Module Handbook
Industrial Engineering and Management B.Sc.

SPO 2015

Summer term 2023

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KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT

www.kit.edu

Table Of Contents

1 General information

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

1.1 Structural elements

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

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

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

1.2 Begin and completion of a module

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

1.3 Module versions

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

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

1.4 General and partial examinations

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

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

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

1.5 Types of exams

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

Caution: exam type dependent on further pandemic developments

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

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

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

1.6 Repeating exams

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

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

1.7 Examiners

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

1.8 Additional accomplishments

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

1.9 Further information

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

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

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

1.10 Contact

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

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2 Study plan

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

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

	Term	Credits	Business Administration	Economics	Informatics	Operations Research	Engineering	Statistics	Mathematics	Electives	Internship Bachelor Thesis
Basic Program	1 (WT)	28	Mangement and Marketing 5 LP	ECON 1 5 CP	PROG 1 5 CP		Mat. Science (MS) 1 3 CP		MATH 1 10 CP		
	2 (ST)	34	Financing and Accounting 5 LP	ECON 2 5 CP	INFO 1 5 CP	OR 9 LP	Eng. Mech. (EM) 1 3 CP	STAT 1 5 CP	MATH 2 7 CP		
	3 (WT)	30	Production, Logistics and Inf. Systems 5 CP		INFO 2 5 CP		Electr. Eng. 1 3 CP / AFoE 3 CP	STAT 2 5 CP	MATH 3 4 CP		
Specialization Program	4 (ST)	30		ECON 9 CP	INFO 9 CP	OR 9 CP	ENG 9 CP			Seminar 3 CP	Internship 10 CP
	5 (WT)	28,5	BUS 9 CP							2 Elective Modules (one from BUS/ENG) 9 CP + 9 CP	
	6 (ST)	29,5									Bachelor Thesis 12 CP
		180									

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

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

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

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

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

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

3 New study plan as of winter semester 2021/2022

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

4 Qualification objectives of the Bachelor's degree in Industrial Engineering and Management

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

The economics section includes business-related topics from the financial industry, company management, information industry, production management, marketing and accounting as well as economic correlations of microeconomics and macroeconomics.

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 on material and energy balances, material characterization and development, engineering mechanics and electrical engineering.

The technological area is covered by the Applied and Theoretical Computer Science. 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 and technological structures and processes.

Graduates can independently solve basic engineering calculations and are able to apply important mathematical concepts and methods to solve concrete tasks.

The graduates have deeper knowledge in business administration, economics, computer science, operations research and engineering. Specialization is either done in the field of business administration or engineering depending on one's wishes. Additional knowledge in statistics, law or sociology is also offered depending on one's interests. They are able to react based on this knowledge from the different subjects and disciplines. They thereby largely operate independently in economic, technical and technological topics and survey, analyze, interpret and evaluate the situations systematically.

They are able to classify specialized problems as well as model and choose appropriate methods and procedures for solving the given tasks as well as derive improvement potentials. They know how to validate, illustrate and interpret the achieved 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 Industrial Engineering and Management master the basics of project management and are able to assume responsibility in interdisciplinary teams. They are in a position to argue and defend their position both before expert representatives and laypersons.

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

5 Key Skills

The Bachelor's degree course in Industrial Engineering and Management 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

6 Field of study structure

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

6.1 Preliminary Exam

Mandatory		
M-WIWI-100950	Preliminary Exam	0 CR

6.2 Bachelor's Thesis

Credits 12

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

6.3 Internship

Credits 10

Mandatory		
M-WIWI-101419	Internship	10 CR

6.4 Business Administration

Credits 24

Mandatory		
M-WIWI-105768	Management and Marketing	5 CR
M-WIWI-105769	Financing and Accounting	5 CR
M-WIWI-105770	Production, Logistics and Information Systems	5 CR
Specialisation Program Business Administration (Election: at least 9 credits)		
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-105610	Financial Data Science	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-105928	HR Management & Digital Workplace	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-105981	Information Systems & Digital Business	9 CR
M-WIWI-101513	Human Resources and Organizations	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

6.5 Economics

Credits 19

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

6.6 Informatics

Credits 24

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

6.7 Operations Research

Credits
18

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

6.8 Engineering Sciences

Credits
21

Mandatory		
M-ETIT-101155	Electrical Engineering	3 CR
M-MACH-101259	Engineering Mechanics	3 CR
M-WIWI-101839	Additional Fundamentals of Engineering	3 CR
M-MACH-101260	Materials Science	3 CR
Specialisation Program Engineering Sciences (Election: at least 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-102379	Power Network	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-101299	Mechanical Design	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-106236	Mechatronic Product Design	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-101270	Product Lifecycle Management	9 CR
M-ETIT-101156	Control Engineering	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-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR

6.9 Mathematics

Credits
21

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

6.10 Statistics

Credits
10

Mandatory		
M-WIWI-101432	Introduction to Statistics	10 CR

6.11 Compulsory Elective Modules	Credits 21

Election notes

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

Mandatory		
M-WIWI-101816	Seminar Module	3 CR
Business Administration oder Engineering Sciences (Election: 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-102379	Power Network	9 CR
M-ETIT-101165	Energy Generation and Network Components	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-WIWI-105610	Financial Data Science	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-105928	HR Management & Digital Workplace	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-105981	Information Systems & Digital Business	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-WIWI-105482	Machine Learning and Data Science	9 CR
M-MACH-101299	Mechanical Design	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-WIWI-101513	Human Resources and Organizations	9 CR
M-MACH-101270	Product Lifecycle Management	9 CR
M-ETIT-101156	Control Engineering	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101421	Supply Chain Management	9 CR
M-WIWI-105447	Team Project Management and Technology (BUS/ENG)	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-WIWI-101422	Specialization in Customer Relationship Management	9 CR
M-MACH-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-MACH-101284	Specialization in Production Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Business Administration (Election: at most 9 credits)		
M-WIWI-101498	Management Accounting	9 CR

M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-105610	Financial Data Science	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-105928	HR Management & Digital Workplace	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-105981	Information Systems & Digital Business	9 CR
M-WIWI-101513	Human Resources and Organizations	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101421	Supply Chain Management	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-WIWI-105482	Machine Learning and Data Science	9 CR
Economics (Election: at most 9 credits)		
M-WIWI-101499	Applied Microeconomics	9 CR
M-WIWI-101403	Public Finance	9 CR
M-WIWI-101599	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
M-WIWI-101668	Economic Policy I	9 CR
M-WIWI-101501	Economic Theory	9 CR
Informatics (Election: at most 9 credits)		
M-WIWI-101426	Electives in Informatics	9 CR
Operations Research (Election: at most 9 credits)		
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-103278	Optimization under Uncertainty	9 CR
Engineering Sciences (Election: at most 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-102379	Power Network	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-101299	Mechanical Design	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-101270	Product Lifecycle Management	9 CR
M-ETIT-101156	Control Engineering	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-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
M-MACH-106236	Mechatronic Product Design	9 CR
Statistics (Election: at most 9 credits)		
M-WIWI-101599	Statistics and Econometrics	9 CR
M-WIWI-105414	Statistics and Econometrics II	9 CR
Law or Sociology (Election: at most 9 credits)		
M-INFO-105084	Public and Civil Law	9 CR
M-GEISTSOZ-101167	Sociology/Empirical Social Research	9 CR
Team Project (Election: at most 9 credits)		
M-WIWI-105440	Team Project Management and Technology	9 CR

7 Modules

M 7.1 Module: Additional Fundamentals of Engineering [M-WIWI-101839]

Responsible:	Prof. Dr.-Ing. Alexander Fidlin PD Dr. Volker Gaukel Prof. Dr. Michael Hoffmann
Organisation:	KIT Department of Economics and Management
Part of:	Engineering Sciences (mandatory)

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

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

Competence Certificate
See course description.

Prerequisites
None

Competence Goal
See German version.

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

Annotation
ThecourseT-ETIT-100534 "Electrical Engineering for Business Engineers, Part II" is only offered temporarily in the module.

It should be pointed out that "Material Science II for Business Engineers" and "Electrical Engineering for Business Engineers, Part II" are not offered in winter term, but only in summer term.

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

M 7.2 Module: Applications of Operations Research [M-WIWI-101413]

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

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

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

Competence Certificate

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

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

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

Prerequisites

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

Competence Goal

The student

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

Content

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

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

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

Annotation

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

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

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

M 7.3 Module: Applied Informatics [M-WIWI-105112]

Responsible: Dr.-Ing. Michael Färber
Prof. Dr. Andreas Oberweis
Prof. Dr. Ali Sunyaev
Prof. Dr. Melanie Volkamer

Organisation: KIT Department of Economics and Management

Part of: Informatics (Specialisation Program Informatics)

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

Advanced Programming (Election: 1 item)			
T-WIWI-102747	Advanced Programming - Java Network Programming	4,5 CR	Ratz, Zöllner
T-WIWI-102748	Advanced Programming - Application of Business Software	4,5 CR	Klink, Oberweis
Compulsory Elective Area (Election: 1 item)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	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 7.4 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

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102876	Auction & Mechanism Design	4,5 CR	Szech
T-WIWI-112228	Digital Markets and Market Design	4,5 CR	Hillenbrand
T-WIWI-102892	Economics and Behavior	4,5 CR	Szech
T-WIWI-102850	Introduction to Game Theory	4,5 CR	Puppe, Reiß
T-WIWI-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").

Content

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

Workload

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

Recommendation

Completion of the module Economics is strongly recommended.

M 7.5 Module: Automotive Engineering [M-MACH-101266]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

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

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

Automotive Engineering (Election: at least 9 credits)			
T-MACH-100092	Automotive Engineering I	6 CR	Gauterin, Unrau
T-MACH-102117	Automotive Engineering II	3 CR	Gauterin, Unrau
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gauterin, Gießler
T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I	1,5 CR	Bardehle
T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II	1,5 CR	Bardehle
T-MACH-102093	Fluid Power Systems	5 CR	Geimer
T-MACH-102150	BUS-Controls	3 CR	Becker, Geimer
T-MACH-108889	BUS-Controls - Advance *This item will not influence the grade calculation of this parent.*	0 CR	Geimer
T-MACH-102203	Automotive Engineering I	6 CR	Gauterin, Gießler
T-MACH-110796	Python Algorithm for Vehicle Technology	4 CR	Rhode
T-MACH-112126	Data-Driven Algorithms in Vehicle Technology	4 CR	Scheubner

Competence Certificate
The assessment is carried out as partial exams.

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

Prerequisites
None

Competence Goal
The student

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

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

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

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

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

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

M   7.6 Module: Combustion Engines I [M-MACH-101275]

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

Organisation: KIT Department of Mechanical Engineering

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

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

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

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

Prerequisites
None

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

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

Content
Working Principle og ICE

Characteristic Parameters

Characteristic parameters

Engine parts

Crank drive

Fuels

Gasolien engine operation modes

Diesel engine operation modes

Emissions

Fundamentals of ICE combustion

Thermodynamics of ICE

Flow field

Wall heat losses

Combsution in Gasoline and Diesel engines

Heat release calculation

Waste heat recovery

CO_2-free engine technology

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

M 7.7 Module: Combustion Engines II [M-MACH-101303]

Responsible: Dr.-Ing. Heiko Kubach
Julia Reichel

Organisation: KIT Department of Mechanical Engineering

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

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

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

Competence Certificate

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

Prerequisites

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

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

Competence Goal

See courses.

Content

Compulsory:

Supercharging and air management

Engine mapsEmissions and Exhaust gas aftertreatment

Transient engine operationECU application

Electrification and alternative powertrains

Elective:

Fuels and lubricants for ICE

Fundamentals of catalytic EGA

Analysis tools for combustion diagnostics

Engine measurement techniques

Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines

Workload

regular attendance: 62 h

self-study: 208 h

Learning type

Lecture, Tutorial

M 7.8 Module: Control Engineering [M-ETIT-101156]

Responsible: Prof. Dr.-Ing. Sören Hohmann
                     Dr.-Ing. Mathias Kluwe
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
                     Compulsory Elective Modules (Business Administration oder Engineering Sciences)
                     Compulsory Elective Modules (Engineering Sciences)

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

Mandatory			
T-ETIT-101921	System Dynamics and Control Engineering	6 CR	Hohmann
T-ETIT-109285	Complex Analysis and Integral Transformations	4 CR	Kluwe

Prerequisites

M   7.9 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 oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

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

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

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

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

Prerequisites
None

Competence Goal
The students

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

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

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

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

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

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

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

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

M	**7.10 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
Compulsory Elective Courses (Election: 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.

Prerequisites

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

Competence Goal

Students shall be given the ability to

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

Content

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

Workload

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

Recommendation

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

M 7.11 Module: Economic Theory [M-WIWI-101501]

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

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

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

Competence Certificate

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

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

Prerequisites
None

Competence Goal
See German version.

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.

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

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

Recommendation
None

M 7.12 Module: eFinance [M-WIWI-101402]

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

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

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

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

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

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

Competence Goal
The students

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

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

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

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

M 7.13 Module: Electives in Informatics [M-WIWI-101426]

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

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

Compulsory Elective Area (Election: 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 Instituts AIFB
T-WIWI-104679	Foundations of Mobile Business	4,5 CR	Oberweis
Advanced Labs (Election: at most 1 item)			
T-WIWI-111127	Advanced Lab Blockchain Hackathon (Bachelor)	4,5 CR	Sunyaev
T-WIWI-111124	Advanced Lab Sociotechnical Information Systems Development (Bachelor)	4,5 CR	Sunyaev
T-WIWI-110541	Advanced Lab Informatics (Bachelor)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer

Competence Certificate

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

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

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

Prerequisites

None

Competence Goal

The student

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

Content

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

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

M 7.14 Module: Electrical Engineering [M-ETIT-101155]

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

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

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

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

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

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

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

Workload
See German version.

M   7.15 Module: Emphasis in Fundamentals of Engineering [M-MACH-101261]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

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

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

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

Competence Certificate

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

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

Competence Goal

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

Content

The module content depends on the elected courses.

Annotation

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

Workload

See German version.

M 7.16 Module: Emphasis Materials Science [M-MACH-101262]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

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

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

Specialization Materials Science (Election: at least 9 credits)			
T-MACH-102141	Constitution and Properties of Wearresistant Materials	4 CR	Ulrich
T-MACH-105179	Functional Ceramics	4 CR	Hinterstein, Rheinheimer
T-MACH-100287	Introduction to Ceramics	6 CR	Hoffmann
T-MACH-102102	Physical Basics of Laser Technology	5 CR	Schneider
T-MACH-102137	Polymer Engineering I	4 CR	Liebig
T-MACH-102138	Polymer Engineering II	4 CR	Liebig
T-MACH-102157	High Performance Powder Metallurgy Materials	4 CR	Schell
T-MACH-102179	Structural Ceramics	4 CR	Hoffmann
T-MACH-102170	Structural and Phase Analysis	4 CR	Hinterstein, Wagner
T-MACH-100531	Systematic Materials Selection	4 CR	Dietrich, Schulze
T-MACH-102139	Failure of Structural Materials: Fatigue and Creep	4 CR	Gruber, Gumbsch
T-MACH-102140	Failure of Structural Materials: Deformation and Fracture	4 CR	Gumbsch, Weygand
T-MACH-102079	Material Science II for Business Engineers	5 CR	Hoffmann

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

Prerequisites
None

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

Content
The module content depends on the elected courses.

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

Workload
The module requires an average workload of 270 hours.

Learning type
Lecture, Tutorial.

M 7.17 Module: Energy Economics [M-WIWI-101464]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

The student

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

Content

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

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

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

Annotation

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

Workload

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

Recommendation

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

M 7.18 Module: Energy Generation and Network Components [M-ETIT-101165]

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

Organisation: KIT Department of Electrical Engineering and Information Technology

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

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

Mandatory			
T-ETIT-101924	Power Generation	3 CR	Hoferer
T-ETIT-101925	Design and Operation of Power Transformers	3 CR	Leibfried, Schäfer
T-ETIT-100724	Photovoltaic System Design	3 CR	Grab

Competence Certificate

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

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

Prerequisites

It is only possible to choose this module in combination with the module *Power Networks* [WW3INGETIT3]. The module is passed only after the final partial exam of *Power Networks* is additionally passed.

Competence Goal

The student

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

Content

The module deals with basic knowledge about the structure and operation of electrical power networks and their needed facilities. Further lectures give an insight into specific topics, such as the procedures for generating electrical energy or the Photovoltaic System Design

Workload

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

M	**7.19 Module: Engineering Mechanics [M-MACH-101259]**

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

Part of: Engineering Sciences (mandatory)

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

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

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

Permitted utilities: non-programmable calculator, literature

Prerequisites
None

Competence Goal
Professional competences:

Students will

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

Interdisciplinary competences:

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

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

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

Workload
The total workload for this module is approximately 90 hours

Learning type
Lecture and exercises

M 7.20 Module: Essentials of Finance [M-WIWI-101435]

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

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

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

Competence Certificate

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

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

Prerequisites

None

Competence Goal

The student

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

Content

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

Workload

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

M 7.21 Module: Extracurricular Module in Engineering [M-WIWI-101404]

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

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

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

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

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

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

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

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

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

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

Competence Goal
See German version.

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

M 7.22 Module: Financial Data Science [M-WIWI-105610]

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

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

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

Competence Certificate

Due to the professor's research sabbatical, the BSc module "Financial Data Science" and MSc module "Foundations for Advanced Financial -Quant and -Machine Learning Research" and the MSc module "Advanced Machine Learning and Data Science" along with the respective examinations will not be offered in SS2023. Bachelor and Master thesis projects are not affected and will be supervised.

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

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

Organisation: KIT Department of Economics and Management

Part of: Business Administration (mandatory)

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

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

Competence Certificate

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

Competence Goal

The student

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

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

Content

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

Workload

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

M   7.24 Module: Foundations of Informatics [M-WIWI-101417]

Responsible: Dr.-Ing. Michael Färber
                   Prof. Dr. Sanja Lazarova-Molnar
Organisation: KIT Department of Economics and Management
Part of: Informatics (mandatory)

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	Lazarova-Molnar

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

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

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

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

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

M   7.25 Module: Foundations of Marketing [M-WIWI-101424]

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

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

Mandatory			
T-WIWI-102805	Managing the Marketing Mix	4,5 CR	Klarmann
Supplementary Courses (Election: at least 4,5 credits)			
T-WIWI-111367	B2B Sales Management	4,5 CR	Klarmann
T-WIWI-112156	Brand Management	4,5 CR	Kupfer
T-WIWI-106569	Consumer Behavior	4,5 CR	Scheibehenne

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

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

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

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

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

Additionally when taking the course "B2B Sales Management":

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

Additionally when taking the course "Consumer Behavior":

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

Content

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

Annotation

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

Workload

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

M   7.26 Module: Fundamentals of Construction [M-BGU-101004]

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

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

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

Prerequisites
none

Competence Goal
The student

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

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

Recommendation
None

M 7.27 Module: Fundamentals of Digital Service Systems [M-WIWI-102752]

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

Organisation: KIT Department of Economics and Management

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

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

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

Prerequisites
None

Competence Goal
Students

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

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

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

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

Recommendation
None

M 7.28 Module: Handling Characteristics of Motor Vehicles [M-MACH-101264]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

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

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

Vehicle Properties (Election: at least 9 credits)		
T-MACH-105152	Handling Characteristics of Motor Vehicles I	3 CR	Unrau
T-MACH-105153	Handling Characteristics of Motor Vehicles II	3 CR	Unrau
T-MACH-105154	Vehicle Comfort and Acoustics I	3 CR	Gauterin
T-MACH-105155	Vehicle Comfort and Acoustics II	3 CR	Gauterin
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gauterin, Gießler

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

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

Prerequisites
None

Competence Goal
The student

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

Content
See courses.

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

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

M   7.29 Module: HR Management & Digital Workplace [M-WIWI-105928]

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

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

Elective Offer (Election:)			
T-WIWI-102909	Human Resource Management	4,5 CR	Nieken
T-WIWI-111858	Topics in Human Resource Management	3 CR	Nieken
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-111914	Practical Seminar: Interactive Systems	4,5 CR	Mädche

Competence Certificate

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

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

Prerequisites

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

Competence Goal

The student

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

Content

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

Annotation

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

Workload

Total workload for 9 credits: approx. 270 hours.

M 7.30 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 oder Engineering Sciences)
	Compulsory Elective Modules (Business Administration)

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

Elective Offer (Election:)			
T-WIWI-102909	Human Resource Management	4,5 CR	Nieken
T-WIWI-102908	Personnel Policies and Labor Market Institutions	4,5 CR	Nieken
T-WIWI-111858	Topics in Human Resource Management	3 CR	Nieken
T-WIWI-102630	Managing Organizations	3,5 CR	Lindstädt
T-WIWI-102871	Problem Solving, Communication and Leadership	2 CR	Lindstädt

Competence Certificate
The assessment is carried out as partial written exams or alternative exam assessment of the single courses of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

Prerequisites
The course T-WIWI-111858 Topics in Human Resource Management may not be taken together with the course T-WIWI-102871 Problem Solving, Communication, and Leadership.

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.

Content
Students acquire basic knowledge in the field of human resources, personnel economics and organization economics. Strategic as well as operative aspects of human resource management practices are analyzed and current research results discussed. Students gain knowledge about methods and instruments from the field of human resources and are able to apply those. The module addresses the opportunities and threats of digitalization in the workplace as well as the use of AI in HRM. In addition, questions of optimal organizational design or personnel politics are considered. The focus lies on the strategic analysis of decisions and the use of microeconomic or behavioral approaches. Empirical results of field or lab studies are discussed critically.

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

Recommendation
Completion of module Business Administration is recommended.

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

M 7.31 Module: Industrial Production I [M-WIWI-101437]

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

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

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

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

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

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

Competence Goal

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

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

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

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

M 7.32 Module: Information Systems & Digital Business [M-WIWI-105981]

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

Organisation: KIT Department of Economics and Management

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

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

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-106569	Consumer Behavior	4,5 CR	Scheibehenne
T-WIWI-111307	Digital Services: Foundations	4,5 CR	Satzger, Vössing
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-107506	Platform Economy	4,5 CR	Weinhardt
Complementary Offer (Election: at most 1 item)			
T-WIWI-110888	Practical Seminar: Digital Services	4,5 CR	Satzger, Weinhardt
T-WIWI-111914	Practical Seminar: Interactive Systems	4,5 CR	Mädche
T-WIWI-112154	Practical Seminar: Platform Economy	4,5 CR	Satzger, Weinhardt

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

Competence Goal
Students

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

Content

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

Foundations of Interactive Systems:

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

Platform Economy:

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

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 to make 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.

Annotation

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

Workload

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

M   7.33 Module: Integrated Production Planning [M-MACH-101272]

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

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

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

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

Competence Certificate
Written Exam (120 min)

Prerequisites
none

Competence Goal
The students

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

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

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

Learning type
Lecture, exercise, excursion

M	**7.34 Module: Internship [M-WIWI-101419]**

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

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

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

Competence Certificate

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

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

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

The certificate must at least contain the following information:

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

2. Information on to the presentation:

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

Prerequisites
None

Competence Goal

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

Content

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

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

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

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

Annotation

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

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

Vacation days are not figured into the internship.

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

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

Workload

The total workload for this module is approximately 300 hours.

M 7.35 Module: Introduction to Economics [M-WIWI-101398]

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

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

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

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module. The assessment procedures of each course of this module is defined for each course separately.

Competence Goal
The student

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

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

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

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

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

Workload
See German version.

M   7.36 Module: Introduction to Natural Hazards and Risk Analysis [M-WIWI-104838]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

See German version

Content

See German version

Annotation

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

Information on the course "Geological Hazards and Risk":

Language: English

Content:

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

Learning outcomes:

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

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

Workload:

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

Workload

The total workload for this module is approximately 270 hours. For further information 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].

M 7.37 Module: Introduction to Operations Research [M-WIWI-101418]

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

Organisation: KIT Department of Economics and Management

Part of: Operations Research (mandatory)

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

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

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

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

M	**7.38 Module: Introduction to Programming [M-WIWI-101581]**

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

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

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

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

Prerequisites
None

Competence Goal
see german version

Content
see german version

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

M   7.39 Module: Introduction to Statistics [M-WIWI-101432]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

See German version.

Content

The module contains the fundamental methods and scopes of Statistics.

A. Descriptive Statistics: univariate und bivariate analysis

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

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

Module grade calculation

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

Workload

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

M 7.40 Module: Logistics and Supply Chain Management [M-MACH-105298]

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

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

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

Module grade calculation
grade of the module is grades of the exam

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

- lecture: 60 h

independent study:

- preparation and follow-up lectures: 90 h
- preparation of case studies: 60 h
- examination preparation: 60 h

total: 270 h

Recommendation
none

Learning type
Lectures, tutorials, case studies.

Literature

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

Dieter Arnold et. al.: Handbuch Logistik, 2008

Marc Goetschalkx: Supply Chain Engineering, 2011

M 7.41 Module: Machine Learning and Data Science [M-WIWI-105482]

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

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

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

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

Prerequisites
None

Competence Goal
The student

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

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

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

M 7.42 Module: Machine Tools and Industrial Handling [M-MACH-101286]

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

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

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

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

Competence Certificate
Oral exam (45 minutes)

Prerequisites
None

Competence Goal
The students

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

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

The individual topics are:

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

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

Learning type
Lecture, exercise, excursio

M 7.43 Module: Management Accounting [M-WIWI-101498]

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

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

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

Competence Certificate

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

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

Competence Goal

Students

- are familiar with various management accounting methods,

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

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

- have the capacity to devise instruments for organizational control.

Content

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

Annotation

The following courses are part of this module:

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

Workload

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

M **7.44 Module: Management and Marketing [M-WIWI-105768]**

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

Organisation: KIT Department of Economics and Management

Part of: Business Administration (mandatory)

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

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

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

Competence Goal
The student

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

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

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

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

M   7.45 Module: Manufacturing Technology [M-MACH-101276]

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

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

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

Mandatory		
T-MACH-102105	Manufacturing Technology	9 CR	Schulze

Competence Certificate
Written Exam (180 min)

Prerequisites
None

Competence Goal
The students

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

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

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

Learning type
Lectures, exercise, excursion

M   7.46 Module: Material Flow in Logistic Systems [M-MACH-101277]

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

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

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

Prerequisites
none

Competence Goal
The student

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

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

Workload
270 hours

Learning type
Lectures, tutorials.

| M | **7.47 Module: Materials Science [M-MACH-101260]** |

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (mandatory)

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

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

Competence Certificate

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

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

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

Prerequisites

None.

Competence Goal

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

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

Content

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

Workload

The total workload for this module is approximately 90 hours.

M   7.48 Module: Mathematics 1 [M-MATH-105754]

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

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

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

Competence Certificate

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

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

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

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

Both the midterm and final exams must be passed individually.

Competence Goal

Students

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

Content

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

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

Module grade calculation

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

Workload

Work load: 300 hours (10 ETCS)

Classes: 150 hours

Preparation of courses and examinations: 150 hours

Recommendation

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

Literature

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

M 7.49 Module: Mathematics 2 [M-MATH-105756]

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

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

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

Competence Certificate
The assessment consists of two written exams of 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. Both resit exams will take place on the same day.

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

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

Both the midterm and final exams must be passed individually.

Competence Goal
Students

- have a basic knowledge of multivariate differential calculus,
- are confident with important concepts in the theory of normed vector spaces.

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

- Eigenvalue theory,
- Multivariate calculus,
- Multiple integrals,
- Implicit functions,
- General linear spaces,
- Linear Mappings,
- Banach's fixed point theorem.

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

Workload
Work load: 210 hours (7 ETCS)

Classes: 120 hours

Preparation of courses and examinations: 90 hours

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

M 7.50 Module: Mathematics 3 [M-MATH-105757]

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

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

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

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

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

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

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

Competence Goal
Students

- have some basic knowledge of ordinary differential equations,
- have some basic knowledge of Fourier analysis.

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

- Ordinary differential equations,
- Linear differential equations,
- Fourier analysis,
- Integral transformations.

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

Workload
Work load: 120 hours (4 ETCS)

Classes: 60 hours

Preparation of courses and examinations: 60 hours

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

M 7.51 Module: Mechanical Design [M-MACH-101299]

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

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

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

Mandatory			
T-MACH-112225	Mechanical Design I and II	7 CR	Matthiesen
T-MACH-112226	Mechanical Design I, Tutorial	1 CR	Matthiesen
T-MACH-112227	Mechanical Design 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

Prerequisites
None

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

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

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

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

Learning type
Lecture

Tutorial

Project work during the semester

Online-test

M 7.52 Module: Mechatronic Product Design [M-MACH-106236]

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

Organisation:

KIT Department of Mechanical Engineering

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

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

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

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

Prerequisites
None

Competence Goal
The students

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

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

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

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

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

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

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

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

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

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

Learning type
Lecture, exercise and project work

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

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

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

Learning type
Lecture, exercise and project work

M	**7.53 Module: Methodical Foundations of OR [M-WIWI-101414]**

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

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

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

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

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

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

Competence Goal
The student

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

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

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

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

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

M   7.54 Module: Microsystem Technology [M-MACH-101287]

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

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

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

Mikrosystemtechnik (Election: at least 9 credits)			
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CR	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CR	Guber
T-MACH-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-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
T-MACH-111807	Introduction to Bionics	3 CR	Hölscher

Competence Certificate

The assessment is carried out as partial exams

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

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

Prerequisites
none

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

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

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

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

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

Mandatory			
T-MACH-105168	Mobile Machines	9 CR	Geimer
Mobile Machines (Election: at least 1 credit)			
T-MACH-105307	Drive Train of Mobile Machines	4 CR	Geimer, Wydra
T-MACH-105311	Design and Development of Mobile Machines	4 CR	Geimer, Siebert
T-MACH-108887	Design and Development of Mobile Machines - Advance	0 CR	Geimer, Siebert
T-MACH-102093	Fluid Power Systems	5 CR	Geimer
T-MACH-111389	Fundamentals in the Development of Commercial Vehicles	3 CR	Weber
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer
T-MACH-108888	Simulation of Coupled Systems - Advance	0 CR	Geimer, Xiang
T-MACH-111821	Steuerung mobiler Arbeitsmaschinen	4 CR	Becker, Geimer
T-MACH-111820	Steuerung mobiler Arbeitsmaschinen-Vorleistung	0 CR	Becker, Geimer

Competence Certificate

The assessment is carried out as a general oral exam (duration approx. 60 mins) (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

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

The assessment may be carried out as partial oral exams (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.In this case the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

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

Prerequisites

Successful passing of the corresponding modules of the basic program.

