme
2119100, SS 2021, SWS, 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. The students can work on the topic either alone or in a group work. At the end the results are presented and discussed with a final presentation. The 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 7.200 Course: Seminar in Informatics (Bachelor) [T-WIWI-103485]

**Responsible:** Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 20/21	2513200	Seminar Programming 3 (Bachelor)	2 SWS	Seminar / 🖥	Oberweis, Zöllner, Frister, Fritsch, Struppek, Forell
WT 20/21	2513214	Seminar Information security and data protection (Bachelor)	2 SWS	Seminar / 🖥	Oberweis, Volkamer, Raabe, Alpers, Düzgün, Schiefer, Wagner
WT 20/21	2513312	Seminar Linked Data and the Semantic Web (Bachelor)	2 SWS	Seminar / 🖥	Färber, Käfer, Heling, Bartscherer
WT 20/21	2513313	Seminar Linked Data and the Semantic Web (Master)	2 SWS	Seminar / 🖥	Färber, Käfer, Heling, Bartscherer
WT 20/21	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	Seminar / 🖥	Nickel, Weinhardt, Färber, Zehnder, Brandt
WT 20/21	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	Seminar / 🖥	Nickel, Weinhardt, Färber, Zehnder, Brandt
WT 20/21	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar / 🖥	Zöllner
WT 20/21	2513550	Seminar Security, Usability and Society (Bachelor)	2 SWS	Seminar / 🖥	Volkamer, Aldag, Düzgün, Mayer, Mossano, Berens
ST 2021	2513308	Seminar Knowledge Discovery and Data Mining (Bachelor)	3 SWS	Seminar / 🖥	Färber, Nguyen, Noullet, Saier, Bartscherer
ST 2021	2513310	Seminar Data Science & Real-time Big Data Analytics (Bachelor)	2 SWS	Seminar / 🖥	Färber, Riemer, Heyden , Käfer
ST 2021	2513402	Seminar Emerging Trends in Internet Technologies (Bachelor)	2 SWS	Seminar / 🖥	Sunyaev, Thiebes, Lins
ST 2021	2513404	Seminar Emerging Trends in Digital Health (Bachelor)	2 SWS	Seminar / 🖥	Lins, Sunyaev, Thiebes
ST 2021	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar / 🖥	Zöllner
Exams					
WT 20/21	7900002	Seminar Data Science & Real-time Big Data Analytics (Bachelor)			Sure-Vetter
WT 20/21	7900038	Seminar Linked Data and the Semantic Web (Bachelor)			Sure-Vetter
WT 20/21	7900042	Seminar Programming 3 (Bachelor)			Oberweis
WT 20/21	7900121	Seminar Information Security and Privacy (Bachelor)			Volkamer
WT 20/21	7900129	Seminar Security and Privacy Awareness			Volkamer
WT 20/21	7900185	Seminar Security, Usability and Society (Bachelor)			Volkamer
WT 20/21	7900187	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)			Sure-Vetter
ST 2021	7900090	Seminar Data Science & Real-time Big Data Analytics (Bachelor)			Sure-Vetter
ST 2021	7900094	Seminar Knowledge Discovery and Data Mining (Bachelor)			Sure-Vetter
ST 2021	7900136	Seminar Emerging Trends in Digital Health (Bachelor)			Sunyaev
ST 2021	7900187	Seminar Emerging Trends in Internet Technologies (Bachelor)			Sunyaev

ST 2021	7900265	Interactive Analytics Seminar	Mädche

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation

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	**Seminar Programming 3 (Bachelor)** 2513200, WS 20/21, 2 SWS, Open in study portal	**Seminar (S) Online**

Content

Registration information and the content of the seminar will be announced on the course page. Only bachelor students are allowed to attend this seminar.