Competence Goal

The student

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

Content

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

Workload

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

Recommendation

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

M 7.56 Module: Mobility and Infrastructure [M-BGU-101067]

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

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

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

Prerequisites
none

Annotation
none

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

M   7.57 Module: Module Bachelor's Thesis [M-WIWI-101601]

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

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

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

Competence Certificate

The Bachelor 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.

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.

Competence Goal

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

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

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

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

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

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

Workload
The total workload for this module is approximately 360 hours. For further information see German version.

M   7.58 Module: Optimization under Uncertainty [M-WIWI-103278]

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

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

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

Competence Certificate

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

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

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

Prerequisites

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

Competence Goal

The student

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

Content

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

Annotation

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

Workload

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

Recommendation

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

M 7.59 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:	Engineering Sciences (Specialisation Program Engineering Sciences)
	Compulsory Elective Modules (Business Administration oder Engineering Sciences)
	Compulsory Elective Modules (Engineering Sciences)

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

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

M	7.60 Module: Preliminary Exam [M-WIWI-100950]

Organisation: University
Part of: Preliminary Exam

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

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

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

Prerequisites
none

Annotation
For students who are or were enrolled in a degree program in the summer semester 2020, winter semester 2020/2021, summer semester 2021, or winter semester 2021/2022, the deadline for taking the orientation exam has been extended by one semester in each case (section 32 (5 a), sentence 1 LHG).
This means that the deadline has been extended for
- *students enrolled in one of the above semesters in the same program by one semester;*
- *students enrolled in two of the above semesters in the same program by two semesters;*
- *students enrolled in three or more of the above semesters in the same program by a maximum of three semesters.*

M 7.61 Module: Product Lifecycle Management [M-MACH-101270]

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

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

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

Product Lifecycle Management (Kernbereich) (Election: 1 item)		
T-MACH-105147 Product Lifecycle Management	4 CR	Ovtcharova
Product Lifecycle Management (Election: at least 5 credits)		
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.

Prerequisites
None

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.

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

Responsible:	Prof. Dr. Wolf Fichtner
	Prof. Dr. Andreas Geyer-Schulz
	Prof. Dr. Alexander Mädche
	Prof. Dr. Stefan Nickel
	Prof. Dr. Frank Schultmann
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	Business Administration (mandatory)

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

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

Competence Certificate

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

Competence Goal

The student

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

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

Content

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

Workload

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

M 7.63 Module: Public and Civil Law [M-INFO-105084]

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

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

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

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

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

Prerequisites
None

Workload
See German version.

M 7.64 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	6

Compulsory Elective Courses (Election: 9 credits)		
T-WIWI-102877	Introduction to Public Finance	4,5 CR	Wigger
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-112721	Public Economics	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.

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.

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

M 7.65 Module: Rail System Technology [M-MACH-101274]

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

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

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

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

Competence Certificate

Oral examination

Duration: ca. 45 minutes

No tools or reference materials may be used during the exam.

Competence Goal

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- Based on operating requirements and legal framework they derive the requirements concerning a capable infrastructure and suitable concepts of rail vehicles.
- They recognize the impact of alignment, understand the important function of the wheel-rail-contact and estimate the impact of driving dynamics on the operating program.
- They evaluate the impact of operating concepts on safety and capacity of a rail system.
- They know the infrastructure to provide power supply to rail vehicles with different drive systems.
- The students learn the role of rail vehicles and understand their classification. They understand the basic structure und know the functions of the main systems. They understand the overall tasks of vehicle system technology.
- They learn functions and requirements of car bodies and jugde advantages and disadvantages of design principles. They know the functions of the car body's interfaces.
- They know about the basics of running dynamics and bogies.
- The students learn about advantages and disadvantages of different types of traction drives and judge, which one fits best for each application.
- They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems.
- They know the basic setup of train control management system and understand the most important functions.
- They specify and define suitable vehicle concepts based on requirements for modern rail vehicles.

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations
8. Vehicle system technology: structure and main systems of rail vehicles
9. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
10. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
11. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
12. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
13. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
14. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Annotation

A bibliography is available for download (Ilias-platform).

The lectures can be attended in the same term.

Workload

1. Regular attendance: 42 hours
2. Self-study: 42 hours
3. Exam and preparation: 186 hours

Learning type

Lectures

M 7.66 Module: Seminar Module [M-WIWI-101816]

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

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

Compulsory Elective Courses (Election: 3 credits)			
T-WIWI-103486	Seminar in Business Administration (Bachelor)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103485	Seminar in Informatics (Bachelor)	3 CR	Professorenschaft des Instituts AIFB
T-WIWI-108763	Seminar in Engineering Science Master (approval)	3 CR	Fachvertreter ingenieurwissenschaftlicher Fakultäten
T-MATH-102265	Seminar in Mathematics (Bachelor)	3 CR	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.

Prerequisites

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

Competence Goal

- Students are able to independently deal with a defined problem in a specialized field based on scientific criteria.
- They are able to research, analyze the information, abstract and derive basic principles and regularities from unstructured information.
- They can solve the problems in a structured manner using their interdisciplinary know-how.
- They know how to validate the obtained results.
- Finally, they are able to logically and systematically present the results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.
- Students are familiar with the DFG´s Code of Conduct "Guidelines for Safeguarding Good Research Practice" and base their scientific work on it.

Content

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

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

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

Annotation

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

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

Workload

See German version.

M 7.67 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   7.68 Module: Specialization in Customer Relationship Management [M-WIWI-101422]

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

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

Mandatory			
T-WIWI-102597	Operative CRM	4,5 CR	Geyer-Schulz
Supplementary Courses (Election: 1 item)			
T-WIWI-102596	Analytical CRM	4,5 CR	Geyer-Schulz
T-WIWI-109938	Digital Services	4,5 CR	Satzger, Weinhardt
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

Competence Certificate

This module will be offered for the last time in winter semester 2019/20.

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

Prerequisites

The course "Operative CRM" is compulsory.

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

Competence Goal

The student

- knows the scientific methods (from business administration, statistics, informatics) which are most relevant for analytic CRM and he autonomously applies these methods to standard cases,
- gains an overview of the market for CRM software,
- designs, implements, and analyzes operative CRM processes in concrete application domains (e.g. campaign management, call center management, …),
- is aware of the problems of protecting the privacy of customers and the implications of privacy law.

Content

In this module, analysis methods and techniques for the management and improvement of customer relations are presented. Furthermore, modelling, implementation, introduction, change, analysis and valuation of operative CRM processes are treated. Regarding the first part, we teach analysis methods and techniques suitable for the management and improvement of customer relations. For this goal we treat the principles of customer- and service-oriented management as the foundation of successful customer relationship management. In addition, we show how knowledge of the customer can be used for decision-making at an aggregate level (e.g. planning of sortiments, analysis of customer loyality, …). A basic requirement for this is the integration and collection of data from operative processes in a suitably defined data-warehouse in which all relevant data is kept for future analysis. The process of transfering data from the operative systems into the data warehouse is known as the ETL process (Extract / Transform / Load). The process of modelling a data-warehouse as well as the so-called extraction, transformation, and loading process for building and maintaining a data-warehouse are discussed in-depth. The data-warehouse serves as a base for flexible management reporting. In addition, various statistic methods (e.g. cluster analysis, regression analysis, stochastic models, …) are presented which help in computing suitable key performance indicators or which support decision-making.
Regaring the operative part, we emphasize the design of operative CRM processes. This includes the modelling, implementation, introduction and change, as well as the analysis and evaluation of operative CRM processes. Petri nets and their extensions are the scientific foundation of process modelling. The link of Petri nets to process models used in industry as e.g. UML activity diagrams is presented. In addition, a framework for process innovation which aims at a radical improvement of key business processes is introduced. The following application areas of operative CRM processes are presented and discussed:
Strategic marketing processes
Operative marketing processes (campaign managament, permission marketing, …)
Customer service processes (sales force management, field services, call center management, …)

Workload

The total amount of work for this module is approximately 270 hours (9 credits). The subdivision is based on the credits of the courses of the module.

The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam periods and the time that is required to achieve the objectives of the module as an average student with an average performance.

M 7.69 Module: Specialization in Production Engineering [M-MACH-101284]

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

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

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

Vertiefung der Produktionstechnik (Election: at least 9 credits)			
T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry	4 CR	Wawerla
T-MACH-110991	Global Production	4 CR	Lanza
T-MACH-110981	Tutorial Global Production	1 CR	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-112115	Artificial Intelligence in Production	5 CR	Fleischer
T-MACH-105783	Learning Factory "Global Production"	6 CR	Lanza
T-MACH-108878	Laboratory Production Metrology	5 CR	Lanza
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-110984	Production Technology for E-Mobility	4 CR	Fleischer
T-MACH-110960	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	4 CR	Zanger
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-112121	Seminar Application of Artificial Intelligence in Production	4 CR	Fleischer
T-MACH-105185	Control Technology	4 CR	Gönnheimer
T-MACH-105177	Metal Forming	4 CR	Herlan
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber

Competence Certificate

Oral exams: duration approx. 5 min per credit point

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

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

Prerequisites

Competence Goal

The students

- are able to apply the methods of production science to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Content

Within this module the students will get to know and learn about production science. Manifold lectures and excursions as part of several lectures provide specific insights into the field of production science.

Workload

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

Learning type
Lectures, seminars, workshops, excursions

M   7.70 Module: Statistics and Econometrics [M-WIWI-101599]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

The student

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

Content

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

Workload

The total workload for this module is approximately 270 hours.

M　7.71 Module: Statistics and Econometrics II [M-WIWI-105414]

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

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

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

Competence Certificate

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

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

Prerequisites

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

Competence Goal

The student

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

Content

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

Workload

The total workload for this module is approximately 270 hours.

M 7.72 Module: Strategy and Organization [M-WIWI-101425]

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

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

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

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

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

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

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

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

Competence Certificate

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

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

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

Prerequisites

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

Competence Goal

The students

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

Content

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

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

Annotation

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

Workload

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

M 7.74 Module: Team Project Management and Technology [M-WIWI-105440]

Responsible:	Prof. Dr. Martin Klarmann
	Prof. Dr. Alexander Mädche
Organisation:	KIT Department of Economics and Management
Part of:	Compulsory Elective Modules (Team Project)

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

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

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

Modeled Conditions
The following conditions have to be fulfilled:

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

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

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

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

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

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

M 7.75 Module: Team Project Management and Technology (BUS/ENG) [M-WIWI-105447]

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

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

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

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

Modeled Conditions
The following conditions have to be fulfilled:

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

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

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

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

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

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

M 7.76 Module: Technical Logistics [M-MACH-101279]

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

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

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each 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	6 CR	Hochstein

Competence Certificate

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

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

Prerequisites

Competence Goal

The student

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

Content

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

Workload

270 hours

Learning type

Lecture

M 7.77 Module: Topics in Finance I [M-WIWI-101465]

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

Organisation: KIT Department of Economics and Management

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

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

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-107505	Financial Accounting for Global Firms	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-112694	FinTech	4,5 CR	Thimme
T-WIWI-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 Technology 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.

Prerequisites

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

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

Competence Goal

The student

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

Content

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

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

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

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

Compulsory Elective Courses (Election: 9 credits)		
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-107505	Financial Accounting for Global Firms	4,5 CR	Luedecke
T-WIWI-112694	FinTech	4,5 CR	Thimme
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technology 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.

Prerequisites

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

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

Competence Goal
The student

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

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

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

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

M   7.79 Module: Vehicle Development [M-MACH-101265]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

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

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

Vehicle Development (Election: at least 9 credits)			
T-MACH-102207	Tires and Wheel Development for Passenger Cars	3 CR	Leister
T-MACH-111389	Fundamentals in the Development of Commercial Vehicles	3 CR	Weber
T-MACH-105162	Fundamentals of Automobile Development I	1,5 CR	Frech
T-MACH-105163	Fundamentals of Automobile Development II	1,5 CR	Frech
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gauterin, Gießler
T-MACH-110796	Python Algorithm for Vehicle Technology	4 CR	Rhode
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer
T-MACH-108888	Simulation of Coupled Systems - Advance *This item will not influence the grade calculation of this parent.*	0 CR	Geimer, Xiang
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber
T-MACH-112126	Data-Driven Algorithms in Vehicle Technology	4 CR	Scheubner

Competence Certificate
The assessment is carried out as partial exams.

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

Prerequisites
None

Competence Goal
The student

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

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

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

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

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

8 Courses

T 8.1 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 22/23	2512402	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course / 🗔	Sunyaev, Kannengießer, Sturm, Beyene
Exams					
WT 22/23	7900086	Advanced Lab Blockchain Hackathon (Bachelor)			Sunyaev
ST 2023	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

T 8.2 Course: Advanced Lab Informatics (Bachelor) [T-WIWI-110541]

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

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

Events					
WT 22/23	2512204	Lab Realisation of innovative services (Bachelor)	3 SWS	Practical course / ✵	Oberweis, Toussaint, Schiefer, Schüler
WT 22/23	2512400	Practical Course Sociotechnical Information Systems Development (Bachelor)	3 SWS	Practical course / ▯	Sunyaev, Pandl, Goram, Leiser
WT 22/23	2512402	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course / ▯	Sunyaev, Kannengießer, Sturm, Beyene
WT 22/23	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course / ▯	Volkamer, Mayer, Berens, Mossano, Ballreich
WT 22/23	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course / ▯	Volkamer, Mayer, Berens, Mossano, Ballreich
ST 2023	2512204	Lab Realisation of innovative services (Bachelor)	3 SWS	Practical course / ✵	Schiefer, Schüler, Toussaint
ST 2023	2512400	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	3 SWS	Practical course / ▯	Sunyaev, Pandl, Goram, Leiser
ST 2023	2512402	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course / ▯	Sunyaev, Sturm, Kannengießer, Beyene
Exams					
WT 22/23	7900047	Advanced Lab Realization of Innovative Services (Bachelor)			Oberweis
WT 22/23	7900080	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)			Sunyaev
WT 22/23	7900086	Advanced Lab Blockchain Hackathon (Bachelor)			Sunyaev
WT 22/23	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
ST 2023	7900016	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)			Sunyaev
ST 2023	7900085	Advanced Lab Realization of innovative services (Bachelor)			Oberweis
ST 2023	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	**Lab Realisation of innovative services (Bachelor)**	**Practical course (P)**
	2512204, WS 22/23, 3 SWS, Language: German, Open in study portal	**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	**Praktikum Security, Usability and Society (Bachelor)**	**Practical course (P)**
	2512554, WS 22/23, 3 SWS, Language: German/English, Open in study portal	**Online**

Content

The Praktikum "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. The deadline for the first round is 18.07.2022. Topics in italics have been already assigned.

Important dates:

Kick-off: 13.10.2022, 10:00 AM CET in Big Blue Button - Link
Report + code submission : 30.01.2023 23:59 CET
Presentation deadline : 30.01.2023, 23:59 CET

Presentation day: 01.02.2023

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: Portfolio Graphical Recognition-Based PWDs with Gamepads
Number of students: 2 Bachelor or Master level
Description: Graphical passwords use graphical elements as passwords and they are usually easier to remember than textual passwords. Moreover, they can be combined with "portfolio authentication" techniques to make them shoulder surfing resistant. The goal of this topic is to implement a graphical portfolio authentication shceme for gamepads, based on previous textual schemes implementations.

Title: Development of a secure web interface with a ticket system for the Hashcat Password Cracker
Number of students: 2 Bachelor or Master level
Description: Hashcat is a console application which allows to crack passwords using a given wordlist or password pattern. In order to allow multiple not necessarily trustworthy users to register a password cracking job with the specified parameters in parallel, a web platform with a ticket system should be developed within the framework of this laboratory topic.Therefore a frontend and backend should be implemented separately and a clear description of the interface between is essential part of this work. Python with Flask Web Framework can be used to implement the backend. Good knowledge in programming, APIs and web security are required.

Designing Security User studies

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

Title: NoPhish Cardgame
Number of students: 1/2 Bachelor level
Description: Das NoPhish Konzept findet bereits in vielen Formen Anwendung. Es hilft dabei betrügerische Nachrichten von legitimen zu Unterscheiden. Die neueste Form ist ein Cardgame bei dem man spielerisch lernen kann Phishing zu erkennen. Hierbei wird sowohl grundlegendes Wissen, als auch konkretes Wissen vermittelt. Aufgabe: Erheben von Daten (Studiendesign ist bereits vorhanden) und Auswertung bestehender Daten mit neu erhobenen Daten

Title: Analysing the percetions on email subject extensions like 'Caution - This e-mail is sent from someone outside the company'
Number of students: 1/2 Bachelor or Master level
Description: Email subject extensions are used in myn organistions to reduce the risk to become a victim of a phishing email - why should your boss e.g. send you an external email? Likely to be a phish! The idea is to develope the study protocol and to collect first data which should be analysed.

Title: Benutzerstudie zur Erkennung von Angriffen auf die E-Mail Absicherung mit S/MIME-Zertifikaten
Number of students: 2 Bachelor or Master level
Description: Das KIT bietet den Beschäftigten und Studierenden die Möglichkeit, ihre E-Mail-Kommunikation mittels S/MIME-Zertifikaten abzusichern. Für die Nutzenden entsteht hierbei die Herausforderung, eingehende Nachrichten hinsichtlich gültiger Signatur und Verschlüsselung zu prüfen und mögliche Angriffe zu erkennen. Zielsetzung dieser Arbeit ist die Konzeption und Erstellung einer Nutzerstudie zur Evaluation von Schulungsmaterialien. Die Studie soll verschiedene Nutzungsszenarien bei der Erkennung von Angriffen (z.B. durch ungültige Zertifikate) und das Verhalten der Nutzenden innerhalb dieser Szenarien umfassen.

Title: Evaluation of the Sudoku Privacy Friendly App usability for users with rheumatoid arthritis (English only)
Number of students: 1 Bachelor or Master level
Description: The Privacy Friendly Apps are a set of applications developed by the SECUSO group that do not contain any advertisement or tracking mechanism, hence preserving the privacy of their users (https://secuso.aifb.kit.edu/english/105.php). One of these apps is "Sudoku", available for Android on both the Google Store and F-Droid. Although the app is friendlier to privacy that other alternatives, it requires multiple tactile interactions with the mobile device. This can be an issue for users with reduced hand mobility, such as those suffering from rheumatoid arthritis. To approximate the reduced mobility caused by reumatoid arthritis in healthy users, it is common to use arthritis simulation gloves (e.g., https://idarinstitute.com/products/arthritis-simulation-gloves). The task of the student is to design a lab study involving arthritis simulation gloves that evaluates the Sudoku app usability for users suffering from rheumatoid arthritis,.

Title: Replication and extension of "What is this URL's destination?" (English only)
Number of students: 1 Bachelor level
Description: Replication of studies is a fundamental part of the scientific process: it allows to confirm or deny experimental results and can open new lines of research. This topic is a replication of the study presented in Albakry, S., Vaniea, K. & Wolters, M.K. (2020) What is this URL's destination? Empirical Evaluation of Users' URL Reading" (https://doi.org/10.1145/3313831.3376168). The student will re-implement the study following the precise description from the original authors, run it and then compare the results with the previous iteration.

Title: Password Generator Defaults
Number of students: 2 Bachelor or Master level
Description: Password Managers are useful tools that help the use of complex passwords and avoid the password recycle practice. Moreover, they support users by providing password generator tools, that create random password of specific length. However, the defaults settings might be at odds with the password policies of popular website, e.g., they can contain forbidden characters or be too long/short. Moreover, we need to understand if Password Managers users change the default settings to generate passwords, in how many cases and for what reasons. The students task is therefore two-folds: (1) compare the default settings of several Password Managers to the privacy policies of popular websites; (2) design and implement a survey to collect the behavior of Password Managers users with regard to the password generator tools.

Title: Benutzerstudie zur Auswertung der PassSec+ Browser Extension mittels Eye-Tracking
Number of students: 1/2 Bachelor or Master level
Description: PassSec+ ist eine von SECUSO entwickelte Browser-Erweiterung für Firefox und Google Chrome, die hilft, Passwörter, Zahlungsdaten und andere sensible Daten besser zu schützen, indem es bereits vor der Eingabe dieser Daten prüft, ob eine sichere Dateneingabe gewährleistet ist und im Zweifel ein Dialog anzeigt, welcher den Nutzer bei der Entscheidung unterstützt. In der Nutzerstudie soll untersucht werden, wo der Fokus des Nutzers mit und ohne Benutzung von PassSec+ liegt und dabei die Effektivität zur Prävention vor Phishing untersucht werden. Es wird das Setup sowie der Aufbau der Studie bereits vorgegeben. Ziel ist es, die Nutzerstudie mit Probanden durchzuführen und die Daten entsprechend z.B. mit Heatmaps auszuwerten.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V	**Praktikum Security, Usability and Society (Master)** 2512555, WS 22/23, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

The Praktikum "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. The deadline for the first round is 18.07.2022. Topics in italics have been already assigned.

WiWi portal: https://portal.wiwi.kit.edu/ys/6273

Important dates:

Kick-off: 13.10.2022, 10:00 AM CET in Big Blue Button - Link
Report + code submission : 30.01.2023 23:59 CET
Presentation deadline : 30.01.2023, 23:59 CET

Presentation day: 01.02.2023

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: Portfolio Graphical Recognition-Based PWDs with Gamepads
Number of students: 2 Bachelor or Master level
Description: Graphical passwords use graphical elements as passwords and they are usually easier to remember than textual passwords. Moreover, they can be combined with "portfolio authentication" techniques to make them shoulder surfing resistant. The goal of this topic is to implement a graphical portfolio authentication shceme for gamepads, based on previous textual schemes implementations.

Title: Development of a secure web interface with a ticket system for the Hashcat Password Cracker
Number of students: 2 Bachelor or Master level
Description: Hashcat is a console application which allows to crack passwords using a given wordlist or password pattern. In order to allow multiple not necessarily trustworthy users to register a password cracking job with the specified parameters in parallel, a web platform with a ticket system should be developed within the framework of this laboratory topic.Therefore a frontend and backend should be implemented separately and a clear description of the interface between is essential part of this work. Python with Flask Web Framework can be used to implement the backend. Good knowledge in programming, APIs and web security are required.

Designing Security User studies

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

Title: Analysing the percetions on email subject extensions like 'Caution - This e-mail is sent from someone outside the company'
Number of students: 1/2 Bachelor or Master level
Description: Email subject extensions are used in myn organistions to reduce the risk to become a victim of a phishing email - why should your boss e.g. send you an external email? Likely to be a phish! The idea is to develope the study protocol and to collect first data which should be analysed.

Title: Benutzerstudie zur Erkennung von Angriffen auf die E-Mail Absicherung mit S/MIME-Zertifikaten
Number of students: 2 Bachelor or Master level
Description: Das KIT bietet den Beschäftigten und Studierenden die Möglichkeit, ihre E-Mail-Kommunikation mittels S/MIME-Zertifikaten abzusichern. Für die Nutzenden entsteht hierbei die Herausforderung, eingehende Nachrichten hinsichtlich gültiger Signatur und Verschlüsselung zu prüfen und mögliche Angriffe zu erkennen. Zielsetzung dieser Arbeit ist die Konzeption und Erstellung einer Nutzerstudie zur Evaluation von Schulungsmaterialien. Die Studie soll verschiedene Nutzungsszenarien bei der Erkennung von Angriffen (z.B. durch ungültige Zertifikate) und das Verhalten der Nutzenden innerhalb dieser Szenarien umfassen.

Title: Evaluation of the Sudoku Privacy Friendly App usability for users with rheumatoid arthritis (English only)
Number of students: 1 Bachelor or Master level
Description: The Privacy Friendly Apps are a set of applications developed by the SECUSO group that do not contain any advertisement or tracking mechanism, hence preserving the privacy of their users (https://secuso.aifb.kit.edu/english/105.php). One of these apps is "Sudoku", available for Android on both the Google Store and F-Droid. Although the app is friendlier to privacy that other alternatives, it requires multiple tactile interactions with the mobile device. This can be an issue for users with reduced hand mobility, such as those suffering from rheumatoid arthritis. To approximate the reduced mobility caused by reumatoid arthritis in healthy users, it is common to use arthritis simulation gloves (e.g., https://idarinstitute.com/products/arthritis-simulation-gloves). The task of the student is to design a lab study involving arthritis simulation gloves that evaluates the Sudoku app usability for users suffering from rheumatoid arthritis.

Title: Password Generator Defaults
Number of students: 2 Bachelor or Master level
Description: Password Managers are useful tools that help the use of complex passwords and avoid the password recycle practice. Moreover, they support users by providing password generator tools, that create random password of specific length. However, the defaults settings might be at odds with the password policies of popular website, e.g., they can contain forbidden characters or be too long/short. Moreover, we need to understand if Password Managers users change the default settings to generate passwords, in how many cases and for what reasons. The students task is therefore two-folds: (1) compare the default settings of several Password Managers to the privacy policies of popular websites; (2) design and implement a survey to collect the behavior of Password Managers users with regard to the password generator tools.

Title: Benutzerstudie zur Auswertung der PassSec+ Browser Extension mittels Eye-Tracking
Number of students: 1/2 Bachelor or Master level
Description: PassSec+ ist eine von SECUSO entwickelte Browser-Erweiterung für Firefox und Google Chrome, die hilft, Passwörter, Zahlungsdaten und andere sensible Daten besser zu schützen, indem es bereits vor der Eingabe dieser Daten prüft, ob eine sichere Dateneingabe gewährleistet ist und im Zweifel ein Dialog anzeigt, welcher den Nutzer bei der Entscheidung unterstützt. In der Nutzerstudie soll untersucht werden, wo der Fokus des Nutzers mit und ohne Benutzung von PassSec+ liegt und dabei die Effektivität zur Prävention vor Phishing untersucht werden. Es wird das Setup sowie der Aufbau der Studie bereits vorgegeben. Ziel ist es, die Nutzerstudie mit Probanden durchzuführen und die Daten entsprechend z.B. mit Heatmaps auszuwerten.

Title: User study on user's knowledge about brainwaves verification
Number of students: 1 Master level
Description: Brainwaves can be used to authenticate users. Hoerver, several questions are left unanswered regarding the users' stance on this: What is the prior knowledge of users about verification and brainwaves? Are they comfortable wearing a device to record their brainwaves? How are they feeling regarding storing their brainwaves samples? Which kind of information can be extracted from the smaples? How secure would such an authentication scheme be? The task of the student is to design, implement an pre-test a user study investigating these questions.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V	**Lab Realisation of innovative services (Bachelor)** 2512204, SS 2023, 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 2023, 3 SWS, Language: German/English, Open in study portal	**Practical course (P)** **Online**

Content

The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

T 8.3 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 see Annotations	Version 2

Events					
WT 22/23	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course / 📱	Volkamer, Mayer, Berens, Mossano, Ballreich
WT 22/23	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course / 📱	Volkamer, Mayer, Berens, Mossano, Ballreich
Exams					
WT 22/23	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
WT 22/23	7900307	Advanced Lab Security, Usability and Society (Master)			Volkamer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
The alternative exam assessment consists of:

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

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

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

Annotation
The course will not be offered in the summer semester 2023.

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

V	**Praktikum Security, Usability and Society (Bachelor)** 2512554, WS 22/23, 3 SWS, Language: German/English, Open in study portal	Practical course (P) Online

Content
The Praktikum "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. The deadline for the first round is 18.07.2022. Topics in italics have been already assigned.

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Presentation day: 01.02.2023

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: Portfolio Graphical Recognition-Based PWDs with Gamepads
Number of students: 2 Bachelor or Master level
Description: Graphical passwords use graphical elements as passwords and they are usually easier to remember than textual passwords. Moreover, they can be combined with "portfolio authentication" techniques to make them shoulder surfing resistant. The goal of this topic is to implement a graphical portfolio authentication shceme for gamepads, based on previous textual schemes implementations.

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Description: Hashcat is a console application which allows to crack passwords using a given wordlist or password pattern. In order to allow multiple not necessarily trustworthy users to register a password cracking job with the specified parameters in parallel, a web platform with a ticket system should be developed within the framework of this laboratory topic.Therefore a frontend and backend should be implemented separately and a clear description of the interface between is essential part of this work. Python with Flask Web Framework can be used to implement the backend. Good knowledge in programming, APIs and web security are required.

Designing Security User studies

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

Title: NoPhish Cardgame
Number of students: 1/2 Bachelor level
Description: Das NoPhish Konzept findet bereits in vielen Formen Anwendung. Es hilft dabei betrügerische Nachrichten von legitimen zu Unterscheiden. Die neueste Form ist ein Cardgame bei dem man spielerisch lernen kann Phishing zu erkennen. Hierbei wird sowohl grundlegendes Wissen, als auch konkretes Wissen vermittelt. Aufgabe: Erheben von Daten (Studiendesign ist bereits vorhanden) und Auswertung bestehender Daten mit neu erhobenen Daten

Title: Analysing the percetions on email subject extensions like 'Caution - This e-mail is sent from someone outside the company'
Number of students: 1/2 Bachelor or Master level
Description: Email subject extensions are used in myn organistions to reduce the risk to become a victim of a phishing email - why should your boss e.g. send you an external email? Likely to be a phish! The idea is to develope the study protocol and to collect first data which should be analysed.

Title: Benutzerstudie zur Erkennung von Angriffen auf die E-Mail Absicherung mit S/MIME-Zertifikaten
Number of students: 2 Bachelor or Master level
Description: Das KIT bietet den Beschäftigten und Studierenden die Möglichkeit, ihre E-Mail-Kommunikation mittels S/MIME-Zertifikaten abzusichern. Für die Nutzenden entsteht hierbei die Herausforderung, eingehende Nachrichten hinsichtlich gültiger Signatur und Verschlüsselung zu prüfen und mögliche Angriffe zu erkennen. Zielsetzung dieser Arbeit ist die Konzeption und Erstellung einer Nutzerstudie zur Evaluation von Schulungsmaterialien. Die Studie soll verschiedene Nutzungsszenarien bei der Erkennung von Angriffen (z.B. durch ungültige Zertifikate) und das Verhalten der Nutzenden innerhalb dieser Szenarien umfassen.

Title: Evaluation of the Sudoku Privacy Friendly App usability for users with rheumatoid arthritis (English only)
Number of students: 1 Bachelor or Master level
Description: The Privacy Friendly Apps are a set of applications developed by the SECUSO group that do not contain any advertisement or tracking mechanism, hence preserving the privacy of their users (https://secuso.aifb.kit.edu/english/105.php). One of these apps is "Sudoku", available for Android on both the Google Store and F-Droid. Although the app is friendlier to privacy that other alternatives, it requires multiple tactile interactions with the mobile device. This can be an issue for users with reduced hand mobility, such as those suffering from rheumatoid arthritis. To approximate the reduced mobility caused by reumatoid arthritis in healthy users, it is common to use arthritis simulation gloves (e.g., https://idarinstitute.com/products/arthritis-simulation-gloves). The task of the student is to design a lab study involving arthritis simulation gloves that evaluates the Sudoku app usability for users suffering from rheumatoid arthritis,.

Title: Replication and extension of "What is this URL's destination?" (English only)
Number of students: 1 Bachelor level
Description: Replication of studies is a fundamental part of the scientific process: it allows to confirm or deny experimental results and can open new lines of research. This topic is a replication of the study presented in Albakry, S., Vaniea, K. & Wolters, M.K. (2020) What is this URL's destination? Empirical Evaluation of Users' URL Reading" (https://doi.org/10.1145/3313831.3376168). The student will re-implement the study following the precise description from the original authors, run it and then compare the results with the previous iteration.

Title: Password Generator Defaults
Number of students: 2 Bachelor or Master level
Description: Password Managers are useful tools that help the use of complex passwords and avoid the password recycle practice. Moreover, they support users by providing password generator tools, that create random password of specific length. However, the defaults settings might be at odds with the password policies of popular website, e.g., they can contain forbidden characters or be too long/short. Moreover, we need to understand if Password Managers users change the default settings to generate passwords, in how many cases and for what reasons. The students task is therefore two-folds: (1) compare the default settings of several Password Managers to the privacy policies of popular websites; (2) design and implement a survey to collect the behavior of Password Managers users with regard to the password generator tools.

Title: Benutzerstudie zur Auswertung der PassSec+ Browser Extension mittels Eye-Tracking
Number of students: 1/2 Bachelor or Master level
Description: PassSec+ ist eine von SECUSO entwickelte Browser-Erweiterung für Firefox und Google Chrome, die hilft, Passwörter, Zahlungsdaten und andere sensible Daten besser zu schützen, indem es bereits vor der Eingabe dieser Daten prüft, ob eine sichere Dateneingabe gewährleistet ist und im Zweifel ein Dialog anzeigt, welcher den Nutzer bei der Entscheidung unterstützt. In der Nutzerstudie soll untersucht werden, wo der Fokus des Nutzers mit und ohne Benutzung von PassSec+ liegt und dabei die Effektivität zur Prävention vor Phishing untersucht werden. Es wird das Setup sowie der Aufbau der Studie bereits vorgegeben. Ziel ist es, die Nutzerstudie mit Probanden durchzuführen und die Daten entsprechend z.B. mit Heatmaps auszuwerten.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

| V | **Praktikum Security, Usability and Society (Master)**
2512555, WS 22/23, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**
Online |

Content

The Praktikum "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. The deadline for the first round is 18.07.2022. Topics in italics have been already assigned.

WiWi portal: https://portal.wiwi.kit.edu/ys/6273

Important dates:

Kick-off: 13.10.2022, 10:00 AM CET in Big Blue Button - Link
Report + code submission : 30.01.2023 23:59 CET
Presentation deadline : 30.01.2023, 23:59 CET

Presentation day: 01.02.2023

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: Portfolio Graphical Recognition-Based PWDs with Gamepads
Number of students: 2 Bachelor or Master level
Description: Graphical passwords use graphical elements as passwords and they are usually easier to remember than textual passwords. Moreover, they can be combined with "portfolio authentication" techniques to make them shoulder surfing resistant. The goal of this topic is to implement a graphical portfolio authentication shceme for gamepads, based on previous textual schemes implementations.

Title: Development of a secure web interface with a ticket system for the Hashcat Password Cracker
Number of students: 2 Bachelor or Master level
Description: Hashcat is a console application which allows to crack passwords using a given wordlist or password pattern. In order to allow multiple not necessarily trustworthy users to register a password cracking job with the specified parameters in parallel, a web platform with a ticket system should be developed within the framework of this laboratory topic.Therefore a frontend and backend should be implemented separately and a clear description of the interface between is essential part of this work. Python with Flask Web Framework can be used to implement the backend. Good knowledge in programming, APIs and web security are required.

Designing Security User studies

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

Title: Analysing the percetions on email subject extensions like 'Caution - This e-mail is sent from someone outside the company'
Number of students: 1/2 Bachelor or Master level
Description: Email subject extensions are used in myn organistions to reduce the risk to become a victim of a phishing email - why should your boss e.g. send you an external email? Likely to be a phish! The idea is to develope the study protocol and to collect first data which should be analysed.

Title: Benutzerstudie zur Erkennung von Angriffen auf die E-Mail Absicherung mit S/MIME-Zertifikaten
Number of students: 2 Bachelor or Master level
Description: Das KIT bietet den Beschäftigten und Studierenden die Möglichkeit, ihre E-Mail-Kommunikation mittels S/MIME-Zertifikaten abzusichern. Für die Nutzenden entsteht hierbei die Herausforderung, eingehende Nachrichten hinsichtlich gültiger Signatur und Verschlüsselung zu prüfen und mögliche Angriffe zu erkennen. Zielsetzung dieser Arbeit ist die Konzeption und Erstellung einer Nutzerstudie zur Evaluation von Schulungsmaterialien. Die Studie soll verschiedene Nutzungsszenarien bei der Erkennung von Angriffen (z.B. durch ungültige Zertifikate) und das Verhalten der Nutzenden innerhalb dieser Szenarien umfassen.

Title: Evaluation of the Sudoku Privacy Friendly App usability for users with rheumatoid arthritis (English only)
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Number of students: 2 Bachelor or Master level
Description: Password Managers are useful tools that help the use of complex passwords and avoid the password recycle practice. Moreover, they support users by providing password generator tools, that create random password of specific length. However, the defaults settings might be at odds with the password policies of popular website, e.g., they can contain forbidden characters or be too long/short. Moreover, we need to understand if Password Managers users change the default settings to generate passwords, in how many cases and for what reasons. The students task is therefore two-folds: (1) compare the default settings of several Password Managers to the privacy policies of popular websites; (2) design and implement a survey to collect the behavior of Password Managers users with regard to the password generator tools.

Title: Benutzerstudie zur Auswertung der PassSec+ Browser Extension mittels Eye-Tracking
Number of students: 1/2 Bachelor or Master level
Description: PassSec+ ist eine von SECUSO entwickelte Browser-Erweiterung für Firefox und Google Chrome, die hilft, Passwörter, Zahlungsdaten und andere sensible Daten besser zu schützen, indem es bereits vor der Eingabe dieser Daten prüft, ob eine sichere Dateneingabe gewährleistet ist und im Zweifel ein Dialog anzeigt, welcher den Nutzer bei der Entscheidung unterstützt. In der Nutzerstudie soll untersucht werden, wo der Fokus des Nutzers mit und ohne Benutzung von PassSec+ liegt und dabei die Effektivität zur Prävention vor Phishing untersucht werden. Es wird das Setup sowie der Aufbau der Studie bereits vorgegeben. Ziel ist es, die Nutzerstudie mit Probanden durchzuführen und die Daten entsprechend z.B. mit Heatmaps auszuwerten.

Title: User study on user's knowledge about brainwaves verification
Number of students: 1 Master level
Description: Brainwaves can be used to authenticate users. Hoerver, several questions are left unanswered regarding the users' stance on this: What is the prior knowledge of users about verification and brainwaves? Are they comfortable wearing a device to record their brainwaves? How are they feeling regarding storing their brainwaves samples? Which kind of information can be extracted from the smaples? How secure would such an authentication scheme be? The task of the student is to design, implement an pre-test a user study investigating these questions.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

T   8.4 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 Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 22/23	2512400	Practical Course Sociotechnical Information Systems Development (Bachelor)	3 SWS	Practical course / 🖥	Sunyaev, Pandl, Goram, Leiser

Exams				
WT 22/23	7900080	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)		Sunyaev
ST 2023	7900016	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

| T | **8.5 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	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2511026	Advanced Programming - Application of Business Software	2 SWS	Lecture / 🖥	Klink
WT 22/23	2511027	Exercises Advanced Programming - Application of Business Software	1 SWS	Practice / 🧩	Klink, Schreiber
WT 22/23	2511028	Computer lab Advanced Programming - Application of Business Software	2 SWS	Practice / 🖥	Schreiber, Forell, Ullrich
Exams					
WT 22/23	7900019	Advanced Programming - Application of Business Software			
ST 2023	7900049	Advanced Programming - Application of Business Software			Klink

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate
The success control takes place in the form of a written examination. The duration of the exam is 60 minutes 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 22/23, 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   8.6 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	4

Events					
ST 2023	2511020	Advanced Programming - Java Network Programming	2 SWS	Lecture / 🗣	Ratz, Stegmaier, Schneider, Mütsch
ST 2023	2511021	Tutorium zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	1 SWS	Tutorial (/ 🧩	Ratz, Stegmaier, Schneider, Mütsch
ST 2023	2511023	Rechnerpraktikum zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	2 SWS	/ 🧩	Ratz, Stegmaier, Schneider, Mütsch
Exams					
WT 22/23	7900020	Advanced Programming - Java Network Programming			Ratz
ST 2023	7900041	Advanced Programming - Java Network Programming			Ratz

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

Competence Certificate

At the end of the lecture period, a written examination (90 min.) (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**
2511020, SS 2023, 2 SWS, Language: German, Open in study portal
     Lecture (V)
On-Site

Content

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

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

Learning objectives:

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

Workload:

The total workload for this course is approximately 150 hours.

Organizational issues

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

Literature

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

Weiterführende Literatur:

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

T | 8.7 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

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.

T   8.8 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 22/23	5011007	Analysis of Social Structures	2 SWS	Practice / 🖥	Nollmann
Exams					
WT 22/23	7400029	Analalysis of Social Structurs (WiWi)			Nollmann

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

T 8.9 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 2023	2134150	Gas, lubricating oil and operating media analysis in drive train development	2 SWS	Lecture / 🗣	Gohl

Exams			
WT 22/23	76-T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	Koch
ST 2023	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	**Gas, lubricating oil and operating media analysis in drive train development** 2134150, SS 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Literature
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.

T 8.10 Course: Analysis of Multivariate Data [T-WIWI-103063]

Responsible:	Prof. Dr. Oliver Grothe
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101599 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

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

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   8.11 Course: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

Responsible: Jürgen Pfeil
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2023	2134134	Analysis tools for combustion diagnostics	2 SWS	Lecture / 🗣	Pfeil
Exams					
WT 22/23	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Koch
ST 2023	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**	Lecture (V)
2134134, SS 2023, 2 SWS, Language: German, Open in study portal	On-Site

Literature
Skript, erhältlich in der Vorlesung

T   8.12 Course: Analytical CRM [T-WIWI-102596]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101422 - Specialization in Customer Relationship Management

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

Competence Certificate

The exam will be offered for first time writers for the last time in the summer semester 2020.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites

None

Recommendation

We expect knowledge about data models and the UML modelling language concerning information systems.

T   8.13 Course: Applied Informatics – Applications of Artificial Intelligence [T-WIWI-110340]

Responsible:	Dr.-Ing. Michael Färber
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101426 - Electives in Informatics
	M-WIWI-105112 - Applied Informatics

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

Events					
WT 22/23	2511314	Applied Informatics - Applications of Artificial Intelligence	2 SWS	Lecture / 🧩	Färber, Käfer
WT 22/23	2511315	Exercises to Applied Informatics - Applications of Artificial Intelligence	1 SWS	Practice / 🗣	Färber, Käfer, Popovic, Noullet, Qu , Yuan
Exams					
WT 22/23	79AIFB_AKI_C1	Applied Informatics - Applications of Artificial Intelligence			Färber
ST 2023	79AIFB_AKI_C1	Applied Informatics - Applications of AI (Registration until 17 July 2023)			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.

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

V	**Applied Informatics - Applications of Artificial Intelligence** 2511314, WS 22/23, 2 SWS, Language: German, Open in study portal	Lecture (V) Blended (On-Site/Online)

Content

The lecture provides insights into the fundamentals of artificial intelligence. Basic methods of artificial intelligence and their applications in industry are presented.

Applications of the AI is a sub-area of computer science dealing with the automation of intelligent behavior. In general, it is a question of mapping human intelligence. Methods of artificial intelligence are presented in various areas such as, for example, question answering systems, speech recognition and image recognition.

The lecture gives an introduction to the basic concepts of artificial intelligence. Essential theoretical foundations, methods and their applications are presented and explained.

This lecture aims to provide students with a basic knowledge and understanding of the structure, analysis and application of selected methods and technologies on artificial intelligence. The topics include, among others, knowledge modeling, machine learning, text mining, uninformed search, and intelligent agents.

Learning objectives:

The students

- consider current research topics in the field of artificial intelligence and in particular learn about the topics of knowledge modeling, machine learning, text mining and uninformed search.
- interdisciplinary thinking.
- technological approaches to current problems.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

V	**Exercises to Applied Informatics - Applications of Artificial Intelligence** 2511315, WS 22/23, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **On-Site**

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

Events					
ST 2023	2511200	Applied Informatics - Database Systems	2 SWS	Lecture / 🗣	Sommer
ST 2023	2511201	Exercises Applied Informatics - Database Systems	1 SWS	Practice / 🗣	Sommer

Exams				
WT 22/23	79AIFB_DBS_C3	Applied Informatics - Database Systems		Oberweis
ST 2023	79AIFB_DBS_B1	Applied Informatics - Database Systems (Registration until 17 July 2023)		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 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content

Database systems (DBS) play an important role in today's companies. Internal and external data is stored and processed in databases in every company. The proper management and organization of data helps to solve many problems, enables simultaneous queries from multiple users and is the organizational and operational base for the entire working procedures and processes of the company. The lecture leads in the area of the database theory, covers the basics of database languages and database systems, considers basic concepts of object-oriented and XML databases, conveys the principles of multi-user control of databases and physical data organization. In addition, it gives an overview of business problems often encountered in practice such as:

- Correctness of data (operational, semantic integrity)
- Restore of a consistent database state
- Synchronization of parallel transactions (phantom problem).

Learning objectives:

Students

- are familiar with the concepts and principles of data base models, languages and systems and their applications and explain it,
- design and model relational data bases on the basis of theoretical foundations,
- create queries for relational databases,
- know how to handle enhanced data base problems occurring in the enterprises.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Schlageter, Stucky. Datenbanksysteme: Konzepte und Modelle. Teubner 1983.
- S. M. Lang, P. C. Lockemann. Datenbankeinsatz. Springer-Verlag 1995.
- Jim Gray, Andreas Reuter. Transaction Processing: Concepts and Techniques. Morgan Kaufmann 1993.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

V	**Exercises Applied Informatics - Database Systems** 2511201, SS 2023, 1 SWS, Language: German, Open in study portal	**Practice (Ü) On-Site**

Content

Database systems (DBS) play an enormously important role in today's companies. The internal and external data is stored and processed in the database of the respective company. The correct management and organization of this data helps to solve numerous problems, enables simultaneous queries by several users and is the organizational and operational basis for the entire workflows and processes of the company.

The lecture introduces the field of database theory, covers the basics of database languages and database systems, teaches the principles of multi-user database control and physical data organization. In addition, it provides an overview of database problems often encountered in business practice, such as the correctness of data (operational, semantic integrity), the recovery of a consistent database state, and the synchronization of parallel transactions.

Literature

Schlageter / Stucky: Datenbanksysteme: Konzepte und Modelle, 2. Auflage, Teubner, Stuttgart, 1983 P. C. Lockemann / J. W. Schmidt (Hrsg.): Datenbank-Handbuch, Springer-Verlag, 1987 S. Cannan / G. Otten: SQL - The Standard Handbook, McGraw-Hill, 1993 Jim Gray / Andreas Reuter: Transaction Processing: Concepts and Techniques, Morgan Kaufmann, 1993 S. M. Lang / P. C. Lockemann: Datenbankeinsatz, Springer-Verlag, 1995 Ramez Elmasri / Shamkant B. Navathe: Fundamentals of Database Systems, Addison-Wesley, 1994 und 2000

T   8.15 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	see Annotations	4

Exams			
WT 22/23	79AIFB_IS_A3	Applied Informatics - Information Security	Volkamer
ST 2023	79AIFB_IS_A1	Applied Informatics - Information Security (Registration until 17 July 2023)	Volkamer

Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation, for which admission must be obtained through successful participation in the exercise during the semester.

The exam takes place every semester and can be repeated at every regular examination date.

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-WIWI-108387 - Information Security must not have been started.

Annotation

Lecture and exercise will not be offered in the summer semester 2023.

T	8.16 Course: Applied Informatics – Modelling [T-WIWI-110338]

Responsible: Dr.-Ing. 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 22/23	2511030	Applied Informatics - Modelling	2 SWS	Lecture / 🗣	Oberweis, Schiefer, Schüler
WT 22/23	2511031	Exercises to Applied Informatics - Modelling	1 SWS	Practice / 🗣	Oberweis, Schiefer, Schüler
Exams					
WT 22/23	79AIFB_AI1_C5	Applied Informatics - Modelling			Oberweis
ST 2023	79AIFB_AI1_B2	Applied Informatics - Modelling (Registration until 17 July 2023)			Oberweis

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written examination (60 min) in the first week after lecture period (according to Section 4 (2),1 of the examination regulation).

Prerequisites
None

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

| V | **Applied Informatics - Modelling**
2511030, WS 22/23, 2 SWS, Language: German, Open in study portal | Lecture (V) On-Site |
|---|---|---|

Content

In the context of complex information systems, modelling is of central importance, e.g. – in the context of systems to be developed – for a better understanding of their functionality or in the context of existing systems for supporting maintenance and further development.

Modelling, in particular modelling of information systems, forms the core part of this lecture. The lecture is organized in two parts. The first part mainly covers the modelling of static aspectes, the second part covers the modelling of dynamic aspects of information systems.

The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and 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
- Presence time: 45 hours
- Self study: 75-90 hours

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

Weiterführende Literatur:

- 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 22/23, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **On-Site**

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

Bei Bedarf wird ein Tutorium online angeboten.

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

Weiterführende Literatur:

- 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.

8 COURSES

Course: Applied Informatics – Principles of Internet Computing: Foundations
for Emerging Technologies and Future Services [T-WIWI-110339]

T 8.17 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	2

Events					
ST 2023	2511032	Applied Informatics - Internet Computing	2 SWS	Lecture / 🗣	Sunyaev
ST 2023	2511033	Übungen zu Angewandte Informatik - Internet Computing	1 SWS	Practice / 🧩	Sunyaev, Rank, Guse
Exams					
WT 22/23	79AIFB_AI2_A1	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services			Sunyaev
ST 2023	79AIFB_AI2_A2	Applied Informatics - Internet Computing (Registration until 17 July 2023)			Sunyaev

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

Successful participation in the exercise by submitting correct solutions to 50% of the exercises can earn a grade bonus. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Annotation
Replaces from winter semester 2019/2020 T-WIWI-109445 "Applied Informatics - Internet Computing".

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

V Applied Informatics - Internet Computing
2511032, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

8 COURSES

Course: Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-110339]

Content

The lecture Applied Computer Science - Internet Computing provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

Learning objectives:

The student learns about basic concepts and emerging technologies of distributed systems and internet computing. Practical topics will be deepened in lab classes.

Recommendations:

Knowledge of content of the module [WI1INFO].

Workload:

The total workload for this course is approximately 135-150 hours.

Literature

Wird in der Vorlesung bekannt gegeben

T   8.18 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	2

Events					
ST 2023	2511206	Applied Informatics - Software Engineering	2 SWS	Lecture / 🗣	Oberweis
ST 2023	2511207	Übungen zu Angewandte Informatik - Software Engineering	1 SWS	Practice / 🗣	Oberweis, Forell, Frister, Schüler, Fritsch
Exams					
WT 22/23	79AIFB_SE_B1	Applied Informatics - Software Engineering			Oberweis
ST 2023	79AIFB_SE_B3	Applied Informatics - Software Engineering (Registration until 17 July 2023)			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.

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

V	**Applied Informatics - Software Engineering** 2511206, SS 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

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 8.19 Course: Artificial Intelligence in Production [T-MACH-112115]

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

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2149921	Artificial Intelligence in Production	2 SWS	Lecture / ⚙	Fleischer, Schlagenhauf
Exams					
WT 22/23	76-T-MACH-112115	Artificial Intelligence in Production			Fleischer
ST 2023	76-T-MACH-112115	Artificial Intelligence in Production			Fleischer

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

Competence Certificate
Written Exam (90 min)

Prerequisites
none

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

V	**Artificial Intelligence in Production**	Lecture (V)
	2149921, WS 22/23, 2 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Content

The module AI in Production is designed to teach students the practical, holistic integration of machine learning and artificial intelligence methods in production. The course is oriented towards the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content-related aspects (methods) within the individual phases. In addition to teaching the practical aspects of integrating the most important machine learning methods, the focus is primarily on the necessary steps for data generation and data preparation as well as the implementation and validation of the methods in an industrial environment.

The lecture"Artificial Intelligence in Production" deals with the theoretical basics in a practical context. Here, the six phases of the CRISP-DM process are run through sequentially and the necessary basics for the implementation of the respective phases are taught. The course first deals with the data sources that are prevalent in the production environment. Subsequently, possibilities for target-oriented data acquisition as well as data transfer and data storage are introduced. Possibilities for data filtering and data preprocessing are discussed and production-relevant aspects are pointed out. The course then covers in detail the necessary algorithms and procedures for implementing AI in production, before techniques and fundamentals for making the models permanent in production (deployment) are discussed.

Learning Outcomes:

The students

- understand the relevance for the application of AI in production and know the main drivers and challenges.
- will understand the CRISP-DM process for implementing AI projects in manufacturing. Students will be able to name the main data sources, data ingestion methods, communication architectures, models and methods for data processing.
- will understand the main machine learning techniques and be able to contrast and select them in the context of industrial issues.
- are able to assess whether a specific problem in the context of production can be solved in a target-oriented manner using machine learning methods, as well as what the necessary steps are for implementation.
- are able to assess the most important challenges and name possible approaches to solve them.
- are able to apply the phases of the CRISP-DM to a problem in production. Students will know the steps necessary to build a data pipeline and will be able to do so theoretically in the context of a real-world use case.
- are able to evaluate the results of common deep learning methods and, based on this, to theoretically elaborate and theoretically apply proposed solutions (from the field of machine learning).

Workload:

MACH:
regular attendance: 31,5 hours
self-study: 88,5 hours
WING:
regular attendance: 31,5 hours
self-study: 118,5 hours

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   8.20 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 2023	2560550	Digitale Märkte und Mechanismen	2 SWS	Lecture / 🎤	Rosar
ST 2023	2560551	Übung zu Digitale Märkte und Mechanismen	1 SWS	Practice / 🎤	Rosar
Exams					
ST 2023	7900161	Exam Digitale Märkte und Mechanismen			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   Digitale Märkte und Mechanismen

2560550, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 8.21 Course: Automotive Engineering I [T-MACH-102203]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 22/23	2113809	Automotive Engineering I	4 SWS	Lecture / 🗣	Gauterin, Gießler
Exams					
WT 22/23	76-T-MACH-102203	Automotive Engineering I			Gauterin
ST 2023	76-T-MACH-102203	Automotive Engineering I			Gauterin

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

Competence Certificate
Written examination

Duration: 120 minutes

Auxiliary means: none

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100092 - Automotive Engineering I must not have been started.

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

V	Automotive Engineering I 2113809, WS 22/23, 4 SWS, Language: English, Open in study portal	Lecture (V) On-Site

Content
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5.Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues

You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/, *students from eucor universities send an e-mail to* martina.kaiser@kit.edu

Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.

Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Literature

1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichister 2015

2. Onori, S. / Serrao, L: / Rizzoni, G.: Hybrid Electric Vehicles - Energy Management Strategies, Springer London, Heidelberg, New York, Dordrecht 2016

3. Reif, K.: Brakes, Brake Control and Driver Assistance Systems - Function, Regulation and Components, Springer Vieweg, Wiesbaden 2015

4. Gauterin, F. / Gießler, M. / Gnadler, R.: Scriptum zur Vorlesung 'Automotive Engineering I', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

T 8.22 Course: Automotive Engineering I [T-MACH-100092]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Hans-Joachim Unrau

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Language	Version
Written examination	6	Grade to a third	Each winter term	1 terms		3

Events					
WT 22/23	2113805	Automotive Engineering I	4 SWS	Lecture / 🗣	Gauterin, Unrau
WT 22/23	2113809	Automotive Engineering I	4 SWS	Lecture / 🗣	Gauterin, Gießler
Exams					
WT 22/23	76-T-MACH-100092	Automotive Engineering			Unrau, Gauterin
WT 22/23	76-T-MACH-100092_mdl	Automotive Engineering I			Gauterin, Unrau
ST 2023	76-T-MACH-100092	Automotive Engineering			Gauterin, Unrau

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

Competence Certificate
Written examination

Duration: 120 minutes

Auxiliary means: none

Prerequisites
The brick "T-MACH-102203 - Automotive Engineering I" is not started or finished. The bricks "T-MACH-100092 - Grundlagen der Fahrzeugtechnik I" and "T-MACH-102203 - Automotive Engineering I" can not be combined.

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

V Automotive Engineering I
2113805, WS 22/23, 4 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Content
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performance, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5. Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues

Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Kann nicht mit der Veranstaltung [2113809] kombiniert werden.

Can not be combined with lecture [2113809].

Literature

1. Mitschke, M. / Wallentowitz, H.: Dynamik der Kraftfahrzeuge, Springer Vieweg, Wiesbaden 2014

2. Pischinger, S. / Seiffert, U.: Handbuch Kraftfahrzeugtechnik, Springer Vieweg, Wiesbaden 2016

3. Gauterin, F. / Unrau, H.-J. / Gnadler, R.: Scriptum zur Vorlesung "Grundlagen der Fahrzeugtechnik I", KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

V **Automotive Engineering I** 2113809, WS 22/23, 4 SWS, Language: English, Open in study portal	**Lecture (V)** **On-Site**

Content

1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5.Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues

You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/*, students from eucor universities send an e-mail to* martina.kaiser@kit.edu

Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.

Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Literature

1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichister 2015

2. Onori, S. / Serrao, L: / Rizzoni, G.: Hybrid Electric Vehicles - Energy Management Strategies, Springer London, Heidelberg, New York, Dordrecht 2016

3. Reif, K.: Brakes, Brake Control and Driver Assistance Systems - Function, Regulation and Components, Springer Vieweg, Wiesbaden 2015

4. Gauterin, F. / Gießler, M. / Gnadler, R.: Scriptum zur Vorlesung 'Automotive Engineering I', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

T 8.23 Course: Automotive Engineering II [T-MACH-102117]

Responsible: Prof. Dr. Frank Gauterin
                     Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

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

Events					
ST 2023	2114835	Automotive Engineering II	2 SWS	Lecture / 🗣	Unrau
ST 2023	2114855	Automotive Engineering II	2 SWS	Lecture / 🗣	Gießler
Exams					
WT 22/23	76-T-MACH-102117	Automotive Engineering II			Unrau, Gauterin
WT 22/23	76T-MACH-102117-2	Automotive Engineering II			Gauterin, Unrau
ST 2023	76-T-MACH-102117	Automotive Engineering II			Unrau, Gauterin

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

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

V	**Automotive Engineering II** 2114835, SS 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content
1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, comparison of designs

Learning Objectives:

The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle bodywork and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

Organizational issues
Kann nicht mit der Veranstaltung [2114855] kombiniert werden.