V	**Seminar Linked Data and the Semantic Web (Bachelor)** 2513312, WS 20/21, 2 SWS, Language: German/English, Open in study portal	**Seminar (S) Online**

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this 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 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 Linked Data and the Semantic Web (Master)**
2513313, WS 20/21, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)**
Online |

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this 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 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 20/21, 3 SWS, Language: German/English, Open in study portal | **Seminar (S)**
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 20/21, 3 SWS, Language: German/English, Open in study portal | **Seminar (S)**
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)**
2513500, WS 20/21, 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 Knowledge Discovery and Data Mining (Bachelor)** 2513308, SS 2021, 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

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 (Bachelor)** 2513310, SS 2021, 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 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 2021, 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 7.201 Course: Seminar in Mathematics (Bachelor) [T-MATH-102265]

Responsible:	Dr. Martin Folkers
	Prof. Dr. Günter Last
Organisation:	KIT Department of Mathematics
Part of:	M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	1

T   7.202 Course: Seminar in Operations Research (Bachelor) [T-WIWI-103488]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 20/21	2550131	Seminar on Methodical Foundations of Operations Research	2 SWS	Seminar / 📱	Stein, Neumann
WT 20/21	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar	Stein, Neumann
WT 20/21	2550472	Seminar on Power Systems Optimization (Bachelor)	2 SWS	Seminar / 📱	Rebennack, Warwicker
WT 20/21	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 📱	Nickel, Mitarbeiter
ST 2021	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar / 📱	Stein, Beck, Neumann, Schwarze
ST 2021	2550472	Seminar on Power Systems Optimization (Bachelor)	2 SWS	Seminar / 📱	Rebennack, Warwicker, Sinske
ST 2021	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 📱	Nickel, Mitarbeiter
Exams					
WT 20/21	7900011_WS2021	Seminar in Operations Research B (Bachelor)			Stein
WT 20/21	7900012_WS2021	Seminar in Operations Research A (Master)			Stein
WT 20/21	7900108	Seminar: Modern OR and Innovative Logistics			Nickel
WT 20/21	7900282	Digitization in the Steel Industry			Nickel
WT 20/21	7900313	Seminar in Operations Research (Bachelor)			Rebennack

Legend: 📱 Online, ⌘ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

| V | **Seminar on Methodical Foundations of Operations Research**
2550131, WS 20/21, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
Online |

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.

Organizational issues
Blockveranstaltung, Termin n. V.

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 20/21, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
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 2021, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
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 7.203 Course: Seminar in Statistics (Bachelor) [T-WIWI-103489]

Responsible:	Prof. Dr. Oliver Grothe
	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 20/21	2521310	Topics in Econometrics	2 SWS	Seminar / 🖥	Schienle, Chen, Görgen, Krüger, Buse
Exams					
WT 20/21	7900256	Data Mining. Seminar in Economics (Bachelor)			Nakhaeizadeh

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 20/21, 2 SWS, Language: German, Open in study portal	**Online**

Organizational issues

Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

T   7.204 Course: Seminar Production Technology [T-MACH-109062]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
                     Prof. Dr.-Ing. Gisela Lanza
                     Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2021	2149665	Seminar Production Technology	1 SWS	Seminar / 📱	Fleischer, Lanza, Schulze, Zanger
Exams					
WT 20/21	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze
ST 2021	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, SS 2021, 1 SWS, Language: German, Open in study portal	Seminar (S) 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 7.205 Course: Seminar: Legal Studies I [T-INFO-101997]

Responsible:	Prof. Dr. Thomas Dreier
Organisation:	KIT Department of Informatics
Part of:	M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 20/21	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / 🖥	Reussner, Raabe, Müller-Quade
WT 20/21	2400133	Hate speech & Fake news – Das öffentliche Recht in der „postrationalen Konstellation"?	2 SWS	Seminar / 🖥	Eichenhofer
WT 20/21	2400240	Grundfragen Ethik und IT	2 SWS	Seminar / 🖥	Dreier
WT 20/21	24389	IT-Sicherheit und Recht	2 SWS	Seminar / 🖥	Schallbruch
WT 20/21	2513214	Seminar Information security and data protection (Bachelor)	2 SWS	Seminar / 🖥	Oberweis, Volkamer, Raabe, Alpers, Düzgün, Schiefer, Wagner
ST 2021	2400041	Governance, Risk & Compliance	2 SWS	Seminar / 🖥	Herzig
ST 2021	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar / 🖥	Bless, Boehm, Hartenstein, Mädche, Sunyaev, Zitterbart, Volkamer
ST 2021	2400065	"Die Corona-Krise aus der Sicht des Verfassungsrechts"	2 SWS	Seminar / 🖥	Eichenhofer
ST 2021	2400082	"Verfassungsrechtliche Fragen staatlicher Öffentlichkeitsarbeit"	2 SWS	Seminar / 🖥	Eichenhofer
ST 2021	2400127	Aktuelle Probleme des Datenschutzrechts		Seminar / 🖥	Eichenhofer
ST 2021	2400153	Technische Aspekte der DSGVO und deren Umsetzung in der Praxis	2 SWS	Seminar / 🖥	Boehm, Dimitrova
ST 2021	24820	Current Issues in Patent Law	2 SWS	Seminar / 🖥	Melullis
Exams					
WT 20/21	7500035	Seminar: Legal Studies II			Eichenhofer
WT 20/21	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe
WT 20/21	7500232	Seminar Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection			Reussner
ST 2021	7500140	Seminar: Legal Studies I			Dreier, Boehm, Melullis, Matz
ST 2021	7500159	Seminar: Legal Studies I			Eichenhofer