Can not be combined with lecture [2114855]

Literature

1. Heißing, B. / Ersoy, M.: Fahrwerkhandbuch: Grundlagen, Fahrdynamik, Komponenten, Systeme, Mechatronik, Perspektiven, Springer Vieweg, Wiesbaden, 2013

2. Breuer, B. / Bill, K.-H.: Bremsenhandbuch: Grundlagen - Komponenten - Systeme - Fahrdynamik, Springer Vieweg, Wiesbaden, 2017

3. Unrau, H.-J. / Gnadler, R.: Scriptum zur Vorlesung 'Grundlagen der Fahrzeugtechnik II', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährliche Aktualisierung

V	**Automotive Engineering II** 2114855, SS 2023, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, comparison of the designs

Learning Objectives:

The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

Literature
Elective literature:

1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichester 2015
2. Heißing, B. / Ersoy, M.: Chassis Handbook - fundamentals, driving dynamics, components, mechatronics, perspectives, Vieweg+Teubner, Wiesbaden 2011
3. Gießler, M. / Gnadler, R.: Script to the lecture "Automotive Engineering II", KIT, Institut of Vehicle System Technology, Karlsruhe, annual update

T   8.24 Course: B2B Sales Management [T-WIWI-111367]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

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

Events					
WT 22/23	2572187	B2B Sales Management	2 SWS	Lecture / 🗣	Klarmann
WT 22/23	2572188	Übung zu B2B Vertriebsmanagement (Bachelor)	1 SWS	Practice / 🗣	Cordts, Gerlach
Exams					
WT 22/23	7900125	B2B Sales Management			Klarmann
WT 22/23	7900346	B2B Sales Management			Klarmann

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

Competence Certificate
The assessment of success takes place through the preparation and presentation of a sales presentation based on a case study (max 30 points) and a written exam with additional aids in the sense of an open book exam (max. 60 points). In total, a maximum of 90 points can be achieved in the course. Further details will be announced during the lecture.

Prerequisites
None.

Annotation
Starting in the winter semester 22/23, the course will be scheduled to be completed after the first half of the semester.
For further information, please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

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

V	**B2B Sales Management** 2572187, WS 22/23, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content
Content

The event is designed to teach you taking on marketing responsibility in a very special business environment. This involves companies that sell and market their (often technically highly complex) products themselves to other companies, which is referred to as "business-to-business" (B2B) marketing and sales. Since traditional communication instruments (e.g. advertising) often hardly work in this environment and many projects lead to a long-term cooperation between supplier and customer, (personal) sales play a special role in marketing. Therefore, this event introduces marketing in B2B markets on the one hand and deals with questions of sales and distribution on the other hand.

Topics with regard to B2B sales management are:

- Basic aspects of B2B sales and B2B purchasing
- Understanding of marketing challenges in specific B2B business types (commodities, systems, solutions)
- Value pricing and value-based selling
- Organizational buying behavior
- Basics of B2B customer relationship management (e.g. key account management, reference customer management)
- Sales process (lead generation, sales presentations, customer-oriented selling, closing)
- Sales automation

Learning objectives

Students

- Are familiar with marketing and sales peculiarities and challenges in B2B environments
- Are able to identify different B2B business types and their marketing characteristics
- Are familiar with central theories of organizational buying behavior
- Are familiar with central objectives of Customer Relationship Management in B2B environments and are able to implement them with appropriate tools
- Are able to prioritize customers and calculate B2B Customer Lifetime Value
- Know how B2B sales presentations work and have also gained practical experience in this area
- Are able to determine value-based prices

Workload

The total workload for this course is approximately 135.0 hours.
Attendance time: 35.0 hours
Self-study: 100.0 hours

Organization

A detailed schedule will be announced.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 8.25 Course: Bachelor's Thesis [T-WIWI-103067]

Responsible:	Studiendekan des KIT-Studienganges
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101601 - Module Bachelor's Thesis

Type	Credits	Grading scale	Version
Final Thesis	12	Grade to a third	1

Competence Certificate
see module description

Prerequisites
see module description

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline	6 months
Maximum extension period	1 months
Correction period	6 weeks

T   8.26 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 2023	2560280	Basic Principles of Economic Policy	2 SWS	Lecture / 🎙	Ott
ST 2023	2560281	Exercises of Basic Principles of Economic Policy	1 SWS	Practice / 🎙	Scheidt, Zoroglu, Völkle
Exams					
WT 22/23	7900079	Basic Principles of Economic Policy			Ott
ST 2023	7900106	Basic Principles of Economic Policy			Ott

Legend: 📱 Online, 🜲 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

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

Annotation

Please note that the lecture will not be held in summer semester 2021. The exam is offered.

Description:

Theory of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:

Students learn:

- To apply basic concepts of micro- and macroeconomic theories to economic policy issues.
- to develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- to derive theory-based policy recommendations.

Learning content:

- Market interventions: microeconomic perspective
- Market interventions: macroeconomic perspective
- Institutional economic aspects
- Economic policy and welfare economics
- Economic policy makers: Political-economic aspects

Workload:

- Total effort at 4.5 LP: approx. 135 hours
- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Media:

See course announcement

References:

See course announcement

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

V	**Basic Principles of Economic Policy** 2560280, SS 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content

The lecture deals with theories of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:

Students shall be given the ability to

- apply basic concepts of micro- and macroeconomic theories to economic policy issues
- develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- derive theory-based policy recommendations

Recommendations:

Basic micro- and macroeconomic knowledge is required, especially as taught in the courses Economics I [2610012] and Economics II [2600014].

Workload:

Total effort at 4.5 LP is approx. 135 hours and consists of:

- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Assessment:

The examination takes place in the form of a written examination (60min) (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

Organizational issues

Zugehörige Veranstaltung: Übungen zur Einführung in die Wirtschaftspolitik [2560281]

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 2023, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **On-Site**

Organizational issues

Zugehörige Veranstaltung: [2560280] Einführung in die Wirtschaftspolitik

Literature

- Klump, Rainer (2013): Wirtschaftspolitik. Pearson Studium
- Baldwin, Richard und Charles Wyplosz (2019): The Economics of European Integration, 6. Edition, McGraw-Hill Education, London
- Foliensatz zur Vorlesung
- Übungsaufgaben

T   8.27 Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

Responsible:	Dr. Gerd Gutekunst
	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101403 - Public Finance
	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

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

Events					
WT 22/23	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture / 🗣	Wigger, Gutekunst

Exams				
WT 22/23	790unbe	Basics of German Company Tax Law and Tax Planning		Wigger
ST 2023	790unbe	Basics of German Company Tax Law and Tax Planning		Wigger

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5 h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course "Öffentliche Einnahmen" beforehand.

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

V	**Basics of German Company Tax Law and Tax Planning** 2560134, WS 22/23, 3 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content
Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

T   8.28 Course: Basics of Technical Logistics I [T-MACH-109919]

Responsible:	Dr.-Ing. Martin Mittwollen
	Dr.-Ing. Jan Oellerich
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101279 - Technical Logistics

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

Events					
WT 22/23	2117095	Basics of Technical Logistics I	3 SWS	Lecture / Practice (/ ⚙	Mittwollen, Oellerich

Exams				
WT 22/23	76-T-MACH-109001	Basics of Technical Logistics I		Mittwollen
WT 22/23	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 I
2117095, WS 22/23, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content

- effect model of conveyor machines
- elements for the change of position and orientation
- conveyor processes
- identification systems
- drives
- mechanical behaviour of conveyors
- structure and function of conveyor machines
- elements of intralogistics
- sample applications and calculations in addition to the lectures inside practical lectures

Students are able to:

- Describe processes and machines of technical logistics,
- Model the fundamental structures and the impacts of material handling machines with mathematical models,
- Refer to industrially used machines
- Model real machines applying knowledge from lessons and calculate their dimensions.

Organizational issues

Die Erfolgskontrolle erfolgt in Form einer schritflichen oder mündlichen Prüfung (nach §4 (2), 1 bzw. 2SPO).

The assessment consists of a written or oral exam according to Section 4 (2), 1 or 2of the examination regulation.

Es wird Kenntnis der Grundlagen der Technischen Mechanik vorausgesetzt.

Basics knowledge of technical mechanics is preconditioned.

Ergänzungsblätter, Präsentationen,Tafel.

Supplementary sheets, presentations, blackboard.

Präsenz: 48Std

Nacharbeit: 132Std

presence: 48h

rework: 132h

Literature

Empfehlungen in der Vorlesung / Recommendations during lessons

T	**8.29 Course: Basics of Technical Logistics II [T-MACH-109920]**

Responsible: Dr.-Ing. Maximilian Hochstein
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type Written examination	**Credits** 6	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 2

Events					
WT 22/23	2117098	Basics of Technical Logistics II	3 SWS	Lecture / Practice (/ ⚙)	Oellerich
Exams					
WT 22/23	76-T-MACH-109002	Basics of Technical Logistics II			Hochstein, Mittwollen, Oellerich
WT 22/23	76-T-MACH-109920	Basics of Technical Logistics II			Hochstein, Mittwollen, Oellerich

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 8.30 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2023	2142883	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	2 SWS	Lecture / 🖥	Guber, Ahrens
Exams					
WT 22/23	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 2023, 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
Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format 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 8.31 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 2023	2142879	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	2 SWS	Lecture / 📱	Guber, Ahrens
Exams					
WT 22/23	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 2023, 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
Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format 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   8.32 Course: Boosting of Combustion Engines [T-MACH-105649]

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

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2023	2134153	Boosting of Combustion Engines and Fuel Cells	2 SWS	/ 🗣	Kech

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

Competence Certificate
oral exam, 20 min

Prerequisites

T 8.33 Course: Brand Management [T-WIWI-112156]

Responsible:	Prof. Dr. Ann-Kristin Kupfer
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101424 - Foundations of Marketing

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

Events					
WT 22/23	2572190	Brand Management	2 SWS	Lecture / 🎤	Kupfer
WT 22/23	2572191	Brand Management Exercise	1 SWS	Practice / 🎤	Mitarbeiter
Exams					
WT 22/23	7900158	Brand Management			Kupfer

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

Competence Certificate
The assessment of success will be done by the preparation and presentation of a case study as well as a written exam. Further details will be announced during the lecture.

Prerequisites
None

Recommendation
Students are highly encouraged to actively participate in class.

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

V Brand Management
2572190, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn the theoretical foundations of brand management and its most important concepts. They learn both about the importance of brands for consumers as well as the importance of brands for firms. Special emphasis will be given to the development of brand strategies. Furthermore, students will learn how to evaluate and apply brand instruments. A tutorial offers the opportunity to apply the key learnings of the lecture using case studies.

The learning objectives are as follows:

- Getting to know the theoretical foundations of brand management
- Evaluating strategic branding options (e.g., relating to the development of the core of the brand and the brand architecture) and operative brand instruments (e.g., relating to the brand name and logo)
- Fostering critical and analytical thinking skills and the application of knowledge to marketing problems
- Improving English skills

Total time required for 4.5 credit points: approx. 135 hours

Attendance time: 30 hours

Self-study: 105 hours

T 8.34 Course: BUS-Controls [T-MACH-102150]

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

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	2

Events					
ST 2023	2114080	Control of Mobile Machines	2 SWS	Lecture / 🧩	Geimer, Becker

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108889 must have been passed.

Recommendation

Basic knowledge of electrical engineering is recommended. Programming skills are also helpful.

The number of participants is limited. A registration in mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines.* In case of too many applications, attendance will be granted based on pre-qualification.

Annotation

The students will get an overview of the theoretic and practical functioning of different bus systems.

After the practical oriented lessons the students will be able to visualize the communication structure of different applications, design basic systems and evaluate the complexity of programming of the complete system.
Hereunto the students program in the practical orientated lessons IFM-controllers using the programming environment CoDeSys.

Content:

- Knowledge of the basics of data communication in networks
- Overview of the operating mode of current field buses
- Explicit observation of the operating mode and application areas of CAN buses
- Practical programming of an example application (hardware is provided)

Literature:

- Etschberger, K.: Controller Area Network, Grundlagen, Protokolle, Bausteine, Anwendungen; München, Wien: Carl Hanser Verlag, 2002.
- Engels, H.: CAN-Bus - CAN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

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

V	**Control of Mobile Machines** 2114080, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content

- Basics of sensors, controls and control architectures in mobile machines
- Basics and functionalities of data communication in mobile machines (CAN-Bus, PROFIBUS, Ethernet, ...)
- Legal aspects and requirements (SIL-level, ...)
- Requirements for sensors for use in mobile machines
- Introduction to machine learning methods and their application for the control of mobile machines
- Overview of current research and developments in the field of agricultural robotics
- Implementation of a specific task within the exercise lessons
- The results of the semester task will be summarized in a short report as a pre-requisite for the exam.

Learning objectives

The students learn the theoretical basics of data communication as well as the architecture of control systems in mobile machines. Furthermore, they will be able to identify influences and general conditions during usage and derive practical and legal requirements for sensors and control systems. The students will learn methods of machine learning for control tasks in mobile machines as well as their architecture and the handling of training data. After participating in the exercise, they will be able to implement, train and validate a control system for a specific task.

Recommendations

Basic knowledge of electrical engineering and computer science is recommended. Initial programming knowledge, preferably in Python, is required. The number of participants is limited as hardware will be provided for the exercise. Prior registration is required, details will be announced on the web pages of the Institute of Vehicle Systems Engineering / Department of Mobile Machinery. In case of high registration numbers exceeding the capacities, a selection among all interested persons will take place according to qualification.

regular attendance: 21 hours
total self-study: 92 hours

Literature

Etschberger, K.: Controller Area Network, Grundlagen, Protokolle, Bausteine, Anwendungen; München, Wien: Carl Hanser Verlag, 2002.
Engels, H.: CAN-Bus - CAN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

AN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

| T | **8.35 Course: BUS-Controls - Advance [T-MACH-108889]** |

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

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Competence Certificate
Creation of control program

Prerequisites

T   8.36 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	see Annotations	1

Competence Certificate
The lecture will be offered for the last time in the winter semester 2021/22. The exam will take place for the last time in the summer semester 2022 (only for repeaters).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be offered for the last time in the winter semester 2021/22.

T 8.37 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 22/23	2123357	CAD-NX training course	2 SWS	Practical course / 🧩	Ovtcharova, Mitarbeiter
ST 2023	2123357	CAD-NX training course	2 SWS	Practical course / 🧩	Ovtcharova, Mitarbeiter
Exams					
WT 22/23	76-T-MACH-102187	CAD-NX Training Course			Ovtcharova
ST 2023	76-T-MACH-102187	CAD-NX Training Course			Ovtcharova

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

Competence Certificate
Practical verification as academic achievement by working on a design task on the 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 22/23, 2 SWS, Language: German, 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 kann entweder vorlesungsbegleitend oder als einwöchige Blockveranstaltung in der vorlesungsfreien Zeit absolviert werden. Weitere Informationen siehe ILIAS.

Literature
Praktikumsskript

	CAD-NX training course	**Practical course (P)**
V	2123357, SS 2023, 2 SWS, Language: German/English, Open in study portal	**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 zum einen vorlesungsbegleitend sowie zum anderen als einwöchige Blockveranstaltung in der vorlesungsfreien Zeit angeboten. Weitere Informationen siehe ILIAS.

Literature
Praktikumsskript

T   8.38 Course: Civil Law for Beginners [T-INFO-103339]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-105084 - Public and Civil Law

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

Events					
WT 22/23	24012	Civil Law for Beginners	4 SWS	Lecture / 🗣	Matz
Exams					
WT 22/23	7500012	Civil Law for Beginners			Matz, Dreier
ST 2023	7500041	Civil Law for Beginners			Dreier, Matz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 8.39 Course: Climatology [T-PHYS-101092]

Responsible: Prof. Dr. Joaquim José Ginete Werner Pinto
Organisation: KIT Department of Physics
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	4

Events					
ST 2023	4051111	Klimatologie	3 SWS	Lecture / 🗣	Ginete Werner Pinto, Ludwig
ST 2023	4051112	Übungen zu Klimatologie	1 SWS	Practice / 🗣	Mömken, Ludwig, Ginete Werner Pinto
Exams					
ST 2023	7800005	Climatology			Ginete Werner Pinto

Legend: 📱 Online, ❖ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites

T 8.40 Course: CO2-Neutral Combustion Engines and their Fuels I [T-MACH-111550]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type Oral examination	Credits 5	Grading scale Grade to a third	Recurrence Each winter term	Expansion 1 terms	Version 1

Events					
WT 22/23	2133113	CO2-neutral combustion engines and their fuels I	4 SWS	Lecture / Practice (/ 🗣	Koch
Exams					
WT 22/23	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Kubach, Koch

Legend: 🖥 Online, ⚛ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

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

V	**CO2-neutral combustion engines and their fuels I** 2133113, WS 22/23, 4 SWS, Language: German, Open in study portal	Lecture / Practice (VÜ) On-Site

Content
Introduction, Presentation of IFKM

Working Principle

Characteristic Parameters

Engine Parts

Drive Train

Fuels

Gasoline Engines

Diesel Engines

Hydrogen Engines

Exhaust Gas Emissions

Organizational issues
Übungstermine Donnerstags nach Bekanntgabe in der Vorlesung

T 8.41 Course: CO2-Neutral Combustion Engines and their Fuels II [T-MACH-111560]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2023	2134151	CO2-neutral combustion engines and their fuels II	3 SWS	Lecture / Practice (/ 🗣	Koch
Exams					
WT 22/23	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Kubach, Koch
ST 2023	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Koch, Kubach

Legend: 📱 Online, ❄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral examination, duration: 25 minutes, no auxiliary means

Prerequisites
none

Recommendation
Fundamentals of Combustion Engines II helpful

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

V	**CO2-neutral combustion engines and their fuels II**	Lecture / Practice (VÜ)
	2134151, SS 2023, 3 SWS, Language: German, Open in study portal	On-Site

T 8.42 Course: Competition in Networks [T-WIWI-100005]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101422 - Specialization in Customer Relationship Management
M-WIWI-101499 - Applied Microeconomics
M-WIWI-101668 - Economic Policy I

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

Events

WT 22/23	2561204	Competition in Networks	2 SWS	Lecture / ♧	Mitusch
WT 22/23	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice / ♧	Wisotzky, Mitusch, Corbo

Exams

WT 22/23	7900221	Competition in Networks			Mitusch

Legend: ▤ Online, ♧ Blended (On-Site/Online), ♣ On-Site, ✕ Cancelled

Competence Certificate
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None.

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

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

V Competition in Networks
2561204, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 8.43 Course: Complex Analysis and Integral Transformations [T-ETIT-109285]

Responsible:	Dr.-Ing. Mathias Kluwe
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-ETIT-101156 - Control Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework (written)	4	pass/fail	Each summer term	1 terms	1

Events					
ST 2023	2303190	Complex analysis and integral transformations	1 SWS	Lecture / 🎤	Kluwe
ST 2023	2303191	Übungen zu 2303190 Komplexe Analysis und Integraltransformationen	1 SWS	Practice / 🎤	Ye
Exams					
WT 22/23	7303190	Complex Analysis and Integral Transformations			Kluwe
ST 2023	7303190	Complex Analysis and Integral Transformations			Kluwe

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Prerequisites

T 8.44 Course: Constitution and Properties of Wearresistant Materials [T-MACH-102141]

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

Part of: M-MACH-101262 - Emphasis Materials Science

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

Events					
ST 2023	2194643	Constitution and Properties of Wear resistant materials	2 SWS	Lecture / 🗣	Ulrich
Exams					
WT 22/23	76-T-MACH-102141	Constitution and Properties of Wearresistant Materials			Ulrich

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

Competence Certificate
oral examination (about 30 min)

no tools or reference materials

Prerequisites
none

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

V	**Constitution and Properties of Wear resistant materials** 2194643, SS 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content

The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Teaching Content:

introduction

materials and wear

unalloyed and alloyed tool steels

high speed steels

stellites and hard alloys

hard materials

hard metals

ceramic tool materials

superhard materials

new developments

regular attendance: 22 hours
self-study: 98 hours

Basic understanding of constitution of wear-resistant materials, of the relations between constitution, properties and performance, of principles of increasing of hardness and toughness of materials as well as of the characteristics of the various groups of wear-resistant materials.

Recommendations: none

Organizational issues

Die Blockveranstaltung findet in folgendem Zeitraum statt:

17.04.-19.04.2023: jeweils von 8:00-16:00 Uhr;

Ort: KIT-CN, Geb. 681, Raum 214

Anmeldung verbindlich bis zum 13.04.2023 unter sven.ulrich@kit.edu.

Nach der Anmeldung wird Ihnen im Falle einer Online-Veranstaltung der Link zur Vorlesung per E-Mail am 14.04.2023 mitgeteilt.

Literature

Laska, R. Felsch, C.: Werkstoffkunde für Ingenieure, Vieweg Verlag, Braunschweig, 1981

Schedler, W.: Hartmetall für den Praktiker, VDI-Verlage, Düsseldorf, 1988

Schneider, J.: Schneidkeramik, Verlag moderne Industrie, Landsberg am Lech, 1995

Kopien der Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed

T 8.45 Course: Construction Technology [T-BGU-101691]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101004 - Fundamentals of Construction

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2023	6200410	Construction Technology	3 SWS	Lecture /	Gentes, Haghsheno, Schneider
ST 2023	6200411	Exercises to Construction Technology	1 SWS	Practice /	Gentes, Haghsheno, Schneider, Waleczko
Exams					
WT 22/23	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 8.46 Course: Consumer Behavior [T-WIWI-106569]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing
M-WIWI-105981 - Information Systems & Digital Business

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

Events					
ST 2023	2572174	Consumer Behavior	3 SWS	Lecture	Scheibehenne
ST 2023	2572176	Übung zu Consumer Behavior	1 SWS	Practice / 🗣	Liu, Scheibehenne
Exams					
WT 22/23	7900029	Consumer Behavior			Scheibehenne

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment of success takes the form of a presentation (weighting 20%) as part of the exercise and a written examination (90 minutes, weighting 80%).

Prerequisites
None.

Annotation
For further information, please contact the research group Marketing and Sales (http://marketing.iism.kit.edu/).

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

V	**Consumer Behavior**	Lecture (V)
	2572174, SS 2023, 3 SWS, Language: English, Open in study portal	

Content
Important information

1. WIWI portal registration is required for the course. The registration will be open in March. Seats are limited to 30;

2. Übung associated with this course is MANDATORY: Students will be asked to do presentations in groups of 3 (introduce and discuss academic papers assigned by the lecturer). This will take place over one day (as a blocked event) during the semester (When and where will be decided at the beginning of the semester). This task will count towards 20% of the final grades of the "Consumer Behavior" class. There will be no weekly or biweekly Übung besides this event.

Goal

The goal of the class is to gain a better understanding of the situational, biological, cognitive, and evolutionary factors that drive consumer behavior. We will address these questions from an interdisciplinary perspective, including relevant theories and empirical research findings from Psychology, Marketing, Cognitive Science, Biology, and Economics.

Description

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

The lecture will be held in English.

Grading

Grading is based on two parts. An oral presentation that takes place in the Übung will count towards 20% of the grade. A written exam at the last day of class will make the rest 80%. The exam will cover the content of the lecture and the literature listed in the required reading list that will be made available to enrolled students on the first day of class. The the exam questions will be in English. You are allowed to bring a language dictionary into the exam but you are not allowed to bring notes.

Workload

The total workload for this course is approximately 135 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45 hours

Exam and exam preparation: 60 hours

Comment

This lecture features a "double down" format: There will be two lecture sessions in a row during the first half of the semester. Thus, you will be finished with this class after 7 weeks.

Literature
Will be made available to enrolled students on the first day of class.

T 8.47 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 2023	2150683	Control Technology	2 SWS	Lecture / 🎤	Gönnheimer
Exams					
WT 22/23	76-T-MACH-105185	Control Technology			Gönnheimer
ST 2023	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 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content
The lecture control technology gives an integral overview of available control components within the field of industrial production systems.
The first part of the lecture deals with the fundamentals of signal processing and with control peripherals in the form of sensors and actors which are used in production systems for the detection and manipulation of process states.
The second part handles with the function of electric control systems in the production environment. The main focus in this chapter is laid on programmable logic controls, computerized numerical controls and robot controls. Finally the course ends with the topic of cross-linking and decentralization with the help of bus systems.
The lecture is very practice-oriented and illustrated with numerous examples from different branches.

The following topics will be covered:

- Signal processing
- Control peripherals
- Programmable logic controls
- Numerical controls
- Controls for industrial robots
- Distributed control systems
- Field bus
- Trends in the area of control technology

Learning Outcomes:

The students …

- are able to name the electrical controls which occur in the industrial environment and explain their function.
- can explain fundamental methods of signal processing. This involves in particular several coding methods, error protection methods and analog to digital conversion.
- are able to choose and to dimension control components, including sensors and actors, for an industrial application, particularly in the field of plant engineering and machine tools. Thereby, they can consider both, technical and economical issues.
- can describe the approach for projecting and writing software programs for a programmable logic control named Simatic S7 from Siemens. Thereby they can name several programming languages of the IEC 1131.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T   8.48 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 22/23	2119100	Fördertechnik und Logistiksysteme		Seminar / 🧩	Furmans
ST 2023	2119100	Fördertechnik und Logistiksysteme		Seminar / 🧩	Furmans, Padhy
Exams					
WT 22/23	76-T-MACH-102135	Conveying Technology and Logistics			Furmans
ST 2023	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, WS 22/23, SWS, Language: German/English, Open in study portal	Seminar (S) Blended (On-Site/Online)

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues
Weiteres siehe Homepage

V	**Fördertechnik und Logistiksysteme** 2119100, SS 2023, SWS, Language: German/English, Open in study portal	Seminar (S) Blended (On-Site/Online)

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues
Ort: Gebäude 50.38, Raum 0.22, Termine siehe homepage

T 8.49 Course: Data-Driven Algorithms in Vehicle Technology [T-MACH-112126]

Responsible: Dr. Stefan Scheubner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 22/23	2113840	Data-Driven Algorithms in Vehicle Technology	2 SWS	Lecture / ⚙	Scheubner
Exams					
WT 22/23	7600001	Data-Driven Algorithms in Vehicle Technology			Scheubner
WT 22/23	76Mach- 112123	Data-Driven Algorithms in Vehicle Technology			Scheubner
ST 2023	7600001	Data-Driven Algorithms in Vehicle Technology			Scheubner

Legend: 🗌 Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

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

V Data-Driven Algorithms in Vehicle Technology
2113840, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Course Syllabus: Data-Driven Algorithms in Vehicle Technology
Motivation for the Course: Nowadays, engineers often develop technical systems using a combination of hard- and software. This is true especially for modern passenger vehicle development. In a digitalized world, such developments are built on knowledge gained from relevant data sources, e.g. the vehicle sensors. Therefore, engineers in automobile technology need qualifications from data science to successfully create new functionalities in the cars. To prevent remaining purely theoretical, the algorithms in this course are explained using a real-world problem of "EV Routing". Students have the opportunity to test methods in Python with frequent exercises presented.
Goal of the Course: Students have a basic understanding of data-driven algorithms such as Markov Models, Machine Learning or Monte-Carlo Methods. The approach for building data-driven models in automobile technology are known to students and they are able to test algorithms in the programming language "Python". Furthermore, students have learnt how to analyse the algorithm performance.
Content:
1. Introduction to function development as well as the prerequisites for the course (e.g. Fundamentals for running Python code)
2. Fundamentals for EV Routing and relevant data sources
3. Parameter estimation and state classification algorithms to determine the current situation of the vehicle
4. Learning methods for driver behaviour
5. Forecast algorithms to predict future energy consumption of an electric vehicle

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/ PasswoerterIlias/

Campus Ost, Geb. 70.04, Raum 219. Studierende müssen einen eigenen Laptop mitbringen.

| T | **8.50 Course: Decision Theory [T-WIWI-102792]** |

Responsible: Prof. Dr. Karl-Martin Ehrhart
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics

| **Type**
Written examination | **Credits**
4,5 | **Grading scale**
Grade to a third | **Recurrence**
Each summer term | **Version**
1 |

Exams			
WT 22/23	7900159	Decision Theory	Ehrhart
ST 2023	7900254	Decision Theory	Ehrhart

Competence Certificate

The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites

None

Recommendation

Knowledge in mathematics and statistics is required.

T 8.51 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 2023	2530550	Derivatives	2 SWS	Lecture / 🗣	Uhrig-Homburg
ST 2023	2530551	Übung zu Derivate	1 SWS	Practice / 🗣	Eska, Uhrig-Homburg
Exams					
WT 22/23	7900051	Derivatives			Uhrig-Homburg
ST 2023	7900111	Derivatives			Uhrig-Homburg

Legend: 🗎 Online, 🎇 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

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

V Derivatives
2530550, SS 2023, 2 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Weiterführende Literatur:

Cox/Rubinstein (1985): Option Markets, Prentice Hall

T   8.52 Course: Design and Development of Mobile Machines [T-MACH-105311]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Jan Siebert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2113079	Design and Development of Mobile Machines	2 SWS	Lecture / 🗣	Geimer
Exams					
WT 22/23	76-T-MACH-105311	Design and Development of Mobile Machines			Geimer
ST 2023	76-T-MACH-105311	Design and Development of Mobile Machines			Geimer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A registration is mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines.* In case of too many applications, attendance will be granted based on pre-qualification.

The course will be replenished by interestung lectures of professionals from leading hydraulic companies.

Prerequisites

Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108887 must have been passed.