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 2021, 2 SWS, Open in study portal

**Seminar (S)
Online**

Content

- Registration via https://portal.wiwi.kit.edu/ys/4516

Organizational issues
nach Vereinbarung

T 7.206 Course: Social Science A (WiWi) [T-GEISTSOZ-109048]

Responsible:	Prof. Dr. Gerd Nollmann
Organisation:	KIT Department of Humanities and Social Sciences
Part of:	M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 20/21	5011011	Economic inequality	2 SWS	Seminar	Binder
WT 20/21	5011014	Sociology of Technology		Seminar	Lösch
ST 2021	5011003	Theories of social Norms	2 SWS	Seminar / 🖳	Mäs
ST 2021	5011008	Decomposition and Regression Analysis	2 SWS	Seminar / 🖳	Nollmann
ST 2021	5011013	When and why do opinions polarize?	2 SWS	Seminar / 🖳	Mäs
ST 2021	5011019	The emergence of social differentiation, status hierarchies, and group conflicts	2 SWS	Seminar / 🖳	Mäs
Exams					
WT 20/21	7400041	Social Science A (WiWi)			Nollmann

Legend: 🖳 Online, 🔀 Blended (On-Site/Online), ♣ On-Site, ✗ Cancelled

Below you will find excerpts from events related to this course:

V Theories of social Norms
5011003, SS 2021, 2 SWS, Language: German, Open in study portal

**Seminar (S)
Online**

Content
Social Norms are a central building block of human communities, as they influence individual behavior in social contexts. Unlike law, social norms are not introduced and enforced by central authorities. They emerge spontaneously, can be stable over very long periods, but can also decay quickly. This leads to several intriguing research questions. How do norms emerge? To what degree do they actually change individual behavior? How do norms disseminate in a large population and when are norms stable? Based on sociological, social-psychological and game-theoretical literature, this seminar will develop answers to these questions. The seminar will focus on the question whether social norms can help fight societal challenges such as the pollution of environment and climate change. Since national actors appear to struggle with tackling such global challenges, social norms might become an important approach to tackle them. As a consequence, the seminar will also be concerned with the question how norms can be influenced.

V When and why do opinions polarize?
5011013, SS 2021, 2 SWS, Language: German, Open in study portal

**Seminar (S)
Online**

Content
Numerous western countries experience rising opinion polarization. In particular in the US, it has been warned, growing opinion differences dominate public debate and put at risk democratic decision making. This seminar is concerned with the question why opinion distributions polarize and how too strong polarization can be overcome. To this end, central formal models of opinion dynamics are introduced and analyzed. Students are introduced to the method of agent-based modeling, using the software NetLogo. After the course, students will be able to implement, analyze, and understand these models. In an additional step, we will explore models´ predictions about possible intervention strategies targeted at decreasing polarization.

V The emergence of social differentiation, status hierarchies, and group conflicts
5011019, SS 2021, 2 SWS, Language: German, Open in study portal

**Seminar (S)
Online**

Content

It has been warned that Covid-19 has revealed and intensified societal differences in Germany. For instance, woman have jobs where they are exposed to many customers and, thus, face higher risks of infection. In addition, many lockdown measures affect parts of the economy with a large share of female workers.

This seminar focusses on why and under what conditions societies experience such forms of social stratification. Why do immigrants, woman, persons with disabilities, homosexuals, and many other groups experience systematic disadvantages, although there is a societal consensus that discrimination is undesired? In the seminar, students consult classical theories from sociology (e.g. Norbert Elias), social-psychology (e.g. Social Identity Theory), and novel approaches from complexity research, in order to identify approaches to fight societal discrimination.

Learning outcomes:

At the end of the seminar, ...

... students will know central theories of societal stratification (Elias, Social Identity Theory, Emergence of classes).

... students can reflect about the conditions under which social stratification emerges.

... students can reflect about approaches to fight dynamics of stratification.

... students know agent-based modelling, are able to implement simple models, and are able to independently analyze models.

T 7.207 Course: Social Science B (WiWi) [T-GEISTSOZ-109049]

Responsible:	Prof. Dr. Gerd Nollmann
Organisation:	KIT Department of Humanities and Social Sciences
Part of:	M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 20/21	5011011	Economic inequality	2 SWS	Seminar	Binder
WT 20/21	5011014	Sociology of Technology		Seminar	Lösch
Exams					
WT 20/21	7400046	Social Science B (WiWi)			Nollmann

T 7.208 Course: Special Topics in Information Systems [T-WIWI-109940]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101434 - eBusiness and Service Management

Type Examination of another type	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 2

Exams			
WT 20/21	7900263	Special Topics in Information Systems	Weinhardt

Competence Certificate

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical components and an active participation in class.

Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Prerequisites

see below

Recommendation

None

Annotation

All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in "Information 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 7.209 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-101420 - Econometrics and Economics
	M-WIWI-101608 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 20/21	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture / 🗣	Heller
Exams					
WT 20/21	7900146	Statistical Modeling of generalized regression models			Heller

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.

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 20/21, 2 SWS, Open in study portal

Lecture (V)
On-Site

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 7.210 Course: Statistics I [T-WIWI-102737]

Responsible:	Prof. Dr. Oliver Grothe
	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101432 - Introduction to Statistics
	M-WIWI-101726 - Preliminary Exam

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2021	2600008	Statistics I	4 SWS	Lecture / ▯	Schienle
Exams					
WT 20/21	7900086	Statistics I			Grothe
ST 2021	7900222	Statistics I			Schienle

Legend: ▯ Online, ⚄ Blended (On-Site/Online), ● On-Site, ✕ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

Below you will find excerpts from events related to this course:

V Statistics I
2600008, SS 2021, 4 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

Learning objectives:

The Student understands and applies

- the basic concepts of statistical data exploration,
- the basic definitions and theorems of probability theory.

Content:

A. Descriptive Statistics: univariate und bivariate analysis

B. Probability Theory: probability space, conditional and product probabilities

C. Random variables: location and shape parameters, dependency measures, concrete distribution models

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 60 hours

Preparation and follow-up: 90 hours

Literature

Skriptum: Kurzfassung Statistik I

Weiterführende Literatur:

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

T 7.211 Course: Statistics II [T-WIWI-102738]

Responsible:	Prof. Dr. Oliver Grothe
	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101432 - Introduction to Statistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 20/21	2610020	Statistics II	4 SWS	Lecture / 📱	Grothe
WT 20/21	2610021		2 SWS	Tutorial (/ 📱	Grothe, KIT
WT 20/21	2610022	PC-Praktikum zu Statistik II	2 SWS	/ 🖥	Grothe, KIT
Exams					
WT 20/21	7900340	Statistics II			Grothe
WT 20/21	7900366	Statistics II			Grothe

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 takes place at the end of the lecture period or at the beginning of the recess period. The re-examination takes place in the following semester.

Prerequisites

None

Recommendation

It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2610020].

Below you will find excerpts from events related to this course:

V Statistics II
2610020, WS 20/21, 4 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
Learning objectives:

The student

- understands and applies the basic definitions and theorems of probability theory,
- transfers these theoretical foundations to problems in parametrical mathematical statistics.

Content:

D. Sampling and Estimation Theory: Sampling distributions, estimators, point and interval estimation
E. Test Theory: General Principles of Hypothesis Testing, Concrete 1- and 2-Sampling Tests
F. Regression analysis: Simple and multiple linear regression, statistical inference

Requirements:

It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2600020].