Recommendation

Knowledge in Fluid Power Systems (LV 2114093)

Annotation

After completion of the lecture, studens can:

- design working and travel drive train hydraulics of mobile machines and can derive characteristic key factors.
- choose and apply suitable state of the art designing methods succesfully
- analyse a mobile machines and break its structure down from a complex system to subsystems with reduced complexity
- identify and desrcibe interactions and links between subsystems of a mobile maschine
- present and document solutions of a technical problem according to R&D standards

The number of participants is limited.

Conent:

The working scenario of a mobile machine depends strongly on the machine itself. Highly specialised machines, e.g. pavers are also as common as universal machines with a wide range of applications, e.g. hydraulic excavators. In general, all mobile machines are required to do their intended work in an optimal way and satisfy various critera at the same time. This makes designing mobile machines to a great and interesting challenge. Nevertheless, usually key factors can be derived for every mobile machine, which affect all other machine parameters. During this lecture, those key factors and designing mobile machines accordingly will be adressed. To do so, an exemplary mobile machine will be discussed and designed in the lecture an as a semester project.

Literature:

See german recommendations

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

| V | **Design and Development of Mobile Machines**
2113079, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**
On-Site |

Content

Wheel loaders and excavators are highly specialized mobile machines. Their function is to detach, pick up and deposit materials near by. Significant size for dimensioning of the machines is the content of their standard shovel. In this lecture the main steps in dimensioning a wheel loader or excavator are beeing thought. This includes among others:

- Defining the size and dimensions,
- the dimensioning of the electric drive train,
- the dimensioning of the primary energy supply,
- Determining the kinematics of the equipment,
- the dimension of the working hydraulics and
- Calculations of strength

The entire design process of these machines is strongly influenced by the use of standards and guidelines (ISO/DIN-EN). Even this aspect is dealt with.

The lecture is based on the knowledge from the fields of mechanics, strength of materials, machine elements, propulsion and fluid technique. The lecture requires active participation and continued collaboration.

Recommendations:

Knowledge in Fluid Technology (SoSe, LV 21093)

- regular attendance: 21 hours
- self-study: 99 hours

Literature
Keine.

T	**8.53 Course: Design and Development of Mobile Machines - Advance [T-MACH-108887]**

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

Part of: M-MACH-101267 - Mobile Machines

Type Completed coursework	**Credits** 0	**Grading scale** pass/fail	**Recurrence** Each term	**Version** 1

Exams			
WT 22/23	76-T-MACH-108887	Design and Development of Mobile Machines - Advance	Geimer
ST 2023	76-T-MACH-108887	Design and Development of Mobile Machines - Advance	Geimer

Competence Certificate
Preparation of semester report

Prerequisites

T   8.54 Course: Design and Operation of Power Transformers [T-ETIT-101925]

Responsible: Prof. Dr.-Ing. Thomas Leibfried
              Michael Schäfer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101165 - Energy Generation and Network Components

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

T 8.55 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 Examination of another type	Credits 4	Grading scale Grade to a third	Recurrence Each term	Expansion 1 terms	Version 1

Events					
WT 22/23	2121002	Development methods of technical systems	4 SWS	Project (P / 🗣)	Ovtcharova, Maier
ST 2023	2121002	Development methods of technical systems	4 SWS	Project (P / 🗣)	Ovtcharova, Maier
Exams					
WT 22/23	76-T-MACH-111283	Development Methods of Technical Systems			Ovtcharova

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, WS 22/23, 4 SWS, Language: German/English, Open in study portal

Project (PRO)
On-Site

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.

V Development methods of technical systems
2121002, SS 2023, 4 SWS, Language: German/English, Open in study portal

Project (PRO)
On-Site

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.

T 8.56 Course: Development of Hybrid Drivetrains [T-MACH-110817]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2023	2134155	Development of Hybrid Powertrains	2 SWS	Lecture / 🗣	Koch, Doppelbauer
Exams					
ST 2023	76-T-MACH-110817	Development of hybrid drivetrains			Koch

Legend: 📱 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
written exam, 1 hour

Prerequisites
None

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

V	Development of Hybrid Powertrains	Lecture (V)
	2134155, SS 2023, 2 SWS, Language: German, Open in study portal	On-Site

Content

1. Introduction and Goal
2. Alternative Powertrains
3. Fundamentals of Hybrid Powertrains
4. Fundamentals of Electric Components of Hybrid Powertrains
5. Interactions in Hybrid Powertrain Development
6. Overall System Optimization

T 8.57 Course: Digital Markets and Market Design [T-WIWI-112228]

Responsible: Prof. Dr. Adrian Hillenbrand
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics

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

Events					
WT 22/23	2500035	Digital Markets and Market Design	2 SWS	Lecture / 🗣	Hillenbrand
WT 22/23	2500036	Digital Markets and Market Design	1 SWS	Practice / 🗣	Hillenbrand
Exams					
WT 22/23	7900016	Digital Markets and Market Design			Hillenbrand
WT 22/23	7900026	Digital Markets and Market Design			Hillenbrand

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

Competence Certificate
The assessment consists of a written exam (60 minutes).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Annotation
The lecture will be held in English.

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

V	**Digital Markets and Market Design** 2500035, WS 22/23, 2 SWS, Language: English, Open in study portal	**Lecture (V) On-Site**

Content
Online Markets determine our everyday lives. At the same time rapid technological advancements quickly change the landscape of online markets posing challenges for market design and consumer protection. In this course we apply theoretical economic models in the area of digital markets in order to make sense of current developments. Topics include consumer search, algorithmic pricing, recommender systems and steering, price discrimination and matching markets. We also discuss the potential effects of current policies like the Digital Markets Act and Digital Services Act on market outcomes.

V	**Digital Markets and Market Design** 2500036, WS 22/23, 1 SWS, Language: English, Open in study portal	**Practice (Ü) On-Site**

Content
Exercise Session for the course "Digital Markets and Market Design

Organizational issues
Jede zweite Woche eine Übung

T   8.58 Course: Digital Services [T-WIWI-109938]

Responsible:	Prof. Dr. Gerhard Satzger
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101422 - Specialization in Customer Relationship Management

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

Events					
ST 2023	2595466	Digital Services: Foundations	2 SWS	Lecture / 🧩	Vössing, Satzger
ST 2023	2595467	Exercise Digital Services: Foundations	1 SWS	Practice / 🧩	Vössing, Schöffer
Exams					
WT 22/23	7900002	Digital Services: Foundations			Satzger
ST 2023	7900307	Digital Services			Satzger

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations). 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-105771 "Foundations of Digital Services A" as of winter semester 2019/2020.

Students who wish to register for the examination in the summer semester 2019 please select the examination "Foundations of Digital Services A".

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

V   Digital Services: Foundations
2595466, SS 2023, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

The world has been moving towards "service-led" economies: In many developed countries, services already account for more than 70% of the gross domestic product. In order to design, engineer, and manage services, traditional "goods-oriented" business models are often inappropriate. At the same time, the rapid development of information and communication technology (ICT) pushes "servitization" and the economic importance of digital services and, therefore, drives competition: Increased interaction and individualization options open up new dimensions of "value co-creation" between providers and customers; dynamic and scalable service value networks replace static value chains; services can instantly be delivered anywhere across the globe.

Building on a systematic categorization of different types of services and on the general notion of "value co-creation", we cover concepts and foundations for engineering and managing ICT-based digital services, allowing for further specialization in other KSRI/IISM courses at the Master level. Topics in this course include an introduction to services, 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 8.59 Course: Digital Services: Foundations [T-WIWI-111307]

Responsible: Prof. Dr. Gerhard Satzger
Dr. Michael Vössing

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101434 - eBusiness and Service Management
M-WIWI-102752 - Fundamentals of Digital Service Systems
M-WIWI-105981 - Information Systems & Digital Business

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

Events					
ST 2023	2595466	Digital Services: Foundations	2 SWS	Lecture / ⚙	Vössing, Satzger
ST 2023	2595467	Exercise Digital Services: Foundations	1 SWS	Practice / ⚙	Vössing, Schöffer
Exams					
WT 22/23	7900002	Digital Services: Foundations			Satzger
ST 2023	7900307	Digital Services			Satzger

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

Competence Certificate

The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations).

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-WIWI-109938 - Digital Services must not have been started.

Annotation

The course will be offered in the form of a flipped classroom concept starting in summer semester 2023. The lecture will be recorded in advance and made available online. During the exercise classes, the contents of the lecture will be discussed and applied as part of programming exercises.

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

V Digital Services: Foundations
2595466, SS 2023, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

The world has been moving towards "service-led" economies: In many developed countries, services already account for more than 70% of the gross domestic product. In order to design, engineer, and manage services, traditional "goods-oriented" business models are often inappropriate. At the same time, the rapid development of information and communication technology (ICT) pushes "servitization" and the economic importance of digital services and, therefore, drives competition: Increased interaction and individualization options open up new dimensions of "value co-creation" between providers and customers; dynamic and scalable service value networks replace static value chains; services can instantly be delivered anywhere across the globe.

Building on a systematic categorization of different types of services and on the general notion of "value co-creation", we cover concepts and foundations for engineering and managing ICT-based digital services, allowing for further specialization in other KSRI/IISM courses at the Master level. Topics in this course include an introduction to services, 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 8.60 Course: Digitalization from Production to the Customer in the Optical Industry [T-MACH-110176]

Responsible: Dr.-Ing. Marc Wawerla
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

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

Events					
WT 22/23	2149701	Digitalization from Production to the Customer in the Optical Industry	2 SWS	Lecture / 🗣	Wawerla
Exams					
WT 22/23	76-T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry			Wawerla

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

Competence Certificate
Alternative test achievement (graded):
- Written processing of a case study (weighting 50%) and
- Presentation of the results (ca. 10 min.) followed by a colloquium (ca. 30 min.), (weighting 50%)

Prerequisites
none

Annotation
For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Further information for application can be found via: https://www.wbk.kit.edu/english/education.php.

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

V	**Digitalization from Production to the Customer in the Optical Industry** 2149701, WS 22/23, 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
Start: 28.10.2022

Aus organisatorischen Gründen ist die Teilnehmeranzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Weitere Informationen zur Bewerbung sind unter https://www.wbk.kit.edu/studium-und-lehre.php zu finden.

For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Further information for application can be found via:
https://www.wbk.kit.edu/english/education.php.

T 8.61 Course: Drive Train of Mobile Machines [T-MACH-105307]

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

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2113077	Drive Train of Mobile Machines	2 SWS	Lecture / 🗣	Geimer
WT 22/23	2113078	Übung zu 'Antriebsstrang mobiler Arbeitsmaschinen'	1 SWS	Practice / 🗣	Geimer, Herr
Exams					
WT 22/23	76-T-MACH-105307	Drive Train of Mobile Machines			Geimer
ST 2023	76-T-MACH-105307	Drive Train of Mobile Machines			Geimer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The final assessment will be an oral examination (20 min) taking place during the recess period. The examination will be offered in ervery semester and can be repeated at any regular examination date.

Prerequisites
none

Recommendation

- General principles of mechanicals engineering
- Basic knowledge of hydraulics
- Interest in mobile machinery

Annotation
At the end of the lecture, participants can explain the structure and function of all discussed drive trains of mobile machines. They can analyze complex gearbox schematics and synthesize simple transmission functions using rough calculations.

Content:

In this course the different drive trains of mobile machinery will be discussed. The focus of this course is:

- mechanical gears
- torque converter
- hydrostatic drives
- power split drives
- electrical drives
- hybrid drives
- axles
- terra mechanics

Media: projector presentation

Literature: Download of lecture slides from ILIAS. Further literature recommendations during lectures.

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

V	**Drive Train of Mobile Machines**	Lecture (V)
	2113077, WS 22/23, 2 SWS, Language: German, Open in study portal	**On-Site**

Content
In this course will be discussed the different drive train of mobile machinerys. The fokus of this course is:
- improve knowledge of fundamentals
- mechanical gears
- torque converter
- hydrostatic drives
- continuous variable transmission
- eletrical drives
- hybrid drives
- axles
- terra mechanic

Recommendations:

- general basics of mechanical engineering
- basic knowledge in hydraulics
- interest in mobile machines

- regular attendance: 21 hours
- self-study: 89 hours

Literature
Skriptum zur Vorlesung downloadbar über ILIAS

| T | **8.62 Course: Economics and Behavior [T-WIWI-102892]** |

Responsible:	Prof. Dr. Nora Szech
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-101501 - Economic Theory

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

Events					
WT 22/23	2560137	Economics and Behavior	2 SWS	Lecture / ✿	Szech, Rau, Zhao
WT 22/23	2560138	Übung zu Economics and Behavior	1 SWS	Practice / ✿	Szech, Zhao
Exams					
WT 22/23	7900134	Exam Economics and Behavior			Szech
WT 22/23	7900135	Exam Economics and Behavior (2)			Szech
ST 2023	7900154	Economics and Behavior (2)			Szech

Legend: 🖥 Online, ✿ Blended (On-Site/Online), ✊ On-Site, ✗ Cancelled

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

Prerequisites
None

Recommendation
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Annotation
The lecture will be held in English.

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

| V | **Economics and Behavior**
2560137, WS 22/23, 2 SWS, Language: English, Open in study portal | **Lecture (V)**
Blended (On-Site/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 8.63 Course: Economics I: Microeconomics [T-WIWI-102708]

Responsible: Prof. Dr. Clemens Puppe
                   Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-100950 - Preliminary Exam
                   M-WIWI-101398 - Introduction to Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2610012	Economics I: Microeconomics	3 SWS	Lecture / ⚙	Reiß, Potarca
Exams					
WT 22/23	7910001	Economics I: Microeconomics			Reiß
WT 22/23	7910002	Economics I: Microeconomics			Reiß

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

Competence Certificate

The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.

The main exam takes place subsequent to the lectur. The re-examination is offered at the same examination period. As a rule, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

Prerequisites
None

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

V	**Economics I: Microeconomics**	**Lecture (V)**
	2610012, WS 22/23, 3 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

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 8.64 Course: Economics II: Macroeconomics [T-WIWI-102709]

Responsible:	Prof. Dr. Berthold Wigger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101398 - Introduction to Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2023	2600014	Economics II: Macroeconomics	4 SWS	Lecture	Brumm, Krause
ST 2023	2660015	Economics II : Macroeconomics, Tutorial	2 SWS	Tutorial (	Krause
Exams					
WT 22/23	790vwl2	Economics II: Macroeconomics			Wigger

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

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

V	**Economics II: Macroeconomics** 2600014, SS 2023, 4 SWS, Language: German, Open in study portal	Lecture (V)

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 8.65 Course: Economics III: Introduction in Econometrics [T-WIWI-102736]

Responsible:	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-101599 - Statistics and Econometrics

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

Events					
ST 2023	2520016	Economics III: Introduction to Econometrics	2 SWS	Lecture / 🗣	Schienle, Rüter
ST 2023	2520017	Übungen zu VWL III	2 SWS	Practice	Schienle, Rüter
Exams					
ST 2023	7900044	Economics III: Introduction in Econometrics			Schienle

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 90-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

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

V Economics III: Introduction to Econometrics
2520016, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives:

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

Content:

- Simple and multiple linear regression (estimating parameters, confidence interval, testing, prognosis, testing assumptions)
- Model assessment

Requirements:

Knowledge of the lectures Statistics I + II is required.

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 30 hours

Preparation and follow-up: 120 hours

Literature
Von Auer: Ökonometrie ISBN 3-540-00593-5

Goldberger: A course in Econometrics ISBN 0-674-17544-1

Gujarati. Basic Econometrics ISBN 0-07-113964-8

Schneeweiß: Ökonometrie ISBN 3-7908-0008-2

T 8.66 Course: eFinance: Information Systems for Securities Trading [T-WIWI-110797]

Responsible:	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101402 - eFinance
	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101434 - eBusiness and Service Management
	M-WIWI-101465 - Topics in Finance I
	M-WIWI-105981 - Information Systems & Digital Business

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

Events					
WT 22/23	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture / 🗣	Weinhardt, Notheisen
WT 22/23	2540455	Übungen zu eFinance: Information Systems for Securities Trading	1 SWS	Practice / 🗣	Jaquart
Exams					
WT 22/23	7900182	eFinance: Information Engineering and Management for Securities Trading			Weinhardt
WT 22/23	7900309	eFinance: Information Systems for Securities Trading			Weinhardt

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

Competence Certificate

Success is monitored by means of ongoing elaborations and presentations of tasks and an examination (60 minutes) at the end of the lecture period. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-WIWI-102600 - eFinance: Information Engineering and Management for Securities Trading must not have been started.

Annotation

The course"eFinance: Information Systems for Securities Trading" covers different actors and their function in the securities industry in-depth, highlighting key trends in modern financial markets, such as Distributed Ledger Technology, Sustainable Finance, and Artificial Intelligence. Security prices evolve through a large number of bilateral trades, performed by market participants that have specific, well-regulated and institutionalized roles. Market microstructure is the subfield of financial economics that studies the price formation process. This process is significantly impacted by regulation and driven by technological innovation. Using the lens of theoretical economic models, this course reviews insights concerning the strategic trading behaviour of individual market participants, and models are brought market data. Analytical tools and empirical methods of market microstructure help to understand many puzzling phenomena in securities markets.

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

V	eFinance: Information Systems for Securities Trading	Lecture (V)
	2540454, WS 22/23, 2 SWS, Language: English, Open in study portal	On-Site

Literature

- Picot, Arnold, Christine Bortenlänger, Heiner Röhrl (1996): "Börsen im Wandel". Knapp, Frankfurt
- Harris, Larry (2003): "Trading and Exchanges - Market Microstructure for Practitioners"". Oxford University Press, New York

Weiterführende Literatur:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

T   8.67 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 2023	2307391	Electric Energy Systems	2 SWS	Lecture / 🗣	Leibfried
ST 2023	2307393	Übungen zu 2307391 Elektroenergiesysteme	1 SWS	Practice / 🗣	Steinle
Exams					
WT 22/23	7307391	Electric Energy Systems			Leibfried
ST 2023	7307391	Electric Energy Systems			Leibfried

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

Prerequisites

T **8.68 Course: Electrical Engineering for Business Engineers, Part I [T-ETIT-100533]**

Responsible:	Dr. Wolfgang Menesklou
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-ETIT-101155 - Electrical Engineering

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

Events					
WT 22/23	2304223	Electrical Engineering for Business Engineers, Part I	2 SWS	Lecture / 🗣	Menesklou
WT 22/23	2304225	Electrical Engineering for Business Engineers, Part I (Exercise to 2304223)	2 SWS	Practice / 🗣	Menesklou
Exams					
WT 22/23	7304223	Electrical Engineering for Business Engineers, Part I			Menesklou
ST 2023	7304223	Electrical Engineering for Business Engineers, Part I			Menesklou

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T	**8.69 Course: Electrical Engineering for Business Engineers, Part II [T-ETIT-100534]**

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2023	2304224	Elektrotechnik II für Wirtschaftsingenieure	3 SWS	Lecture / 🗣	Menesklou
Exams					
WT 22/23	7304224	Electrical Engineering for Business Engineers, Part II			Menesklou
ST 2023	7304224	Electrical Engineering for Business Engineers, Part II			Menesklou

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 8.70 Course: Energy Policy [T-WIWI-102607]

Responsible: Prof. Dr. Martin Wietschel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

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

Events					
ST 2023	2581959	Energy Policy	2 SWS	Lecture / 🗣	Wietschel
Exams					
WT 22/23	7981959	Energy Policy			Fichtner
ST 2023	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 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

The availability of cheap, environmentally friendly and secure energy is crucial for human welfare. However, the increasing scarcity of resources and increasing environmental pressures, with a particular focus on climate change, threaten human welfare through economic action. Energy contributes significantly to environmental pollution. The energy industry is characterised by high regulation and a significant influence of political decisions.

At the beginning of the lecture different perspectives on energy policy will be presented and the analysis of political decision-making processes will be discussed. Then the current energy policy challenges in the area of environmental pollution, regulation and the role of energy for households and industry will be discussed. Then the actors of energy policy and energy responsibilities in Europe will be discussed. The economic approaches from traditional environmental economics and sustainability as a new policy approach will then be discussed. Finally, energy policy instruments such as the promotion of renewable energies or energy efficiency are discussed in detail and how they can be evaluated.

The lecture emphasizes the relationship between theory and practice and presents some case studies.

Literature

Wird in der Vorlesung bekannt gegeben.

T 8.71 Course: Engine Measurement Techniques [T-MACH-105169]

Responsible: Dr.-Ing. Sören Bernhardt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2023	2134137	Engine measurement techniques	2 SWS	Lecture / 🗣	Bernhardt
Exams					
WT 22/23	76-T-MACH-105169	Engine Measurement Techniques			Koch
ST 2023	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 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

1. Grohe, H.:Messen an Verbrennungsmotoren
2. Bosch: Handbuch Kraftfahrzeugtechnik
3. Veröffentlichungen von Firmen aus der Meßtechnik
4. Hoffmann, Handbuch der Meßtechnik
5. Klingenberg, Automobil-Meßtechnik, Band C

T 8.72 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

| Exams			
ST 2023	7800052	Exam on Climatology as Minor Subject	Ginete Werner Pinto
ST 2023	7800139	Climatology reexam	Ginete Werner Pinto

T   8.73 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 22/23	2550486	Facility Location and Strategic Supply Chain Management	2 SWS	Lecture	Nickel
WT 22/23	2550487	Übungen zu Standortplanung und strategisches SCM	1 SWS	Practice / 🖥	Pomes, Linner
Exams					
WT 22/23	7900022	Facility Location and Strategic Supply Chain Management			Nickel
ST 2023	7900027	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 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 8.74 Course: Failure of Structural Materials: Deformation and Fracture [T-MACH-102140]

Responsible: Prof. Dr. Peter Gumbsch
Dr. Daniel Weygand
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2181711	Failure of structural materials: deformation and fracture	3 SWS	Lecture / Practice (/ 🗣	Gumbsch, Weygand
Exams					
WT 22/23	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture			Weygand, Gumbsch, Kraft
ST 2023	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture			Weygand, Gumbsch

Legend: 📱 Online, 🕸 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

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

| V | **Failure of structural materials: deformation and fracture**
2181711, WS 22/23, 3 SWS, Language: German, Open in study portal | **Lecture / Practice (VÜ)**
On-Site |
|---|---|---|

Content

1. Introduction
2. linear elasticity
3. classification of stresses
4. Failure due to plasticity
   - tensile test
   - dislocations
   - hardening mechanisms
   - guidelines for dimensioning
5. composite materials
6. fracture mechanics
   - hypotheses for failure
   - linear elasic fracture mechanics
   - crack resitance
   - experimental measurement of fracture toughness
   - defect measurement
   - crack propagation
   - application of fracture mechanics
   - atomistics of fracture

The student

- has the basic understanding of mechanical processes to explain the relationship between externally applied load and materials strength.
- can explain the foundation of linear elastic fracture mechanics and is able to determine if this concept can be applied to a failure by fracture.
- can decribe the main empirical materials models for deformation and fracture and can apply them.
- has the physical understanding to describe and explain phenomena of failure.

preliminary knowlegde in mathematics, mechanics and materials science recommended

regular attendance: 22,5 hours
self-study: 97,5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Organizational issues
Übungstermine werden in der Vorlesung bekannt gegeben!

nach aktuellem Stand Präsenz

Literature

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe

T 8.75 Course: Failure of Structural Materials: Fatigue and Creep [T-MACH-102139]

Responsible: Dr. Patric Gruber
                   Prof. Dr. Peter Gumbsch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2181715	Failure of Structural Materials: Fatigue and Creep	2 SWS	Lecture / 🗣	Gruber, Gumbsch
Exams					
WT 22/23	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep			Gruber, Gumbsch
ST 2023	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep			Gruber, Gumbsch

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

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

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

| V | **Failure of Structural Materials: Fatigue and Creep**
2181715, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**
On-Site |
|---|---|---|

Content
1 Fatigue
1.1 Introduction
1.2 Lifetime
1.3 Fatigue Mechanisms
1.4 Material Selection
1.5 Notches and Shape Optimization
1.6 Case Studies: ICE-Accidents

2 Creep
2.1 Introduction
2.2 High Temperature Plasticity
2.3 Phänomenological DEsciption of Creep
2.4 Creep Mechanisms
2.5 Alloying Effects

The student

- has the basic understanding of mechanical processes to explain the relationships between externally applied load and materials strength.
- can describe the main empirical materials models for fatigue and creep and can apply them.
- has the physical understanding to describe and explain phenomena of failure.
- can use statistical approaches for reliability predictions.
- can use its acquired skills, to select and develop materials for specific applications.

preliminary knowlegde in mathematics, mechanics and materials science recommended

regular attendance: 22,5 hours
self-study: 97,5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Literature

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe
- Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); Standardwerk über Ermüdung, alle Materialklassen, umfangreich, für Einsteiger und Fortgeschrittene

T 8.76 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	2530242	Financial Accounting for Global Firms	2 SWS	Lecture / 🎤	Luedecke
WT 22/23	2530243	Übung zu Financial Accounting for Global Firms	1 SWS	Practice / 🎤	Luedecke
Exams					
WT 22/23	7900142	Financial Accounting for Global Firms			Luedecke, Ruckes
ST 2023	7900195	Financial Accounting for Global Firms			Luedecke

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance and accounting.

Annotation
New lecture in the winter term 2017/18.

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

V	**Financial Accounting for Global Firms** 2530242, WS 22/23, 2 SWS, Language: English, Open in study portal	Lecture (V) On-Site

Literature
Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.

Coenenberg, A.G., Haller, A. und W. Schultze (2016): Jahresabschluss und Jahresabschlussanalyse, 24. Auflage. Schäffer-Poeschel Verlag Stuttgart.

T 8.77 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

Due to the professor's research sabbatical, the BSc module "Financial Data Science" and MSc module "Foundations for Advanced Financial -Quant and -Machine Learning Research" and the MSc module "Advanced Machine Learning and Data Science" along with the respective examinations will not be offered in SS2023. Bachelor and Master thesis projects are not affected and will be supervised.

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 8.78 Course: Financial Econometrics [T-WIWI-103064]

Responsible:	Prof. Dr. Melanie Schienle
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101599 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

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

Events					
WT 22/23	2520022	Financial Econometrics	2 SWS	Lecture / ⚙	Schienle, Buse
WT 22/23	2520023	Übungen zu Financial Econometrics	2 SWS	Practice / ⚙	Schienle, Buse
Exams					
WT 22/23	7900126	Financial Econometrics			Schienle
ST 2023	7900223	Financial Econometrics			Schienle

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

Competence Certificate

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites

None

Recommendation

Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Annotation

The next lecture will take place in the winter semester 2022/23.

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

V	**Financial Econometrics** 2520022, WS 22/23, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content
Learning objectives:

The student

- shows a broad knowledge of fincancial econometric estimation and testing techniques
- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

Content:

ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

Requirements:

It is recommended to attend the course *Economics III: Introduction to Econometrics* [2520016] prior to this course.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Literature

Taylor, S. J. (2005): "Asset Price Dynamics, Volatility, and Prediction", Princeton University Press.

Tsay, R. S. (2005): "Analysis of Financial Time Series: Financial Econometrics", Wiley, 2nd edition.

Cochrane, J. H. (2005): "Asset Pricing", revised edition, Princeton University Press.

Campbell, J. Y., A. W. Lo, and A. C. MacKinlay (1997): "The Econometrics of Financial Markets", Princeton University Press.

Hamilton, J. D. (1994): "Time Series Analysis", Princeton University Press.

Additional literature will be discussed in the lecture.

T 8.79 Course: Financial Econometrics II [T-WIWI-110939]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics
M-WIWI-105414 - Statistics and Econometrics II

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

Events					
ST 2023	2521302	Financial Econometrics II	2 SWS	Lecture / 🎤	Schienle, Buse
ST 2023	2521303	Übung zu Financial Econometrics II	1 SWS	Practice / 🎤	Buse, Schienle
Exams					
ST 2023	7900081	Financial Econometrics II			Schienle

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written examination (90 minutes). If the number of participants is low, an oral examination will be held instead.

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Financial Econometrics"

Annotation
Course language is English
The next lecture will take place in the summer semester of 2023.

T   8.80 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	2530232	Financial Intermediation	2 SWS	Lecture / 🗣	Ruckes
WT 22/23	2530233	Übung zu Finanzintermediation	1 SWS	Practice / 🗣	Ruckes, Benz
Exams					
WT 22/23	7900063	Financial Intermediation			Ruckes
ST 2023	7900078	Financial Intermediation			Ruckes

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

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites
None

Recommendation
None

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

V   Financial Intermediation
2530232, WS 22/23, 2 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Literature
Weiterführende Literatur:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

T 8.81 Course: Financial Management [T-WIWI-102605]

Responsible:	Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101435 - Essentials of Finance

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

Events					
ST 2023	2530216	Financial Management	2 SWS	Lecture / 🎤	Ruckes
ST 2023	2530217	Übung zu Financial Management	1 SWS	Practice / 🎤	Ruckes, Wiegratz
Exams					
WT 22/23	7900060	Financial Management			Ruckes
ST 2023	7900074	Financial Management			Ruckes

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to Section 4 (2), 1 of the examination regulation.
The exam takes place at every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Knowledge of the content of the course Business Administration: Finance and Accounting [25026/25027] is recommended.

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

V	**Financial Management** 2530216, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Literature
Weiterführende Literatur:

- Ross, Westerfield, Jaffe, Jordan (2009): Modern Financial Management, McGraw-Hill International Edition
- Berk, De Marzo (2016): Corporate Finance, 4. Edition, Pearson Addison Wesley

T 8.82 Course: FinTech [T-WIWI-112694]

Responsible:	TT-Prof. Dr. Julian Thimme
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101402 - eFinance
	M-WIWI-101423 - Topics in Finance II
	M-WIWI-101465 - Topics in Finance I

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

Events					
ST 2023	2600004	FinTech	2 SWS	Lecture	Thimme
ST 2023	2600016	FinTech Exercise	1 SWS	Practice	Thimme
Exams					
ST 2023	7900089	FinTech			Thimme

Competence Certificate

Written examination (90 minutes) during the lecture-free period of the semester (according to §4(2), 1 SPO).