Workload:

Total workload: 150 hours (5.0 Credits).

Attendance: 30 hours

Preparation and follow-up: 90 hours

Literature

Skriptum: Kurzfassung Statistik II

Weiterführende Literatur:

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

T   7.212 Course: Strategic Finance and Technoloy Change [T-WIWI-110511]

Responsible:	Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each summer term	1

Exams			
WT 20/21	7900219	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   7.213 Course: Supplement Applied Informatics [T-WIWI-110711]

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

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate

The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Depending on the particular course associated with this placeholder a bonus on the examination grade is possible.

Prerequisites

None

Annotation

This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but is not equivalent to another course of this topic.

| T | **7.214 Course: Systems of Remote Sensing, Prerequisite [T-BGU-101637]** |

Responsible:	Prof. Dr.-Ing. Stefan Hinz
	Dr.-Ing. Uwe Weidner
Organisation:	KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	1

Events

ST 2021	6020242	Systems of Remote Sensing, Excercise	1 SWS	Practice / 📱	Weidner

Legend: 📱 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.215 Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101413 - Applications of Operations Research
	M-WIWI-101421 - Supply Chain Management
	M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2021	2550486	Taktisches und operatives SCM	2 SWS	Lecture / ▯	Nickel
ST 2021	2550487	Übungen zu Taktisches und operatives SCM	1 SWS	Practice / ▯	Pomes, Bakker
Exams					
WT 20/21	7900342	Tactical and Operational Supply Chain Management			Nickel

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ✊ On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the exam will be offered in the summer semester 2021 either as an open-book exam, or as a written exam (60 min).

The exam takes place in every semester.

Prerequisite for admission to examination is the successful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Taktisches und operatives SCM
2550486, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
The planning of material transport is an essential element of Supply Chain Management. By linking transport connections across different facilities, the material source (production plant) is connected with the material sink (customer). The general supply task can be formulated as follows (cf. Gudehus): For given material flows or shipments, choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. The main goal of the inventory management is the optimal determination of order quantities in terms of minimization of fixed and variable costs subject to resource constraints, supply availability and service level requirements. Similarly, the problem of lot sizing in production considers the determination of the optimal amount of products to be produced in a time slot. The course includes an introduction to basic terms and definitions of Supply Chain Management and a presentation of fundamental quantitative planning models for distribution, vehicle routing, inventory management and lot sizing. Furthermore, case
studies from practice will be discussed in detail.

Literature
Weiterführende Literatur

- Domschke: Logistik: Transporte, 5. Auflage, Oldenbourg, 2005
- Domschke: Logistik: Rundreisen und Touren, 4. Auflage, Oldenbourg, 1997
- Ghiani, Laporte, Musmanno: Introduction to Logistics Systems Planning and Control, Wiley, 2004
- Gudehus: Logistik, 3. Auflage, Springer, 2005
- Simchi-Levi, Kaminsky, Simchi-Levi: Designing and Managing the Supply Chain, 3rd edition, McGraw-Hill, 2008
- Silver, Pyke, Peterson: Inventory management and production planning and scheduling, 3rd edition, Wiley, 1998

T 7.216 Course: Tax Law I [T-INFO-101315]

Responsible:	Detlef Dietrich
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 20/21	24168	Tax Law I	2 SWS	Lecture / 🖥	Dietrich
Exams					
WT 20/21	7500066	Tax Law I			Dreier, Matz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), ◕ On-Site, ✗ Cancelled

T 7.217 Course: Tax Law II [T-INFO-101314]

Responsible:	Detlef Dietrich
Organisation:	KIT Department of Informatics
Part of:	M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2021	24646	Tax Law II	2 SWS	Lecture / 🖥	Dietrich
Exams					
WT 20/21	7500067	Tax Law II			Dreier, Matz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T　7.218 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 2021	24632	Telekommunikationsrecht	2 SWS	Lecture / 📱	Hermstrüwer
Exams					
WT 20/21	7500049	Telecommunications Law			Eichenhofer