The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites

None

Recommendation

Knowledge of the course Business Administration: Finance and Accounting [25026/25027] is very helpful.

T   8.83 Course: Fluid Power Systems [T-MACH-102093]

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

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

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

Events					
WT 22/23	2114093	Fluid Technology	2 SWS	Lecture / 🗣	Geimer
Exams					
WT 22/23	76-T-MACH-102093	Fluid Power Systems			Geimer
ST 2023	76-T-MACH-102093	Fluid Power Systems			Geimer

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a writen exam (90 minutes) taking place in the recess period. 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   Fluid Technology
2114093, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In the range of hydrostatics the following topics will be introduced:

- Hydraulic fluids
- Pumps and motors
- Valves
- Accessories
- Hydraulic circuits.

In the range of pneumatics the following topics will be introduced:

- Compressors
- Motors
- Valves
- Pneumatic circuits.

- regular attendance: 21 hours
- self-study: 92 hours

Literature
Skriptum zur Vorlesung *Fluidtechnik*
Institut für Fahrzeugsystemtechnik
downloadbar

T 8.84 Course: Foundations of Informatics I [T-WIWI-102749]

Responsible: Dr.-Ing. Michael Färber
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101417 - Foundations of Informatics

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

Events					
ST 2023	2511010	Foundations of Informatics I	2 SWS	Lecture / 🗣	Färber
ST 2023	2511011	Exercises to Foundations of Informatics I		Practice / 🗣	Färber, Yuan, Popovic
Exams					
WT 22/23	79AIFB_Info1_A6	Foundations of Informatics I			Färber
ST 2023	79AIFB_Info1_B5	Foundations of Informatics I (Registration until 17 July 2023)			Färber

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 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V) On-Site**

Content
The lecture provides an introduction to basic concepts of computer science and software engineering. Essential theoretical foundations and problem-solving approaches, which are relevant in all areas of computer science, are presented and explained, as well as shown in practical implementations.

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:
The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Workload:

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

V	**Exercises to Foundations of Informatics I** 2511011, SS 2023, SWS, Language: German, Open in study portal	**Practice (Ü)** **On-Site**

Content

The exercises are related to the lecture Foundations of Informatics I.

Multiple exercises are held that capture the topics, held in the lecture Foundations of Informatics I, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:

The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

T   8.85 Course: Foundations of Informatics II [T-WIWI-102707]

Responsible:	Prof. Dr. Sanja Lazarova-Molnar
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101417 - Foundations of Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2511012	Foundations of Informatics II	3 SWS	Lecture / 🎤	Lazarova-Molnar
WT 22/23	2511013	Tutorien zu Grundlagen der Informatik II	1 SWS	Tutorial (/ 🎤	Lazarova-Molnar
Exams					
WT 22/23	79AIFB_Info2_B7	Foundations of Informatics II			Käfer
ST 2023	79AIFB_Info2_A5	Foundations of Informatics II (Registration until 17 July 2023)			Käfer

Legend: 📱 Online, ⚃ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

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

Prerequisites
None

Recommendation
It is recommended to attend the course "Foundations of Informatics I" beforehand.

Active participation in the practical lessons is strongly recommended.

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

V   Foundations of Informatics II
2511012, WS 22/23, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture deals with formal models for automata, languages and algorithms as well as real instances of these models, i.e. computer architecture and organization (hardware development, computer arithmetic, architecture models), programing languages (different language levels, from microprogramming to higher programming languages, as well as compiling and execution), operating systems and modes (architecture and properties of operating systems, operating system tasks, client-server systems), data organization and management (types of data organization, primary and secondary organization).

Learning objectives:

- Students acquire vast knowledge of methods and concepts in theoretical computer science and computer architectures.
- Based on the acquired knowledge and skills, students are capable of choosing and applying the appropriate methods and concepts for well-defined problem instances.
- Active participation in the tutorials enables students to acquire the necessary knowledge for developing appropriate solutions cooperatively.

Recommendations:

It is recommended to attend the course *Foundations of Informatics I* [2511010] beforehand.

Active participation in the practical lessons is strongly recommended.

Workload:

The total workload for this course is approximately 150 hours.

Organizational issues
Die Vorlesung wird zu Beginn des Semesters 4-stündig und am Ende 2-stündig gelesen, um eine bessere Abdeckung des Inhalts in den Übungen zu gewährleisten.

Literature
Weiterführende Literatur:

Literatur wird in der Vorlesung bekannt gegeben.

T 8.86 Course: Foundations of Interactive Systems [T-WIWI-109816]

Responsible:	Prof. Dr. Alexander Mädche
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101434 - eBusiness and Service Management
	M-WIWI-102752 - Fundamentals of Digital Service Systems
	M-WIWI-105928 - HR Management & Digital Workplace
	M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	3

Events					
ST 2023	2540560	Foundations of Interactive Systems	3 SWS	Lecture / 🧩	Mädche, Toreini
Exams					
WT 22/23	7900326	Foundations of Interactive Systems			Mädche
ST 2023	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 2023, 3 SWS, Language: English, Open in study portal	**Blended (On-Site/Online)**

Content
Lecture Description

Computers have evolved from batch processors to highly interactive systems. This offers new possibilities besides challenges for designing a successful interaction between humans and computers. Interactive systems are socio-technical systems in which users perform tasks by interacting with technology in a specific context to achieve specified goals and outcomes.

This lecture introduces key concepts and principles of interactive systems from a human and computer perspective. From a human perspective, we discuss selected individual characteristics, cognitive processes, the interplay between cognition and activity, as well asmental models. From a computer perspective, we introduce established interaction technologies as well as contemporary multimodal technologies (e.g. augmented/mixed reality, eye-based interaction, etc.). We also introduce established principles and guidelines for designing user interfaces.. Furthermore, we describe the human-centered design process for interactive systems and supporting techniques & tools (e.g. personas, prototyping, user testing).

With this lecture, students acquire foundational knowledge to successfully **design the interaction between humans and computers** in business and private life. The course is complemented with a **Design Capstone Project**, where students in a team apply design methods & techniques to create an interactive prototype.

Learning Objectives

The students

- have a basic understanding of key conceptual and theoretical foundations of interactive systems from a human and computer perspective
- are aware of important design principles for the design of important classes of interactive systems
- know design processes and techniques for developing interactive systems
- know how to apply the knowledge and skills gathered in the lecture for a real-world problem (as part of design capstone project)

Prerequisites: No specific prerequisites are required for the lecture

Language of instruction: English

Bibliography

Alan Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale. 2003. Human-Computer Interaction (3rd Edition). Prentice-Hall, Inc., USA.

Further literature will be made available in the lecture. In case of questions feel free to approach Moritz Langner (moritz.langner@kit.edu)

Die Erfolgskontrolle erfolgt in Form einer Prüfungsleistung anderer Art (Form) nach § 4 Abs. 2 Nr. 3 SPO. Die Leistungskontrolle erfolgt in Form einer einstündigen Klausur und der Durchführung eines Capstone Projektes. Details zur Ausgestaltung der Erfolgskontrolle werden im Rahmen der Vorlesung bekannt gegeben.

T   8.87 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 2023	2511226	Foundations of mobile Business	2 SWS	Lecture / 🎤	Schiefer, Frister
ST 2023	2511227	Exercises Foundations of mobile Business	1 SWS	Practice / 🎤	Schiefer, Frister
Exams					
WT 22/23	7900118	Foundations of mobile Business			Oberweis
ST 2023	79AIFB_GMB_C5	Foundations of mobile Business (Registration until 17 July 2023)			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   Foundations of mobile Business
2511226, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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).

Industrial Engineering and Management B.Sc.
Module Handbook as of 11/04/2023

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   8.88 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Responsible: Hon.-Prof. Dr. Bernhard Ulrich Kehrwald
                     Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2133108	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture / 🕭	Kehrwald
Exams					
WT 22/23	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald
ST 2023	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald

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

Competence Certificate
oral examination, Duration: ca. 25 min., no auxiliary means

Prerequisites
none

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

V   Fuels and Lubricants for Combustion Engines
2133108, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
electric drives and fuel cell drives with the associated operating materials will also be presented

- Introduction, basics, primary energy and energy chains
- Illustrative chemistry of hydrocarbons
- Fossil fuels, exploration, processing, standards
- Operating materials not fossil, renewable, alternative
- Fuels, lubricants, coolants, AdBlue
- Laboratory analysis, testing, test benches and measurement technology
- Excursion to test fields for motorized drives from 0.5 to 3,500 kW

Literature
Skript

T   8.89 Course: Functional Ceramics [T-MACH-105179]

Responsible: Dr. Manuel Hinterstein
                    Dr.-Ing. Wolfgang Rheinheimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Exams			
WT 22/23	76T-MACH-105179	Functional Ceramics	Hinterstein

Competence Certificate

The assessment consists of an oral exam (20 min) taking place at the agreed date.

Auxiliary means: none

The re-examination is offered upon agreement.

Prerequisites

T   8.90 Course: Fundamentals for Design of Motor-Vehicle Bodies I [T-MACH-102116]

Responsible: Dipl.-Ing. Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2113814	Fundamentals for Design of Motor-Vehicles Bodies I	1 SWS	Lecture / 🗣	Bardehle
Exams					
WT 22/23	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I			Unrau, Bardehle
ST 2023	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I			Bardehle, Unrau

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

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

V   Fundamentals for Design of Motor-Vehicles Bodies I
2113814, WS 22/23, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. History and design

2. Aerodynamics

3. Design methods (CAD/CAM, FEM)

4. Manufacturing methods of body parts

5. Fastening technologie

6. Body in white / body production, body surface

Learning Objectives:

The students have an overview of the fundamental possibilities for design and manufacture of motor-vehicle bodies. They know the complete process, from the first idea, through the concept to the dimensioned drawings (e.g. with FE-methods). They have knowledge about the fundamentals and their correlations, to be able to analyze and to judge relating components as well as to develop them accordingly.

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

CO, Geb. 70.04, Raum 219.

Termine und nähere Informationen: siehe Institutshomepage

Dates and further information will be published on the homepage of the institute

Literature
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T   8.91 Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

Responsible: Dipl.-Ing. Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type Oral examination	Credits 1,5	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2023	2114840	Fundamentals for Design of Motor-Vehicles Bodies II	1 SWS	Lecture / 🎤	Bardehle
Exams					
WT 22/23	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II			Bardehle
ST 2023	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II			Bardehle, Gauterin

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

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

V   Fundamentals for Design of Motor-Vehicles Bodies II
2114840, SS 2023, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Body properties/testing procedures
2. External body-parts
3. Interior trim
4. Compartment air conditioning
5. Electric and electronic features
6. Crash tests
7. Project management aspects, future prospects

Learning Objectives:

The students know that, often the design of seemingly simple detail components can result in the solution of complex problems. They have knowledge in testing procedures of body properties. They have an overview of body parts such as bumpers, window lift mechanism and seats. They understand, as well as, parallel to the normal electrical system, about the electronic side of a motor vehicle. Based on this they are ready to analyze and to judge the relation of these single components. They are also able to contribute competently to complex development tasks by imparted knowledge in project management.

Organizational issues
Voraussichtliche Termine, nähere Informationen und evtl. Änderungen:

siehe Institutshomepage. Präsenzveranstaltung unter Vorbehalt der Pandemie-Entwicklung

Scheduled dates, further Information and possible changes of date:

see homepage of the institute.

Literature
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH,
Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T   8.92 Course: Fundamentals in the Development of Commercial Vehicles [T-MACH-111389]

Responsible: Christof Weber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
          M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	see Annotations	2 terms	2

Events					
WT 22/23	2113812	Fundamentals in the Development of Commercial Vehicles I	1 SWS	Lecture / 🗣	Weber
ST 2023	2114844	Fundamentals in the Development of Commercial Vehicles II	1 SWS	Lecture / 🗣	Weber
Exams					
WT 22/23	76T-MACH-111389	Fundamentals in the Development of Commercial Vehicles			Weber
ST 2023	76T-MACH-111389	Fundamentals in the Development of Commercial Vehicles			Weber

Legend: 📱 Online, ⚅ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Oral group examination

Duration: appr. 30 minutes

Auxiliary means: none

Prerequisites
none

Annotation
Fundamentals in the Development of Commercial Vehicles I, WT

Fundamentals in the Development of Commercial Vehicles II, ST

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

V	**Fundamentals in the Development of Commercial Vehicles I**	Lecture (V)
	2113812, WS 22/23, 1 SWS, Language: German, Open in study portal	On-Site

Content

1. Introduction, definitions, history

2. Development tools

3. Complete vehicle

4. Cab, bodyshell work

5. Cab, interior fitting

6. Alternative drive systems

7. Drive train

8. Drive system diesel engine

9. Intercooled diesel engines

Learning Objectives:

The students have proper knowledge about the process of commercial vehicle development starting from the concept and the underlying original idea to the real design. They know that the customer requirements, the technical realisability, the functionality and the economy are important drivers.

The students are able to develop parts and components. Furthermore they have knowledge about different cab concepts, the interior and the interior design process. Consequently they are ready to analyze and to judge concepts of commercial vehicles as well as to participate competently in the commercial vehicle development.

Organizational issues

Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/ PasswoerterIlias/

CO, Geb. 70.04, Raum 219. Termine und Nähere Informationen: siehe Institutshomepage

Dates and further information will be published on the homepage of the institute.

Literature

1. Marwitz, H., Zittel, S.: ACTROS -- die neue schwere Lastwagenbaureihe von Mercedes-Benz, ATZ 98, 1996, Nr. 9

2. Alber, P., McKellip, S.: ACTROS -- Optimierte passive Sicherheit, ATZ 98, 1996

3. Morschheuser, K.: Airbag im Rahmenfahrzeug, ATZ 97, 1995, S. 450 ff.

V	**Fundamentals in the Development of Commercial Vehicles II** 2114844, SS 2023, 1 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Gear boxes of commercial vehicles

2. Intermediate elements of the drive train

3. Axle systems

4. Front axles and driving dynamics

5. Chassis and axle suspension

6. Braking System

7. Systems

8. Excursion

Learning Objectives:

The students know the advantages and disadvantages of different drives. Furthermore they are familiar with components, such as transfer box, propeller shaft, powered and non-powered frontaxle etc. Beside other mechanical components, such as chassis, axle suspension and braking system, also electric and electronic systems are known. Consequently the student are able to analyze and to judge the general concepts as well as to adjust them precisely with the area of application.

Organizational issues

Genaue Termine sowie nähere Informationen und eventuelle Terminänderungen:

siehe Institutshomepage.

Literature

1.HILGERS, M.: Nutzfahrzeugtechnik lernen, Springer Vieweg, ISSN: 2510-1803

2.SCHITTLER, M.; HEINRICH, R.; KERSCHBAUM, W.: Mercedes-Benz Baureihe 500 – neue V-Motorengeneration für schwere Nutzfahrzeuge, MTZ 57 Nr. 9, S. 460 ff, 1996

3.Robert Bosch GmbH (Hrsg.): Bremsanalgen für Kraftfahrzeuge, VDI-Verlag, Düsseldorf, 1. Auflage, 1994

4.RUBI, V.; STRIFLER, P. (Hrsg. Institut für Kraftfahrwesen RWTH Aachen): Indiustrielle Nutzfahrzeugentwicklung, Schriftenreihe Automobiltechnik, 1993

5.TEUTSCH, R.; CHERUTI, R.; GASSER, R.; PEREIRA, M.; de SOUZA, A.; WEBER, C.: Fuel Efficiency Optimization of Market Specific Truck Applications, Proceedings of the 5th Commercial Vehicle Technology Symposium – CVT 2018

T   8.93 Course: Fundamentals of Automobile Development I [T-MACH-105162]

Responsible: Prof.Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each winter term	1

Events					
WT 22/23	2113810	Fundamentals of Automobile Development I	1 SWS	Lecture / 🎤	Frech
WT 22/23	2113851	Principles of Whole Vehicle Engineering I	1 SWS	Lecture / 🎤	Frech
Exams					
WT 22/23	76-T-MACH-105162	Fundamentals of Automobile Development I			Frech, Unrau
ST 2023	76-T-MACH-105162	Fundamentals of Automobile Development I			Frech, Unrau

Legend: 🖥 Online, ✣ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

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

V   Fundamentals of Automobile Development I
2113810, WS 22/23, 1 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Content
1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Learning Objecitves:

The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

Organizational issues

Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter *https://fast-web-01.fast.kit.edu/ PasswoerterIlias/*

Campus Ost, geb. 70.04., Raum 219

Termine und nähere Informationen finden Sie auf der Institutshomepage.

Kann nicht mit Lehrveranstaltung 2113851 kombiniert werden.

Date and further information will be published on the homepage of the institute.

Cannot be combined with lecture 2113851.

Literature

Skript zur Vorlesung wird zu Beginn des Semesters ausgegeben

The scriptum will be provided during the first lessons

V	**Principles of Whole Vehicle Engineering I** 2113851, WS 22/23, 1 SWS, Language: English, Open in study portal	**Lecture (V)** **On-Site**

Content
1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Learning Objectives:

The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

Organizational issues

You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to *https://fast-web-01.fast.kit.edu/PasswoerterIlias/*

CO, Geb.70.04, Raum 219. Termine und nähere Informationen finden Sie auf der Institutshomepage.

Dats and further information will be published on the homepage of the institute.

Kann nicht mit Lehrveranstaltung 2113810 kombiniert werden

Cannot be combined with lecture 2113810.

Literature

Skript zur Vorlesung wird zu Beginn des Semesters ausgegeben

The scriptum will be provided during the first lessons

T   8.94 Course: Fundamentals of Automobile Development II [T-MACH-105163]

Responsible: Prof.Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type Written examination	Credits 1,5	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2023	2114842	Principles of Whole Vehicle Engineering II	1 SWS	Block / 🗣	Frech
ST 2023	2114860	Principles of Whole Vehicle Engineering II	1 SWS	/ 🖥	Frech
Exams					
WT 22/23	76-T-MACH-105163	Fundamentals of Automobile Development II			Frech, Unrau
ST 2023	76-T-MACH-105163	Fundamentals of Automobile Development II			Frech, Unrau

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

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

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

V   Principles of Whole Vehicle Engineering II
2114842, SS 2023, 1 SWS, Language: German, Open in study portal

Block (B)
On-Site

Content
1. Application-oriented material and production technology I

2. Application-oriented material and production technology II

3. Overall vehicle acoustics in the automobile development

4. Drive train acoustics in the automobile development

5. Testing of the complete vehicle

6. Properties of the complete automobile

Learning Objectives:

The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

Organizational issues
Vorlesung findet als Blockvorlesung am Campus Ost, Geb. 70.04, Raum 219 statt. Termine werden über die Homepage bekannt gegeben.

Kann nicht mit der Veranstaltung [2114860] kombiniert werden.

Cannot be combined with lecture [2114860].

Literature
Skript zur Vorlesung ist über ILIAS verfügbar.

V　Principles of Whole Vehicle Engineering II
2114860, SS 2023, 1 SWS, Language: English, Open in study portal

Online

Content

1. Application-oriented material and production technology I

2. Application-oriented material and production technology II

3. Overall vehicle acoustics in the automobile development

4. Drive train acoustics in the automobile development

5. Testing of the complete vehicle

6. Properties of the complete automobile

Learning Objectives:

The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

Organizational issues

Kann nicht mit der Veranstaltung [2114842] kombiniert werden.

Cannot be combined with lecture [2114842].

Veranstaltung findet am Campus Ost, Geb. 70.04, Raum 219 statt. Genaue Termine entnehmen Sie bitte der Institushomepage.

Scheduled dates:

see homepage of the institute.

Literature

Das Skript zur Vorlesung ist über ILIAS verfügbar.

T 8.95 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsible:	Prof. Dr. Olaf Deutschmann Prof. Dr. Jan-Dierk Grunwaldt Dr.-Ing. Heiko Kubach Hon.-Prof. Dr. Egbert Lox
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2023	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture / 🗣	Lox, Grunwaldt, Deutschmann
Exams					
WT 22/23	76-T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment			Lox
ST 2023	76-T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment			Lox

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

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

V Fundamentals of catalytic exhaust gas aftertreatment
2134138, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 8.96 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 2023	2581950	Fundamentals of Production Management	2 SWS	Lecture / 🎤	Schultmann
ST 2023	2581951	Übungen Grundlagen der Produktionswirtschaft	2 SWS	Practice / 🎤	Steffl, Braun
Exams					
WT 22/23	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 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This lecture focuses on strategic production management with respect to various economic aspects. Interdisciplinary approaches of systems theory will be used to describe the challenges of industrial production. This course will emphasize the importance of R&D as the central step in strategic corporate planning to ensure future long-term success. In the field of site selection and planning for firms and factories, attention will be drawn upon individual aspects of existing and greenfield sites as well as existing distribution and supply centres. Students will obtain knowledge in solving internal and external transport and storage problems.

Organizational issues
Blockveranstaltung, siehe Institutsaushang

Literature
Wird in der Veranstaltung bekannt gegeben.

T 8.97 Course: Gear Cutting Technology [T-MACH-102148]

Responsible: Dr.-Ing. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101284 - Specialization in Production Engineering

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	2149655	Gear Technology	2 SWS	Lecture / �	Klaiber
Exams					
WT 22/23	76-T-MACH-102148	Gear Technology			Klaiber

Legend: 🗎 Online, � Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

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

V Gear Technology
2149655, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Based on the gearing theory, manufacturing processes and machine technologies for producing gearings, the needs of modern gear manufacturing will be discussed in the lecture. For this purpose, various processes for various gear types are taught which represent the state of the art in practice today. A classification in soft and hard machining and furthermore in cutting and non-cutting technologies will be made. For comprehensive understanding the processes, machine technologies, tools and applications of the manufacturing of gearings will be introduced and the current developments presented. For assessment and classification of the applications and the performance of the technologies, the methods of mass production and manufacturing defects will be discussed. Sample parts, reports from current developments in the field of research and an excursion to a gear manufacturing company round out the lecture.

Learning Outcomes:

The students ...

- can describe the basic terms of gearings and are able to explain the imparted basics of the gearwheel and gearing theory.
- are able to specify the different manufacturing processes and machine technologies for producing gearings. Furthermore they are able to explain the functional principles and the dis-/advantages of these manufacturing processes.
- can apply the basics of the gearing theory and manufacturing processes on new problems.
- are able to read and interpret measuring records for gearings. are able to make an appropriate selection of a process based on a given application
- can describe the entire process chain for the production of toothed components and their respective influence on the resulting workpiece properties.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 27.10.2022

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	**8.98 Course: Geological Hazards and Risk [T-PHYS-103525]**

Responsible: Dr. Andreas Schäfer
Organisation: KIT Department of Physics
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type Examination of another type	**Credits** 8	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 2

Events					
WT 22/23	4060121	Geological Hazards and Risk	2 SWS	Lecture / 🔊	Schäfer, Rietbrock
WT 22/23	4060122	Exercises on Geological Hazards and Risk	2 SWS	Practice / 🔊	Schäfer, Rietbrock
Exams					
WT 22/23	7800114	Geological Hazards and Risk			Rietbrock

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

T 8.99 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 2023	2550134	Global Optimization I	2 SWS	Lecture / 🕮	Stein
Exams					
WT 22/23	7900004_WS2223_NK	Global Optimization I			Stein
ST 2023	7900205_SS2023_HK	Global Optimization I			Stein

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🕮 On-Site, ✗ Cancelled

Competence Certificate

Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO). The successful completion of the exercises is required for admission to the written exam.

The exam is offered in the lecture of semester and the following semester.

The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

Prerequisites

None

Recommendation

None

Annotation

Part I and II of the lecture are held consecutively in the **same** semester.

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

V	**Global Optimization I**	Lecture (V)
	2550134, SS 2023, 2 SWS, Language: German, Open in study portal	On-Site

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of 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 8.100 Course: Global Optimization I and II [T-WIWI-103638]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2023	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
ST 2023	2550135	Exercise to Global Optimization I and II	2 SWS	Practice / 🗣	Stein, Beck
ST 2023	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 22/23	7900006_WS2223_NK	Global Optimization I and II			Stein
ST 2023	7900207_SS2023_HK	Global Optimization I and II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

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

V	**Global Optimization I**	Lecture (V)
	2550134, SS 2023, 2 SWS, Language: German, Open in study portal	**On-Site**

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

V	**Global Optimization II** 2550136, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 8.101 Course: Global Optimization II [T-WIWI-102727]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR

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

Events					
ST 2023	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 22/23	7900005_WS2223_NK	Global Optimization II			Stein
ST 2023	7900206_SS2023_HK	Global Optimization II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

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

V	**Global Optimization II** 2550136, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T	8.102 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 22/23	2149613	Global Production	2 SWS	Lecture / ⚙	Lanza, Peukert
Exams					
WT 22/23	76-T-MACH-110991	Global Production			Lanza
ST 2023	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 22/23, 2 SWS, Language: German, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Content

The lecture examines the management of global production networks of manufacturing companies. It gives an overview of the influencing factors and challenges of global production. In-depth knowledge of common methods and procedures for planning, designing and managing global production networks is imparted.

Therefore, the lecture first of all discusses the connections and interdependencies between the business strategy and the production strategy and illustrates necessary tasks for the definition of a production strategy. Methods for site selection, for the site-specific adaptation of product design and production technology as well as for the establishment of new production sites and for the adaptation of existing production networks to changing framework conditions are subsequently taught within the context of the design of the network footprint. With regard to the management of global production networks, the lecture addresses challenges associated with coordination, procurement and order management in global networks. The lecture is complemented by a discussion on the use of industry 4.0 applications in global production and current trends in planning, designing and managing global production networks.

The topics include:

- Basic conditions and influencing factors of global production (historical development, targets, chances and threats)
- Framework for planning, designing and managing global production networks
- Production strategies for global production networks
    - From business strategy to production strategy
    - Tasks of the production strategy (product portfolio management, circular economy, planning of production depth, production-related research and development)
- Design of global production networks
    - Basic types of network structures
    - Planning process for the design of the network footprint
    - Adaptation of the network footprint
    - Site selection
    - Location-specific adaptation of production technology and product design
- Management of global production networks
    - Network coordination
    - Procurement process
    - Order management

- Trends in planning, designing and managing global production networks

Learning Outcomes:

The students …

- can explain the general conditions and influencing factors of global production
- are capable to apply defined procedures for site selection and to evaluate site decisions with the help of different methods
- are able to select the adequate scope of design for siteappropriate production and product construction casespecifically
- can state the central elements in the planning process of establishing a new production site.
- are capable to make use of the methods to design and scale global production networks for company-individual problems

- are able to show up the challenges and potentials of the departments sales, procurement as well as research and development on global basis.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Recommendations:
Combination with Global Production and Logistics – Part 2

Organizational issues
Start: 24.10.2022

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 8.103 Course: Großdiesel- und -gasmotoren für Schiffsantriebe [T-MACH-110816]

Responsible: Dr.-Ing. Heiko Kubach
Organisation:
Part of: M-MACH-101303 - Combustion Engines II

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Expansion 1 terms	Version 1

Events					
ST 2023	2134154	Large Diesel and Gas Engines for Ship Propulsions	2 SWS	Lecture / 🎤	Weisser
Exams					
ST 2023	76-T-MACH-110816	Großdiesel- und -gasmotoren für Schiffsantriebe			Weisser

Legend: 📱 Online, ⚃ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
oral exam, 20 minutes

Prerequisites
None

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

V Large Diesel and Gas Engines for Ship Propulsions
2134154, SS 2023, 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

T   8.104 Course: Handling Characteristics of Motor Vehicles I [T-MACH-105152]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

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

Events					
WT 22/23	2113807	Handling Characteristics of Motor Vehicles I	2 SWS	Lecture / 🎤	Unrau
Exams					
WT 22/23	76-T-MACH-105152	Handling Characteristics of Motor Vehicles I			Unrau
ST 2023	76-T-MACH-105152	Handling Characteristics of Motor Vehicles I			Unrau

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

Competence Certificate
Verbally

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

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

V   Handling Characteristics of Motor Vehicles I
2113807, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Problem definition: Control loop driver - vehicle - environment (e.g. coordinate systems, modes of motion of the car body and the wheels)

2. Simulation models: Creation from motion equations (method according to D'Alembert, method according to Lagrange, programme packages for automatically producing of simulation equations), model for handling characteristics (task, motion equations)

3. Tyre behavior: Basics, dry, wet and winter-smooth roadway

Learning Objectives:

The students know the basic connections between drivers, vehicles and environment. They can build up a vehicle simulation model, with which forces of inertia, aerodynamic forces and tyre forces as well as the appropriate moments are considered. They have proper knowledge in the area of tyre characteristics, since a special meaning comes to the tire behavior during driving dynamics simulation. Consequently they are ready to analyze the most important influencing factors on the driving behaviour and to contribute to the optimization of the handling characteristics.

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/ PasswoerterIlias/

Literature
1. Willumeit, H.-P.: Modelle und Modellierungsverfahren in der Fahrzeugdynamik,
B. G. Teubner Verlag, 1998

2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R.; Unrau, H.-J.: Umdrucksammlung zur Vorlesung Fahreigenschaften von Kraftfahrzeugen I

T   8.105 Course: Handling Characteristics of Motor Vehicles II [T-MACH-105153]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type Oral examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 1

Events					
ST 2023	2114838	Handling Characteristics of Motor Vehicles II	2 SWS	Lecture / 🗣	Unrau
Exams					
WT 22/23	76-T-MACH-105153	Handling Characteristics of Motor Vehicles II			Unrau
ST 2023	76-T-MACH-105153	Handling Characteristics of Motor Vehicles II			Unrau

Legend: 📱 Online, ⚬ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

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

V   Handling Characteristics of Motor Vehicles II
2114838, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Vehicle handling: Bases, steady state cornering, steering input step, single sine, double track switching, slalom, cross-wind behavior, uneven roadway

2. stability behavior: Basics, stability conditions for single vehicles and for vehicles with trailer

Learning Objectives:

The students have an overview of common test methods, with which the handling of vehicles is gauged. They are able to interpret results of different stationary and transient testing methods. Apart from the methods, with which e.g. the driveability in curves or the transient behaviour from vehicles can be registered, also the influences from cross-wind and from uneven roadways on the handling characteristics are well known. They are familiar with the stability behavior from single vehicles and from vehicles with trailer. Consequently they are ready to judge the driving behaviour of vehicles and to change it by specific vehicle modifications.

Literature
1. Zomotor, A.: Fahrwerktechnik: Fahrverhalten, Vogel Verlag, 1991

2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R.; Unrau, H.-J.: Umdrucksammlung zur Vorlesung Fahreigenschaften von Kraftfahrzeugen II

T	8.106 Course: High Performance Powder Metallurgy Materials [T-MACH-102157]

Responsible: apl. Prof. Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2023	2126749	Advanced powder metals	2 SWS	Lecture / 🧩	Schell
Exams					
WT 22/23	76-T-MACH-102157	High Performance Powder Metallurgy Materials			Schell

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

Competence Certificate
oral exam, 20- 30 min

Prerequisites
none

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

V	**Advanced powder metals** 2126749, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Literature

- W. Schatt ; K.-P. Wieters ; B. Kieback. ".Pulvermetallurgie: Technologien und Werkstoffe", Springer, 2007
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
- F. Thümmler, R. Oberacker. "Introduction to Powder Metallurgy", Institute of Materials, 1993

T   8.107 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
M-WIWI-105928 - HR Management & Digital Workplace

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

Events					
WT 22/23	2573005	Human Resource Management	2 SWS	Lecture / 🗣	Nieken
WT 22/23	2573006	Übung zu Human Resource Management	1 SWS	Practice / 🗣	Nieken, Mitarbeiter, Walther
Exams					
WT 22/23	7900200	Human Resource Management			Nieken
ST 2023	7900134	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**	Lecture (V)
	2573005, WS 22/23, 2 SWS, Language: German, Open in study portal	On-Site

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 8.108 Course: Hydraulic Engineering and Water Management [T-BGU-101667]

Responsible: Prof. Dr. Mario Jorge Rodrigues Pereira da Franca

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	6200511	Wasserbau und Wasserwirtschaft	2 SWS	Lecture	Rodrigues Pereira da Franca
WT 22/23	6200512	Übungen zu Wasserbau und Wasserwirtschaft	1 SWS	Practice	Seidel
Exams					
WT 22/23	8230101667	Hydraulic Engineering and Water Management			Rodrigues Pereira da Franca

Competence Certificate
written exam with 60 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T   8.109 Course: Hydrogen and reFuels - Energy Conversion in Combustion Engines [T-MACH-111585]

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

Part of: M-MACH-101275 - Combustion Engines I

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Expansion 1 terms	Version 1

Events					
WT 22/23	2134155	Hydrogen and reFuels - Energy Conversion in Combustion Engines	2 SWS	Lecture / 🎤	Koch

Exams			
WT 22/23	76T-MACH-111585	Hydrogen and reFuels - Energy Conversion in Combustion Engines	Koch
ST 2023	76-T-MACH-105564	Hydrogen and reFuels - Energy Conversion in Combustion Engines	Koch, Kubach

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
oral exam, appr. 25 minutes, no auxillary means

Prerequisites
none

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

V   Hydrogen and reFuels - Energy Conversion in Combustion Engines
2134155, WS 22/23, 2 SWS, Language: German, Open in study portal   Lecture (V) On-Site

Content
New types of CO2-neutral fuels such as gaseous hydrogen but also liquid synthetic fuels often place specific requirements on engine systems that differ significantly from operation with conventional fuels. These special aspects of engine energy conversion are dealt with in this lecture.

Introduction

Thermodynamics of combustion engines

Fundamentals

gas exchange

Flow field

Wall heat losses

Combustion in gasoline engines

Pressure Trace Analysis

Combustion in Diesel engines

Specific Topics of Hydrogen Combsution

Waste heat recovery

T	**8.110 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 Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 22/23	6200513	Hydrology	2 SWS	Lecture / ⚙	Zehe, Wienhöfer
WT 22/23	6200514	Tutorial Hydrology	1 SWS	Practice / 🗣	Zehe, Wienhöfer
Exams					
WT 22/23	8230101693	Hydrology			Wienhöfer, Zehe

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

Prerequisites
None

Recommendation
None

Annotation
None

T   8.111 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 22/23	2123900	I4.0 Systems platform	4 SWS	Project (P / 🗨)	Ovtcharova, Maier
ST 2023	2123900	I4.0 Systems platform	4 SWS	Project (P / 🗨)	Ovtcharova, Maier
Exams					
WT 22/23	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 22/23, 4 SWS, Language: German, Open in study portal

Project (PRO)
On-Site

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

Literature
Keine / None

V   I4.0 Systems platform
2123900, SS 2023, 4 SWS, Language: German, Open in study portal

Project (PRO)
On-Site

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

Literature

Keine / None

T 8.112 Course: Ignition Systems [T-MACH-105985]

Responsible:	Dr.-Ing. Olaf Toedter
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Version
Oral examination	4	Grade to a third	1

Events					
WT 22/23	2133125	Ignition systems	2 SWS	Lecture / 🗣	Toedter
Exams					
WT 22/23	76-T-MACH-105985	Ignition systems			Koch
ST 2023	76-T-MACH-105985	Ignition systems			Toedter

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**	Lecture (V)
	2133125, WS 22/23, 2 SWS, Language: German, Open in study portal	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 8.113 Course: Industrial Organization [T-WIWI-102844]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

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

Events					
ST 2023	2560238	Industrial Organization	2 SWS	Lecture / 🎤	Reiß, Peters
ST 2023	2560239	Übung zu Industrieökonomie	1 SWS	Practice / 🎤	Peters, Reiß
Exams					
WT 22/23	7910003	Industrial Organization			Reiß

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Completion of the module Economics [WW1VWL] is assumed.

Annotation
This course is not given in summer 2017.

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

V Industrial Organization
2560238, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Verpflichtende Literatur:

H. Bester (2012): Theorie der Industrieökonomik, Springer-Verlag.

Ergänzende Literatur:

J. Tirole (1988): Theory of Industrial Organization, MIT Press.

D. Carlton / J. Perloff (2005): Modern Industrial Organization, Pearson.

P. Belleflamme / M. Peitz (2010): Industrial Organization

T 8.114 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 2023	2122014	Information Engineering	2 SWS	Seminar / ⚝	Ovtcharova, Mitarbeiter
Exams					
WT 22/23	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 2023, 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 8.115 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	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
WT 22/23	2121001	Integrated Information Systems for engineers	3 SWS	Lecture / Practice (/ 🗣	Ovtcharova, Elstermann
ST 2023	2121001	Integrated Information Systems for engineers	3 SWS	Lecture / Practice (/ 🗣	Ovtcharova, Elstermann
Exams					
WT 22/23	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 22/23, 3 SWS, Language: German, Open in study portal

**Lecture / Practice (VÜ)
On-Site**

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 2023, 3 SWS, Language: German, Open in study portal

**Lecture / Practice (VÜ)
On-Site**

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 8.116 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 2023	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (/ 🎤	Lanza
Exams					
WT 22/23	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza
ST 2023	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 2023, 6 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **On-Site**

Content

Integrated Production Planning in the age of Industry 4.0 will be taught in the context of this engineering science lecture. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the lecture:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (PPS, process simulation as a validation tool, planning of conveyor technology and storage systems for linking production and IT systems in the I4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The lecture contents are complemented by numerous current practical examples with a strong Industry 4.0 reference. Aspects of sustainability are anchored in all units and thus basic knowledge of sustainable production planning is taught. Within the exercises the lecture contents are deepened and applied to specific problems and tasks.

Learning Outcomes:

The students …

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

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine dienstags 14.00 Uhr und donnerstags 14.00 Uhr, Übungstermine donnerstags 15.45 Uhr. Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

| T	**8.117 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]**

Responsible: Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
WT 22/23	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / ⚙	Schlichtenmayer
ST 2023	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / 🎤	Schlichtenmayer
Exams					
WT 22/23	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer
ST 2023	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 22/23, 2 SWS, Language: German, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Content

The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:

- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrative R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Learning Outcomes:

The students …

- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues

Die LV wird einmalig im WS 2022/23 als Ersatz für die Absage im SS 2022 angeboten.
Im SS 2023 findet die LV wieder regulär statt.

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 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content

The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:

- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrative R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Learning Outcomes:

The students …

- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T	8.118 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Events					
ST 2023	2530570	International Finance	2 SWS	Lecture / 🗣	Walter, Uhrig-Homburg
Exams					
WT 22/23	7900052	International Finance			Uhrig-Homburg
ST 2023	7900097	International Finance			Uhrig-Homburg

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

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Recommendation
None

Annotation
The course is offered as a 14-day or block course.

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

V	International Finance	Lecture (V)
	2530570, SS 2023, 2 SWS, Language: German, Open in study portal	On-Site

Organizational issues
Kickoff am Mittwoch, 26.04.23, 15:45 - 19:00 Uhr im Raum 320 im Geb. 09.21 (Blücherstr. 17). Die Veranstaltung wird samstags als Blockveranstaltung angeboten, nach dem Kickoff nach Absprache.

Literature
Weiterführende Literatur:

- Eiteman, D. et al., Multinational Business Finance, 13. Auflage, 2012.
- Solnik, B. und D. McLeavey, Global Investments, 6. Auflage, 2008.

T   8.119 Course: Internship [T-WIWI-102611]

Responsible:	Studiendekan des KIT-Studienganges
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101419 - Internship

Type Completed coursework	**Credits** 10	**Grading scale** pass/fail	**Version** 2

Exams			
WT 22/23	7900347	Internship	Satzger

Competence Certificate
see module description

Prerequisites
Kein

T 8.120 Course: Introduction to Bionics [T-MACH-111807]

Responsible:	apl. Prof. Dr. Hendrik Hölscher
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	2

Events					
ST 2023	2142151	Introduction to Biomimetics	2 SWS	Lecture / 🗣	Hölscher, Greiner

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

Competence Certificate
written or oral exam

Prerequisites
none

Annotation
Brick T-MACH-102172 may not be started

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

V Introduction to Biomimetics
2142151, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.

The students should be able analyze, judge, plan and develop biomimetic strategies and products.

Basic knowledge in physics and chemistry

The successfull attandence of the lecture is controlled by a written examination.

Organizational issues
Die Vorlesung findet in Abhängigkeit von der aktuellen Situation in Präsenz statt. Im ILIAS werden Materialien (Videos, Originalliteratur, Übungen) zur Vertiefung zur Verfügung gestellt. Zusätzlich können zu den jeweiligen Vorlesungsterminen Aufgaben, Übungen und Fragen besprochen werden.

Diese Vorlesung ersetzt "Bionik für Ingenieure und Naturwissenschafter" (nur der Titel hat sich geändert).

Für die schriftliche Klausur werden zwei Termine angeboten werden (voraussichtlich in der ersten Woche nach Vorlesungsende im Sommersemester und 1-2 Wochen vor Vorlesungsbeginn im Wintersemester).

Literature
Folien und Literatur werden in ILIAS zur Verfügung gestellt.

T 8.121 Course: Introduction to Ceramics [T-MACH-100287]

Responsible: Prof. Dr. Michael Hoffmann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type Oral examination	Credits 6	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	2125757	Introduction to Ceramics	3 SWS	Lecture / 🗣	Hoffmann
Exams					
WT 22/23	76-T-MACH-100287	Introduction to Ceramics			Hoffmann, Schell, Wagner
ST 2023	76-T-MACH-100287	Introduction to Ceramics			Hoffmann, Schell, Wagner

Legend: 📱 Online, ⚅ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral exam (30 min) taking place at a specific date.

The re-examination is offered at a specific date.

Prerequisites
None

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

V Introduction to Ceramics
2125757, WS 22/23, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- H. Salmang, H. Scholze, "Keramik", Springer
- Kingery, Bowen, Uhlmann, "Introduction To Ceramics", Wiley
- Y.-M. Chiang, D. Birnie III and W.D. Kingery, "Physical Ceramics", Wiley
- S.J.L. Kang, "Sintering, Densification, Grain Growth & Microstructure", Elsevier

T 8.122 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	5

Events					
ST 2023	2581010	Introduction to Energy Economics	2 SWS	Lecture / 🎤	Fichtner
ST 2023	2581011	Übungen zu Einführung in die Energiewirtschaft	2 SWS	Practice / 🎤	Lehmann, Sandmeier, Ardone, Fichtner
Exams					
WT 22/23	7981010	Introduction to Energy Economics			Fichtner
ST 2023	7981010	Introduction to Energy Economics			Fichtner

Legend: 🗍 Online, ⌘ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

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

V Introduction to Energy Economics
2581010, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction: terms, units, conversions
2. The energy carrier gas (reserves, resources, technologies)
3. The energy carrier oil (reserves, resources, technologies)
4. The energy carrier hard coal (reserves, resources, technologies)
5. The energy carrier lignite (reserves, resources, technologies)
6. The energy carrier uranium (reserves, resources, technologies)
7. The final carrier source electricity
8. The final carrier source heat
9. Other final energy carriers (cooling energy, hydrogen, compressed air)

The student is able to

- characterize and judge the different energy carriers and their peculiarities,
- understand contexts related to energy economics.

Literature
Weiterführende Literatur:

Pfaffenberger, Wolfgang. Energiewirtschaft. ISBN 3-486-24315-2

Feess, Eberhard. Umweltökonomie und Umweltpolitik. ISBN 3-8006-2187-8

Müller, Leonhard. Handbuch der Elektrizitätswirtschaft. ISBN 3-540-67637-6

Stoft, Steven. Power System Economics. ISBN 0-471-15040-1

Erdmann, Georg. Energieökonomik. ISBN 3-7281-2135-5

T   **8.123 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 22/23	6339057	Einführung in die Ingenieurgeologie	4 SWS	Lecture / Practice (	Blum
Exams					
WT 22/23	8210_101500	Introduction to Engineering Geology			Blum

Prerequisites

T 8.124 Course: Introduction to Engineering Mechanics I: Statics and Strength of Materials [T-MACH-102208]

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

Part of: M-MACH-101259 - Engineering Mechanics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2023	2162238	Introduction to Engineering Mechanics I: Statics and Strength of Materials	2 SWS	Lecture / 🎤	Fidlin
ST 2023	2162239	Introduction to Engineering Mechanics I: Statics and Strength of Materials (Tutorial)	1 SWS	Practice / 🧩	Fidlin, Singhal
Exams					
WT 22/23	76-T-MACH-102208-1	Introduction to Engineering Mechanics I: Statics (75min)			Fidlin
WT 22/23	76-T-MACH-102208-2	Introduction to Engineering Mechanics I: Statics and Strength of Materials (120min)			Fidlin

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

Competence Certificate

The assessment consists of a written examination (120 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place in every semester. Re-examinations are offered at every ordinary examination date.

For students of economics the assessement consists of a written examination (Statics - 75 min.)

Permitted utilities: non-programmable calculator

Prerequisites
None

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

V Introduction to Engineering Mechanics I: Statics and Strength of Materials
2162238, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

Statics: force · moment · general equilibrium condistions · center of mass · inner force in structure · plane frameworks · theory of adhesion

T 8.125 Course: Introduction to Engineering Mechanics II : Dynamics [T-MACH-102210]

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

Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-WIWI-101839 - Additional Fundamentals of Engineering

Type Written examination	Credits 5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	2161276	Introduction to Engineering Mechanics II : Dynamics	2 SWS	Lecture / 🧩	Fidlin, Römer
Exams					
WT 22/23	76-T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics			Römer, Fidlin

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

Competence Certificate
The assessment consists of a written examination (75 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

Permitted utilities: non-programmable calculator, literature.

Prerequisites
None

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

V	**Introduction to Engineering Mechanics II : Dynamics** 2161276, WS 22/23, 2 SWS, Language: German, Open in study portal	Lecture (V) Blended (On-Site/Online)

T 8.126 Course: Introduction to Finance and Accounting [T-WIWI-112820]

Responsible:	Dr. Torsten Luedecke
	Prof. Dr. Martin Ruckes
	Dr. Jan-Oliver Strych
	Prof. Dr. Marliese Uhrig-Homburg
	Prof. Dr. Marcus Wouters
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105769 - Financing and Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2023	2500025	Tutorial Introduction to Finance and Accounting	2 SWS	Tutorial (	Wouters, Ruckes, Assistenten, Kohl
ST 2023	2610026	Introduction to Finance and Accounting	2 SWS	Lecture / 🗣	Ruckes, Wouters, Thimme
Exams					
ST 2023	7900043	Financing and Accounting			Ruckes, Wouters, Luedecke

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

Competence Certificate
Written Exam. The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

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

V Introduction to Finance and Accounting
2610026, SS 2023, 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   8.127 Course: Introduction to Game Theory [T-WIWI-102850]

Responsible:	Prof. Dr. Clemens Puppe
	Prof. Dr. Johannes Philipp Reiß
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101499 - Applied Microeconomics
	M-WIWI-101501 - Economic Theory

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

Events					
ST 2023	2520525	Introduction to Game Theory	2 SWS	Lecture / 🎤	Reiß
ST 2023	2520526	Übungen zu Einführung in die Spieltheorie	1 SWS	Practice / 🎤	Peters, Reiß
Exams					
WT 22/23	7900006	Introduction to Game Theory			Puppe

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes) according to Section 4(2),1 of the examination regulation.

The exam takes place in the recess period and can be repeated at every ordinary examination date.

Recommendation

Knowledge from the lecture "Economics I: Microeconomics" is recommended. Furthermore, basic knowledge of mathematics and statistics is assumed.

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

V   Introduction to Game Theory   Lecture (V)
2520525, SS 2023, 2 SWS, Language: German, Open in study portal   On-Site

Content

The course focusses on non-cooperative game theory. It discusses models, solution concepts, and applications for simultaneous games as well as sequential games. Various solution concepts, e.g., Nash equilibrium and subgame-perfect equilibrium, are introduced along with more advanced concepts.

The assessment consists of a written exam (60 minutes) according to Section 4(2),1 of the examination regulation.

The exam takes place in the recess period and can be resited at every ordinary examination date.

Recommendation: You should have passed the module [M-WIWI-101398] *Introduction to Economics.*

Recommendations:

Basic knowledge of mathematics and statistics is assumed.

This course offers an introduction to the theoretical analysis of strategic interaction situations. At the end of the course, students shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings.

Compulsory textbook:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Additional Literature:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

Literature
Verpflichtende Literatur:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Ergänzende Literatur:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

T 8.128 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-101681]

Responsible:	Dr.-Ing. Sven Wursthorn
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	6071101	Einführung in GIS für Studierende natur-, ingenieur- und geowissenschaftlicher Fachrichtungen, V/Ü	4 SWS	Lecture / Practice (/ 🎤	Wursthorn

Exams			
WT 22/23	8280101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	Wursthorn

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

T   8.129 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite [T-BGU-103541]

Responsible:	Dr.-Ing. Sven Wursthorn
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	3	pass/fail	Each winter term	3

Events					
WT 22/23	6071101	Einführung in GIS für Studierende natur-, ingenieur- und geowissenschaftlicher Fachrichtungen, V/Ü	4 SWS	Lecture / Practice (/ 🔊	Wursthorn
Exams					
WT 22/23	8280103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences			Wursthorn

Legend: 🗎 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T   8.130 Course: Introduction to Machine Learning [T-WIWI-111028]

Responsible: Prof. Dr. Andreas Geyer-Schulz
                   Dr. Abdolreza Nazemi
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105482 - Machine Learning and Data Science

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each winter term	1 terms	1

Events					
WT 22/23	2540539	Introduction to Machine Learning	2 SWS	Lecture / 🎤	Nazemi
WT 22/23	2540540	Übung zu Introduction to Machine Learning	1 SWS	Practice / 🎤	Nazemi
Exams					
WT 22/23	7900025	Introduction to Machine Learning			Geyer-Schulz
WT 22/23	7900349	Introduction to Machine Learning			Geyer-Schulz
ST 2023	7900076	Introduction to Machine Learning			Geyer-Schulz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five-point-steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

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

V   Introduction to Machine Learning
2540539, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

- Introduction
- Data Cleaning
- Data Visualization
- Linear Regression
- Logistic Regression
- Tree-based Algorithms
- Support Vector Machine
- Shrinkage Models
- Dimensionality Reduction
- Clustering

Literature

- Alpaydin, E. (2014). *Introduction to Machine Learning*. Third Edition, MIT Press.
- Hall, J. (2020). *Machine Learning in Business: An Introduction to the World of Data Science.*Independently published.
- James, G., Witten, D., Hastie, T., and R. Tibshirani (2013). *An Introduction to Statistical Learning: with Applications in R*. Springer.
- Tan, P. N., Steinbach, M., Karpatne, A., & Kumar, V. (2018). *Introduction to data mining*. Pearson

T 8.131 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	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 22/23	2141861	Introduction to Microsystem Technology I	2 SWS	Lecture / 🗣	Korvink, Badilita
Exams					
WT 22/23	76-T-MACH-105182	Introduction to Microsystem Technology I			Korvink, Badilita
ST 2023	76-T-MACH-105182	Introduction to Microsystem Technology I			Korvink, Badilita

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
written examination (60 min)

Prerequisites
none

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

V Introduction to Microsystem Technology I
2141861, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

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   8.132 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	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2023	2142874	Introduction to Microsystem Technology II	2 SWS	Lecture / 🎤	Korvink, Badilita
Exams					
WT 22/23	76-T-MACH-105183	Introduction to Microsystem Technology II			Korvink, Badilita
ST 2023	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 2023, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

Organizational issues
Topic: Grundlagen der Mikrosystemtechnik II (MST II) SS 21
Time: Thursdays 14:00 - 15:30

10.91 Redtenbacher-Hörsaal

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 8.133 Course: Introduction to Neural Networks and Genetic Algorithms [T-WIWI-111029]

Responsible:	Prof. Dr. Andreas Geyer-Schulz
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105482 - Machine Learning and Data Science

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4,5	Grade to a third	Each summer term	1 terms	1

Events					
ST 2023	2540541	Introduction to Neural Networks and Genetic Algorithms (SoSe 2023)	2 SWS	Lecture	Geyer-Schulz
ST 2023	2540542	Übung Introduction to Neural Networks and Genetic Algorithms	1 SWS	Practice	Geyer-Schulz
Exams					
WT 22/23	7900295	Introduction to Neural Networks and Genetic Algorithms (Nachklausur SS 2022)			Geyer-Schulz
ST 2023	7900303	Introduction to Neural Networks and Genetic Algorithms			Geyer-Schulz

Competence Certificate

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five-point-steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

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

V Introduction to Neural Networks and Genetic Algorithms (SoSe 2023)
2540541, SS 2023, 2 SWS, Language: English, Open in study portal   **Lecture (V)**

Content

The course consists of a short introduction and two parts:

1. In the introduction, the biological mechanisms of neural and genetic methods are presented.
   Furthermore, a common framework for the learning performance evaluation of these methods in applications is introduced.
2. In the field of genetic methods, simple genetic algorithms and their variants are introduced, analyzed, and applied.
3. In the area of neural methods, the basic algorithms are presented (e.g., backpropagation) as well as their applications in data science.

Learning Objectives:

The student knows the essential algorithms, learning procedures, and methods for neural networks and genetic algorithms. They can apply these methods (e.g. in R) and evaluate their quality.

Literature

- Goldberg, David E. (2001)
  Genetic Algorithms in Search, Optimization and Machine Learning.
  Addison-Wesley, New York.
- Bishop, Christopher M. (2006)
  Pattern Recognition and Machine Learning.
  Springer, New York.
- Goodfellow, Ian; Bengio, Yoshua; Courville, Aaron (2016)
  Deep Learning.
  MIT Press. Cambridge.

T 8.134 Course: Introduction to Operations Research I and II [T-WIWI-102758]

Responsible:	Prof. Dr. Stefan Nickel
	Prof. Dr. Steffen Rebennack
	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101418 - Introduction to Operations Research

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	see Annotations	2

Events					
WT 22/23	2530044			Tutorial (/ 🗣	Dunke
WT 22/23	2550043	Introduction to Operations Research II	2+2 SWS	Lecture / 🗣	Stein
ST 2023	2550040	Introduction to Operations Research I	2 SWS	Lecture / ✸	Rebennack
Exams					
WT 22/23	7900145	Introduction to Operations Research I and II			Stein

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**	Lecture (V)
	2550043, WS 22/23, 2+2 SWS, Language: German, Open in study portal	On-Site

Content

Integer and Combinatorial Programming: Basic notions, cutting plane metehods, branch and bound methods, branch and cut methods, heuristics.

Nonlinear Programming: Basic notions, optimality conditions, solution methods for convex and nonconvex optimization problems.

Dynamic and stochastic models and methods: dynamical programming, Bellman method, lot sizing models, dyanical and stochastic inventory models, queuing theory.

Learning objectives:

The student

- names and describes basic notions of integer and combinatorial optimization, nonlinear programming, and dynamic programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Literature

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

V	**Introduction to Operations Research I** 2550040, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/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, Rebennack, Stein, Waldmann: Operations Research, 3. Auflage, Springer, 2022
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

T	8.135 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 22/23	2511000	Introduction to Programming with Java	3 SWS	Lecture / 🗣	Zöllner
WT 22/23	2511002	Tutorien zu Programmieren I: Java	1 SWS	Tutorial (	Zöllner, Stegmaier, Schneider, Polley
WT 22/23	2511003	Computer lab Introduction to Programming with Java	2 SWS		Zöllner, Stegmaier, Schneider, Polley
Exams					
WT 22/23	79AIFB_Prog1	Introduction to Programming with Java			Zöllner
ST 2023	7900042	Introduction to Programming with Java			Zöllner

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation.

The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.

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

Annotation
see german version

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

V	Introduction to Programming with Java	Lecture (V)
	2511000, WS 22/23, 3 SWS, Language: German, Open in study portal	On-Site

Content

The lecture "Introduction to Programming with Java " introduces systematic programming and provides essential practical basics for all advanced computer science lectures.

Based on considerations of the structured and systematic design of algorithms, the most important constructs of modern higher programming languages as well as programming methods are explained and illustrated with examples. One focus of the lecture is on teaching the concepts of object-oriented Programming. Java is used as the programming language. Knowledge of this language is required in advanced computer science lectures.

At the end of the lecture period, a written examination will be held for which admission must be granted during the semester after successful participation in the practices. The exact details will be announced in the lecture.

Learning objectives:

- Knowledge of the fundamentals, methods and systems of computer science.
- The students acquire the ability to independently solve algorithmic problems in the programming language Java, which dominates in business applications.
- In doing so, they will be able to find strategic and creative answers in finding solutions to well-defined, concrete and abstract problems.

Workload:

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

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

T 8.136 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 22/23	2560131	Introduction to Public Finance	3 SWS	Lecture / 📱	Wigger
Exams					
WT 22/23	790fiwi	Introduction to Public Finance			Wigger
ST 2023	790fiwi	Introduction to Public Finance			Wigger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), ⬤ On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

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

V Introduction to Public Finance
2560131, WS 22/23, 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.

Literature
Literatur:

Wigger, B. U. 2006. *Grundzüge der Finanzwissenschaft.* Springer: Berlin.

T   8.137 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible:	Prof. Dr. Steffen Rebennack
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR
	M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2023	2550470	Introduction to Stochastic Optimization	2 SWS	Lecture / 🖥	Rebennack
ST 2023	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice / 🧩	Rebennack, Füllner
ST 2023	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	2 SWS	Others (sons	Rebennack, Füllner
Exams					
WT 22/23	7900242	Introduction to Stochastic Optimization			Rebennack

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites

None.

T 8.138 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 2023	2530575	Investments	2 SWS	Lecture / 🗣	Uhrig-Homburg, Müller
ST 2023	2530576	Übung zu Investments	1 SWS	Practice / 🗣	Uhrig-Homburg, Kargus
Exams					
WT 22/23	7900054	Investments			Uhrig-Homburg
ST 2023	7900109	Investments			Uhrig-Homburg

Legend: 📱 Online, ⚒ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites

None

Recommendation

Knowledge of Business Administration: Finance and Accounting [2610026] is recommended.

Below you will find excerpts from events related to this course:

V	**Investments** 2530575, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Literature
Weiterführende Literatur:

Bodie/Kane/Marcus (2010): Essentials of Investments, 8. Aufl., McGraw-Hill Irwin, Boston

T 8.139 Course: Laboratory Production Metrology [T-MACH-108878]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each summer term	2

Events					
ST 2023	2150550	Laboratory Production Metrology	3 SWS	Practical course / 🗣	Lanza, Stamer
Exams					
ST 2023	76-T-MACH-108878	Laboratory Production Metrology			Lanza, 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 2023, 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   8.140 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	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	4

Events					
WT 22/23	2149612	Learning Factory "Global Production"	4 SWS	/ ⚙	Lanza
Exams					
WT 22/23	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

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 22/23, 4 SWS, Language: German, Open in study portal   **Blended (On-Site/Online)**

Content

The learning factory "Global Production" serves as a modern teaching environment for the challenges of global production. To make this challenges come alive, students can run a production of electric motors under real production conditions.