Legend: 📱 Online, 🌓 Blended (On-Site/Online), ● On-Site, ✗ Cancelled

T	7.219 Course: Trademark and Unfair Competition Law [T-INFO-101313]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 20/21	24136	Trademark and Unfair Competition Law	2 SWS	Lecture / 🖥	Matz
Exams					
WT 20/21	7500061	Trademark and Unfair Competition Law			Dreier, Matz

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✕ Cancelled

T 7.220 Course: Tutorial Global Production [T-MACH-110981]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101284 - Specialization in Production Engineering

Type Completed coursework	Credits 1	Grading scale pass/fail	Recurrence Each winter term	Version 2

Events					
WT 20/21	2149611	Tutorial Global Production	1 SWS	Practice / 🖥	Lanza
Exams					
WT 20/21	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** 2149611, WS 20/21, 1 SWS, Language: German, Open in study portal	**Practice (Ü) 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

Übungstermine freitags 15:45 Uhr - 17:15 Uhr.
Bekanntgabe der konkreten Termine erfolgt über die Institutshomepage.

Die Teilnahme ist an eine Teilnahme der Veranstaltung Globale Produktion gekoppelt. Nur mit einer Teilnahme an der Vorlesung kann die Übung wahrgenommen werden.

Lecture dates on Fridays, 15:45 h - 17:15 h, exact dates will be announced on the Homepage of the institute.

Participation is linked to participation in the course Global Production and Logistics - Part 1: Global Production. Only with a participation in the lecture the exercise can be attended.

T   7.221 Course: Virtual Reality Practical Course [T-MACH-102149]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type Examination of another type	Credits 4	Grading scale Grade to a third	Recurrence Each term	Version 2

Events					
WT 20/21	2123375	Virtual Reality Practical Course	3 SWS	Project (P / ✸	Ovtcharova, Mitarbeiter

Exams				
WT 20/21	76-T-MACH-102149	Virtual Reality Practical Course		Ovtcharova

Legend: 🗉 Online, ✸ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

Competence Certificate
Assessment of another type (graded)

Prerequisites
None

Annotation
Number of participants is limited

Below you will find excerpts from events related to this course:

V   Virtual Reality Practical Course
2123375, WS 20/21, 3 SWS, Language: German/English, Open in study portal

Project (PRO)
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

T 7.222 Course: Welfare Economics [T-WIWI-102610]

Responsible:	Prof. Dr. Clemens Puppe
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101501 - Economic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	3

Events					
ST 2021	2520517	Welfare Economics	2 SWS	Lecture / 🖥	Puppe, Rollmann
ST 2021	2520518	Übung zur Wohlfahrtstheorie	1 SWS	Practice / 🖥	Puppe, Rollmann

Legend: 🖥 Online, ⚗ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered in the summer semester 2021 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

The course *Economics I: Microeconomics* [2610012] has to be completed beforehand.

Recommendation

None

Annotation

The course only takes place every second summer semester, the next course is planned for summer semester 2021.

Below you will find excerpts from events related to this course:

V Welfare Economics
2520517, SS 2021, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content

The lecture "Welfare economics" deals with the question of efficiency and distributional properties of economic allocations, in particular allocations of market equilibria. The lecture is based on the two welfare theorems: The first welfare theorem (under weak preconditions) says that every competitive equilibrium is efficient.

According to the second welfare theorem (under stronger preconditions), every efficient allocation can be preserved as a competitive equilibrium through adequate choices of initial endowments. Afterwards, the terms and definitions of envy-freeness and the related concept of egalitarian equivalence in the context of the general theory of equilibrium will be discussed.

The second part of the lecture deals with the principle of "social justice" (i.e. distributational justice).The fundamental principles of utilitarism, Rawl's theory of justice as well as John Roemer's theory of equality of opportunity are explained and critically analyzed.

The assessment consists of a written exam at the end of the semester (according to Section 4 (2), 1 or 2 of the examination regulation).

The course will be held every two years in the summer.

The total workload for this course is approximately 135 hours. For further information see German version.

Elective literature:

- J. Rawls: *A Theory of Justice.* Harvard University Press (1971)
- J. Roemer: *Theories of Distributive Justice.* Harvard University Press (1996)

Literature
Weiterführende Literatur:

- J. Rawls: *A Theory of Justice.* Harvard University Press (1971)
- J. Roemer: *Theories of Distributive Justice.* Harvard University Press (1996)