The course is divided into e-learning units and presence dates. The e-learning units help to learn essential basics and to immerse themselves in specific topics (e.g. selection of location, supplier selection and planning of production networks). The focus of the presence appointments is the case-specific application of relevant methods for planning and control of production systems that are suitable for the location. In addition to traditional methods and tools to organize lean production systems (e.g. Kanban and JIT/ JIS, Line Balancing) the lecture in particular deals with site-specific quality assurance and scalable automation. Essential methods for quality assurance in complex production systems are taught and brought to practical experience by a Six Sigma project. In the area of scalable automation, it is important to find solutions for the adaption of the level of automation of the production system to the local production conditions (e.g. automated workpiece transport, integration of lightweight robots for process linking) and to implement them physically. At the same time safety concepts should be developed and implemented as enablers for human-robot collaboration.

The course also includes an excursion to the production plant for the manufacturing of electric motors of an industrial partner.

Main focus of the lecture:

- site selection
- site-specific factory planning
- site-specific quality assurance
- scalable automation
- supplier selection

Learning Outcomes:

The students are able to …

- evaluate and select alternative locations using appropriate methods.
- use methods and tools of lean management to plan and manage production systems that are suitable for the location.
- use the Six Sigma method and apply goal-oriented process management.
- select an appropriate level of automation of the production units based on quantitative variables.
- make use of well-established methods for the evaluation and selection of suppliers.
- apply methods for planning a global production network depending on company-specific circumstances to sketch a suitable network and classify and evaluating it according to specific criteria.
- apply the learned methods and approaches with regard to problem solving in a global production environment and able to reflect their effectiveness.

Workload:

e-Learning: ~ 24 h
regular attendance: ~ 36 h
self-study: ~ 60 h

Organizational issues

Termine werden über die Institutshomepage bekanntgegeben.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Teilnehmer begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php)

Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.

Die Studierenden sollten Vorkenntnisse in mindestens einem der folgenden Bereiche haben:

- Integrierte Produktionsplanung
- Globale Produktion und Logistik
- Qualitätsmanagement

For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/studium-und-lehre.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Literature

Medien:

E-Learning Plattform ilias, Powerpoint, Fotoprotokoll. Die Medien werden über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:

E-learning platform ilias, powerpoint, photo protocol. The media are provided through ilias (https://ilias.studium.kit.edu/).

T	8.141 Course: Logistics and Supply Chain Management [T-WIWI-102870]

Responsible:	Dr.-Ing. Miriam Klein
	Prof. Dr. Frank Schultmann
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101437 - Industrial Production I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	2

Events					
ST 2023	2581996	Logistics and Supply Chain Management	2 SWS	Lecture / 🗣	Schultmann, Kaiser
Exams					
WT 22/23	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).

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-MACH-110771 - Logistics and Supply Chain Management must not have been started.

Below you will find excerpts from events related to this course:

V	**Logistics and Supply Chain Management**	Lecture (V)
	2581996, SS 2023, 2 SWS, Language: English, Open in study portal	On-Site

Content

Students are introduced to the methods and tools of logistics and supply chain management. They students learn the key terms and components of supply chains together with key economic trade-offs. In detail, students gain knowledge of decisions in supply chain management, such as facility location, supply chain planning, inventory management, pricing and supply chain cooperation. In this manner, students will gain knowledge in analyzing, designing and steering of decisions in the domain of logistics and supply chain management.

- Introduction: Basic terms and concepts
- Facility location and network optimization
- Supply chain planning I: flexibility
- Supply chain planning II: forecasting
- Inventory management & pricing
- Supply chain coordination I: the Bullwhip-effect
- Supply chain coordination II: double marginalization
- Supply chain risk management

Literature

Wird in der Veranstaltung bekannt gegeben.

T 8.142 Course: Logistics and Supply Chain Management [T-MACH-110771]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105298 - Logistics and Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each summer term	4

Events					
ST 2023	2118078	Logistics and Supply Chain Management	4 SWS	Lecture / 🗣	Furmans, Alicke

Legend: 🗔 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The success control takes place in the form of an examination performance of a different kind. This is composed as follows:

- 50% assessment of a written examination (60 min) during the semester break
- 50% assessment of an oral examination (20 min) during the semester break

To pass the examination, both examination performances must be passed.

Prerequisites
The course T-WIWI-102870 "Logistics and Supply Chain Management" must not have been selected.

Annotation
The brick cannot be taken if one of the bricks "T-MACH-102089 – Logistics - Organisation, Design and Control of Logistic Systems" and "T-MACH-105181 – Supply Chain Management" has been taken.

Below you will find excerpts from events related to this course:

V Logistics and Supply Chain Management
2118078, SS 2023, 4 SWS, Language: English, Open in study portal

**Lecture (V)
On-Site**

Content
In the lecture "Logistics and Supply Chain Management", comprehensive and well-founded fundamentals of crucial issues in logistics and supply chain management are presented. Furthermore, the interaction of different design elements of supply chains is emphasized. For this purpose, both qualitative and quantitative models are presented and applied. Additionally, methods for mapping and evaluating logistics systems and supply chains are described. The contents of the lecture are deepened in exercises and case studies and comprehension is partially reviewed in case studies. The contents will be illustrated, among other things, on the basis of supply chains in the automotive industry.

Among others, the following topics are covered:

- Inventory Management
- Forecasting
- Bullwhip Effect
- Supply Chain Segmentation and Collaboration
- Key Performance Indicators
- Supply Chain Risk Management
- Production Logistics
- Location Planning
- Route Planning

It is intended to provide an interactive format in which students can also contribute (and work alone or in groups). Since logistics and supply chain management (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 8.143 Course: Machine Tools and High-Precision Manufacturing Systems [T-MACH-110963]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101286 - Machine Tools and Industrial Handling

Type	Credits	Grading scale	Recurrence	Version
Oral examination	9	Grade to a third	Each winter term	2

Events					
WT 22/23	2149910	Machine Tools and High-Precision Manufacturing Systems	6 SWS	Lecture / Practice (/ ⚙	Fleischer
Exams					
WT 22/23	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer
ST 2023	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Oral exam (approx. 45 minutes)

Prerequisites
T-MACH-102158 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-109055 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-110962 - Machine Tools and High-Precision Manufacturing Systems must not be commenced.

Below you will find excerpts from events related to this course:

V Machine Tools and High-Precision Manufacturing Systems
2149910, WS 22/23, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content

The lecture gives an overview of the construction, use and application of machine tools and high-precision manufacturing systems. In the course of the lecture a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools and high-precision manufacturing systems is conveyed. First, the main components of the systems are systematically explained and their design principles as well as the integral system design are discussed. Subsequently, the use and application of machine tools and high-precision manufacturing systems will be demonstrated using typical machine examples. Based on examples from current research and industrial applications, the latest developments are discussed, especially concerning the implementation of Industry 4.0 and artificial intelligence.

Guest lectures from industry round off the lecture with insights into practice.

The individual topics are:

- Structural components of dynamic manufacturing Systems
- Feed axes: High-precision positioning
- Spindles of cutting machine Tools
- Peripheral Equipment
- Machine control unit
- Metrological Evaluation
- Maintenance strategies and condition Monitoring
- Process Monitoring
- Development process for machine tools and high-precision manufacturing Systems
- Machine examples

Learning Outcomes:

The students …

- are able to assess the use and application of machine tools and high-precision manufacturing systems and to differentiate between them in terms of their characteristics and design.
- can describe and discuss the essential elements of machine tools and high-precision manufacturing systems (frame, main spindle, feed axes, peripheral equipment, control unit).
- are able to select and dimension the essential components of machine tools and high-precision manufacturing systems.
- are capable of selecting and evaluating machine tools and high-precision manufacturing systems according to technical and economic criteria.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING/TVWL:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Start: 24.10.2022

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 8.144 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 Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 2

Events					
WT 22/23	2560404	Macroeconomic Theory	2 SWS	Lecture / 🎤	Brumm, Krause
WT 22/23	2560405	Übung zu Macroeconomic Theory	1 SWS	Practice / 🎤	Pegorari
Exams					
WT 22/23	7900264	Macroeconomic Theory			Brumm

Legend: 📱 Online, ⚭ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Macroeconomic Theory
2560404, WS 22/23, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This course introduces a modern approach to macroeconomics by building on microeconomic principles. To be able to rigorously address key macroeconomic questions a general framework based on intertemporal decision making is introduced. Starting by the principles of consumer and firm behavior, this framework is successively expanded by introducing market imperfections, monetary factors as well as international trade. With this framework at hand students are able to analyze labor market policies, government deficits, monetary policy, trade policy, and other important macroeconomic problems. Throughout the course, we not only point out the power of theory but also its limitations.

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 8.145 Course: Management Accounting 1 [T-WIWI-102800]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2023	2579900	Management Accounting 1	2 SWS	Lecture / 🖥	Wouters
ST 2023	2579901	Tutorial Management Accounting 1 (Bachelor)	2 SWS	Practice / 🗣	Dickemann
ST 2023	2579902	Tutorial Management Accounting 1 (Master)	2 SWS	Practice / 🗣	Dickemann
Exams					
WT 22/23	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
WT 22/23	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters
ST 2023	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
ST 2023	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters

Legend: 🖥 Online, ⚃ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Annotation
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V	**Management Accounting 1** 2579900, SS 2023, 2 SWS, Language: English, Open in study portal	Lecture (V) Online

Content

The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics.
- They can use financial information for various purposes in organizations.

Examination:

- The assessment consists of a written exam (120 minutes) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

| V | **Tutorial Management Accounting 1 (Bachelor)**
2579901, SS 2023, 2 SWS, Language: English, Open in study portal | **Practice (Ü)**
On-Site |

Content
see Module Handbook

| V | **Tutorial Management Accounting 1 (Master)**
2579902, SS 2023, 2 SWS, Language: English, Open in study portal | **Practice (Ü)**
On-Site |

Content
see Module Handbook

T   8.146 Course: Management Accounting 2 [T-WIWI-102801]

Responsible:	Prof. Dr. Marcus Wouters
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 22/23	2579903	Management Accounting 2	2 SWS	Lecture / 🖥	Wouters
WT 22/23	2579904	Tutorial Management Accounting 2 (Bachelor)	2 SWS	Practice / 🎤	Letmathe
WT 22/23	2579905	Tutorial Management Accounting 2 (Master)	2 SWS	Practice / 🎤	Letmathe
Exams					
WT 22/23	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
WT 22/23	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters
ST 2023	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
ST 2023	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Recommendation
It is recommended to take part in the course "Management Accounting 1" before this course.

Annotation
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V	**Management Accounting 2** 2579903, WS 22/23, 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	**Tutorial Management Accounting 2 (Bachelor)** 2579904, WS 22/23, 2 SWS, Language: English, Open in study portal	**Practice (Ü)** **On-Site**

Content
see ILIAS

V	**Tutorial Management Accounting 2 (Master)** 2579905, WS 22/23, 2 SWS, Language: English, Open in study portal	**Practice (Ü)** **On-Site**

Content
see ILIAS

T 8.147 Course: Management and Marketing [T-WIWI-111594]

Responsible:	Prof. Dr. Martin Klarmann
	Prof. Dr. Hagen Lindstädt
	Prof. Dr. Petra Nieken
	Prof. Dr. Orestis Terzidis
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105768 - Management and Marketing

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2600023	Management	2 SWS	Lecture / 🗣	Nieken, Lindstädt, Terzidis
WT 22/23	2610026	Marketing	2 SWS	Lecture / 🧩	Klarmann
Exams					
WT 22/23	7900012	Management and Marketing			Nieken, Terzidis, Klarmann
ST 2023	7900184	Management and Marketing			Nieken, Terzidis, Klarmann

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Written exam on the two courses "Management" and "Marketing". The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Marketing**	Lecture (V)
	2610026, WS 22/23, 2 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Literature
Ausführliche Literaturhinweise werden in den Materialen zur Vorlesung gegeben.

| T | **8.148 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	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2023	2577900	Management and Strategy	2 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 22/23	7900199	Management and Strategy			Lindstädt
ST 2023	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**	Lecture (V)
	2577900, SS 2023, 2 SWS, Language: German, Open in study portal	On-Site

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	**8.149 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 Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 4

Events					
WT 22/23	2577902	Managing Organizations	2 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 22/23	7900049	Managing Organizations			Lindstädt
ST 2023	7900066	Managing Organizations			Lindstädt

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

None

Below you will find excerpts from events related to this course:

V	**Managing Organizations** 2577902, WS 22/23, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

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:

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.

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	**8.150 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 2023	2571152	Managing the Marketing Mix	2 SWS	Lecture / 🗣	Klarmann
ST 2023	2571153	Übung zu Marketing Mix (Bachelor)	1 SWS	Practice / 🗣	Gerlach, Weber

Legend: 📱 Online, ❄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

The assessment of success takes place through the preparation and presentation of a case study (max. 30 points) as well as a written exam with additional aids in the sense of an open book exam (max. 60 points). In total, a maximum of 90 points can be achieved in the course. Further details will be announced during the lecture.

Prerequisites

None

Annotation

The course is compulsory in the module "Foundations of Marketing".
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Below you will find excerpts from events related to this course:

V	**Managing the Marketing Mix** 2571152, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

The content of this course concentrates on the elements of the marketing mix. Therefore the main chapters are brand management, pricing, promotion and sales management.

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

This course is compulsory within or the module "Foundations of Marketing" and must be examined.

Learning objectives:

student

- know the meaning of the branding, the brand positioning and the possibilities of the brand value calculation
- understand the price behavior of customers and can apply this knowledge to the practice
  know different methods for price determination (conjoint analysis, cost-plus determination, target costing, customer surveys, bidding procedures) and price differentiation
- are able to name and explain the relevant communication theories
- can identify crisis situations and formulate appropriate response strategies
- can name and judge different possibilities of the Intermediaplanung
- know various design elements of advertising communication
- understand the measurement of advertising impact and can apply it
- know the basics of sales organization
- are able to evaluate basic sales channel decisions

Workload:

The total workload for this course is approximately 135.0 hours.

Literature

Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 8.151 Course: Manufacturing Technology [T-MACH-102105]

Responsible: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	3

Events					
WT 22/23	2149657	Manufacturing Technology	6 SWS	Lecture / Practice (/ ⚙	Schulze
Exams					
WT 22/23	76-T-MACH-102105	Manufacturing Technology			Schulze
ST 2023	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 22/23, 6 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **Blended (On-Site/Online)**

Content

The objective of the lecture is to look at manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to impart detailed process knowledge of the common processes. The lecture covers the basic principles of manufacturing technology and deals with the manufacturing processes according to their classification into main groups regarding technical and economic aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Quality control
- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming, plastics engineering)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing

This lucture provides an excursion to an industry company.

Learning Outcomes:

The students ...

- are capable to specify the different manufacturing processes and to explain their functions.
- are able to classify the manufacturing processes by their general structure and functionality according to the specific main groups.
- have the ability to perform a process selection based on their specific characteristics.
- are enabled to identify correlations between different processes and to select a process regarding possible applications.
- are qualified to evaluate different processes regarding specific applications based on technical and economic aspects.
- are experienced to classify manufacturing processes in a process chain and to evaluate their specific influence on surface integrity of workpieces regarding the entire process chain.

Workload:

regular attendance: 63 hours
self-study: 177 hours

Organizational issues
Start: 24.10.2022

Vorlesungstermine montags und dienstags, Übungstermine mittwochs.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 8.152 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	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each winter term	3

Events					
WT 22/23	2117051	Material flow in logistic systems	15 SWS	Others (sons / 🗣	Furmans, Fleischmann, Köhler
Exams					
WT 22/23	76-T-MACH-102151	Material Flow in Logistic Systems			Furmans

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**	**Others (sonst.)**
	2117051, WS 22/23, 15 SWS, Language: German, Open in study portal	**On-Site**

Content
Learning Content:

- Elements of material flow systems (conveyor elements, fork, join elements)
- Models of material flow networks using graph theory and matrices
- Queueing theory, calculation of waiting time, utilization
- Warehouseing and order-picking
- Shuttle systems
- Sorting systems
- Simulation
- Calculation of availability and reliability
- Value stream analysis

After successful completion of the course, you are able (alone and in a team) to:

- Accurately describe a material handling system in a conversation with an expert.
- Model and parameterize the system load and the typical design elements of a material handling system.
- Design a material handling system for a task.
- Assess the performance of a material handling system in terms of the requirements.
- Change the main lever for influencing the performance.
- Expand the boundaries of today's methods and system components conceptually if necessary.

Literature:

Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 7. Auflage 2019

Description:

This course is seperated into 5 topic blocks which are structured in the following parts:

- self-study phase

- exercise

- plenary

- case study (group work)

- colloquium

- review of case study

The groups for the case study will be formed at the beginning of the course (first week). The results of the group work during the lecture period are presented and evaluated in writing. During the colloquiums, the result of the case study is presented and the understanding of the group work and the models dealt with in the course are tested in an oral defense. The participation in the colloquiums is compulsory and will be controlled. For the written submission and the presentation the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

We strongly recommend to attend the introductory session on 26th of October 2022. In this session, the teaching concept of "Materialfluss in Logistiksysteme" is explained and outstanding issues are clarified.

The course registration including the group allocation with ILIAS is mandatory. The registration will be open for several days after the introductory session (registration duration: 26.10.2022 14:00 Uhr - 01.11.2022 14:00 Uhr)

Workload:

- Regular attendance: 35 h
- Self-study: 135 h
- Group work: 100 h

Competence Certificate:

The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
    - 40% assessment of the result and the presentation of the case studies as group work,
    - 20% assessment of the oral examination during the colloquiums as individual performance.

T   8.153 Course: Material Science II for Business Engineers [T-MACH-102079]

Responsible:	Prof. Dr. Michael Hoffmann
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101261 - Emphasis in Fundamentals of Engineering
	M-MACH-101262 - Emphasis Materials Science
	M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2023	2126782	Materials Science II for Business Engineers	2 SWS	Lecture / 🗣	Wagner
Exams					
WT 22/23	76-T-MACH-102079	Material Science II			Hoffmann, Wagner, Schell, Bucharsky, Hinterstein
ST 2023	76-T-MACH-102079	Material Science II for Business Engineers			Wagner, Schell, Bucharsky

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the winter term is carried out by a written or oral exam.

Prerequisites
The module *Material Science* has to be completed beforehand.

Below you will find excerpts from events related to this course:

V **Materials Science II for Business Engineers**	**Lecture (V)**
2126782, SS 2023, 2 SWS, Language: German, Open in study portal	**On-Site**

Literature
Weiterführende Literatur:

- Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
- Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
- Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
- Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7

## T   8.154 Course: Materials Science I [T-MACH-102078]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101260 - Materials Science

Type Written examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 22/23	2125760	Materials Science I	2 SWS	Lecture / 🗣	Hoffmann, Wagner
Exams					
WT 22/23	76-T-MACH-102078	Materials Science I			Hoffmann, Wagner, Schell, Hinterstein, Bucharsky
ST 2023	76-T-MACH-102078	Materials Science I			Wagner, Schell, Bucharsky

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.

Prerequisites
None

Below you will find excerpts from events related to this course:

V	**Materials Science I** 2125760, WS 22/23, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Literature
Weiterführende Literatur:

Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7 .

T 8.155 Course: Mathematics I - Final Exam [T-MATH-111493]

Responsible:	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	Dr. Franz Nestmann
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-105754 - Mathematics 1

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	1

Exams				
WT 22/23	00027	Mathematics I - Final Exam		Nestmann, Last, Winter
ST 2023	7700050	Mathematics I - Final Exam		Winter, Nestmann, Last

T   8.156 Course: Mathematics I - Midterm Exam [T-MATH-111492]

Responsible:	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	Dr. Franz Nestmann
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-105754 - Mathematics 1

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	1

Exams			
WT 22/23	00070	Mathematics I - Midterm Exam	Nestmann, Last, Winter
ST 2023	7700053	Mathematics I - Midterm Exam	Winter, Nestmann, Last

T 8.157 Course: Mathematics II - Final Exam [T-MATH-111496]

Responsible:	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	Dr. Franz Nestmann
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-105756 - Mathematics 2

Type	Credits	Grading scale	Version
Written examination	3,5	Grade to a third	1

| T | **8.158 Course: Mathematics II - Midterm Exam [T-MATH-111495]** |

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Dr. Franz Nestmann
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-105756 - Mathematics 2

Type Written examination	Credits 3,5	Grading scale Grade to a third	Version 1

T 8.159 Course: Mathematics III - Final Exam [T-MATH-111498]

Responsible:	Prof. Dr. Daniel Hug
	Prof. Dr. Günter Last
	Dr. Franz Nestmann
	PD Dr. Steffen Winter
Organisation:	KIT Department of Mathematics
Part of:	M-MATH-105757 - Mathematics 3

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Version** 1

Exams				
WT 22/23	6700051	Mathematics III - Final Exam		Winter, Last
ST 2023	7700064	Mathematics III - Final Exam		Winter, Last

T   8.160 Course: Mechanical Design I and II [T-MACH-112225]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101299 - Mechanical Design

Type	Credits	Grading scale	Version
Written examination	7	Grade to a third	2

Events					
WT 22/23	2145178	Mechanical Design I	2 SWS	Lecture / 🗪	Albers, Matthiesen
ST 2023	2146178	Mechanical Design II	2 SWS	Lecture / 🗪	Albers, Matthiesen, Düser
Exams					
WT 22/23	76-T-MACH-110363	Mechanical Design I and II			Albers, Matthiesen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗪 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (90min) on the topics of MKL I and MKL II.

Prerequisites
The bricks "T-MACH-112226- Mechanical Design I, Tutorial" and "T-MACH-112227 - Mechanical Design II, Tutorial" must be passed successfully.

Below you will find excerpts from events related to this course:

V   Mechanical Design I
2145178, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 II
2146178, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Lecture content:

Bearings

Sealings

Design

Bolted Connections

Prerequisites

Concomitant to the lecture 2 online tests were carried out and the knowledge from the lecture will be tested. The knowledge from mechanical design I and II will further be controlled with a design and a CAD task.

Further information's will be announced at Ilias and at the beginning of the lecture mechanical design II.

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)

Vorlesungsumdruck:

Über die ILIAS-Plattform des RZ werden alle relevanten Inhalte (Folien zu Vorlesung und Saalübung, sowie Übungsblätter) entprechend den Vorlesungsblöcken gebündelt zur Verfügung gestellt.

T 8.161 Course: Mechanical Design I, Tutorial [T-MACH-112226]

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 22/23	2145185	Tutorials Mechanical Design I	1 SWS	Practice / 🗣	Albers, Matthiesen, Mitarbeiter

Exams			
WT 22/23	76-T-MACH-110364	Mechanical Design I, Tutorial	Matthiesen, Albers

Legend: 📱 Online, ✨ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled. The pass of the colloquia and the process of the workshop task are required for the successful participation.

Furthermore an online test is carried out.

Below you will find excerpts from events related to this course:

V Tutorials Mechanical Design I
2145185, WS 22/23, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

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

T 8.162 Course: Mechanical Design II, Tutorial [T-MACH-112227]

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 summer term	1

Events					
ST 2023	2146185	Tutorials Mechanical Design II	2 SWS	Practice / 🗣	Albers, Matthiesen, Mitarbeiter

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

CIW/ VT/ IP-M/ WiING / MATH/ MWT: To pass the prerequisite it is required that a design task is successfully completed.

MIT: To pass the prerequisite it is required that a design task is successfully completed.

NWT: For students of the subject area NwT, the creation of a teaching video for the teaching of a technical system must be completed as a prerequisite for the exam instead.

Prerequisites

None

Below you will find excerpts from events related to this course:

V Tutorials Mechanical Design II
2146185, SS 2023, 2 SWS, Language: German, Open in study portal

**Practice (Ü)
On-Site**

Content

Bearings

Sealings

Desing

Bolted connections

tutorials: 10,5 h

prerequisites and preparation to exam: 55 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 8.163 Course: Mechatronical Systems and Products (mach/etit/wiwi) [T-MACH-112647]

Responsible:	Prof. Dr.-Ing. Sören Hohmann
	Prof. Dr.-Ing. Sven Matthiesen
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-106236 - Mechatronic Product Design

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2303003	Exercise for 2303161 Mechatronical Systems and Products	1 SWS	Practice / 🗣	Matthiesen, Hohmann, N.N.
WT 22/23	2303161	Mechatronical Systems and Products	2 SWS	Lecture / 🧩	Matthiesen, Hohmann

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
written exam (60 min)

T   8.164 Course: Metal Forming [T-MACH-105177]

Responsible: Prof. Dr.-Ing. Thomas Herlan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2023	2150681	Metal Forming	2 SWS	Lecture / ⚙	Herlan
Exams					
ST 2023	76-T-MACH-105177	Metal Forming			Herlan

Legend: ▯ Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Metal Forming** 2150681, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **Blended (On-Site/Online)**

Content

At the beginning of the lecture the basics of metal forming are briefly introduced. The focus of the lecture is on massive forming (forging, extrusion, rolling) and sheet forming (car body forming, deep drawing, stretch drawing). This includes the systematic treatment of the appropriate metal forming Machines and the corresponding tool technology. Aspects of tribology, as well as basics in material science and aspects of production planning are also discussed briefly. The plastic theory is presented to the extent necessary in order to present the numerical simulation method and the FEM computation of forming processes or tool design. The lecture will be completed by product samples from the forming technology.

The topics are as follows:

- Introduction and basics
- Hot forming
- Metal forming machines
- Tools
- Metallographic fundamentals
- Plastic theory
- Tribology
- Sheet forming
- Extrusion
- Numerical simulation

Learning Outcomes:

The students …

- are able to reflect the basics, forming processes, tools, Machines and equipment of metal forming in an integrated and systematic way.
- are capable to illustrate the differences between the forming processes, tools, machines and equipment with concrete examples and are qualified to analyze and assess them in terms of their suitability for the particular application.
- are also able to transfer and apply the acquired knowledge to other metal forming problems.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues

Vorlesungstermine freitags, wöchentlich.
Die konkreten Termine werden in der ersten Vorlesung bekannt gegeben und auf der Institutshomepage und ILIAS veröffentlicht.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T 8.165 Course: Microactuators [T-MACH-101910]

Responsible: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type Written examination	Credits 3	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2023	2142881	Microactuators	2 SWS	Lecture / 🔊	Kohl
Exams					
ST 2023	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 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Basic knowledge in the material science of the actuation principles

- Layout and design optimization

- Fabrication technologies

- Selected developments

- Applications

The lecture includes amongst others the following topics:

- Microelectromechnical systems: linear actuators, microrelais, micromotors
- Medical technology and life sciences: Microvalves, micropumps, microfluidic systems
- Microrobotics: 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	**8.166 Course: Microeconometrics [T-WIWI-112153]**

Responsible:	Prof. Dr. Fabian Krüger
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101599 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

Type Written examination	**Credits** 4,5	**Grading scale** Grade to a third	**Recurrence** Irregular	**Version** 1

Events					
WT 22/23	2500032	Microeconometrics	2 SWS	Lecture / ⚙	Krüger
WT 22/23	2500033	Tutorial in Microeconometrics	2 SWS	Practice / ⚙	Krüger, Pavlova
Exams					
WT 22/23	00064	Microeconometrics			Krüger
WT 22/23	00065	Microeconometrics			Krüger

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌑 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min).

Prerequisites
None

Recommendation
Course participants are expected to know econometrics at the level of `Volkswirtschaftslehre III: Einführung in die Ökonometrie'

Below you will find excerpts from events related to this course:

V	**Microeconometrics** 2500032, WS 22/23, 2 SWS, Language: English, Open in study portal	**Lecture (V) Blended (On-Site/Online)**

Content
Microeconometrics is concerned with modeling data from an individual (`micro') unit like a person, household or firm. The response variables of interest are often discrete. For example, a person's type of employment may be coded as a binary variable (e.g. working in IT sector versus not working in IT sector), and a person's choice of transportation mode can be cast as a multinomial variable (e.g. bike, train, car, or other). These examples differ from the basic econometric setting of a continuous response variable, and require nonlinear regression modeling.

The course first introduces maximum likelihood estimation which is particularly useful in microeconometrics. We then discuss econometric models for various types of response variables (binary, ordered, multinomial, censored), as well as methods for estimation and model evaluation. Throughout the course, implementation via R software plays an important role.

Prerequisites: Course participants are expected to know econometrics at the level of `Volkswirtschaftslehre III: Einführung in die Ökonometrie'.

Literature
Winkelmann, R., Boes, S. (2006): Analysis of Microdata. Springer.

T 8.167 Course: Mobile Machines [T-MACH-105168]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	9	Grade to a third	Each summer term	1

Events					
ST 2023	2114073	Mobile Machines	4 SWS	Lecture / 🎤	Geimer, Kazenwadel
Exams					
WT 22/23	76T-MACH-105168	Mobile Machines			Geimer
ST 2023	76-T-MACH-105168	Mobile Machines			Geimer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of an oral exam (45 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
none

Recommendation
Knowledge in Fluid Power Systems is required. It is recommended to attend the course *Fluid Power Systems* [2114093] beforehand.

Annotation
After completion of the course the students have knowledge of:

- a wide range of mobile machines
- operation modes and working cycles of importmant mobile machines
- selected subsystems and components

Content:

- Introduction of the required components and machines
- Basics and structure of mobile machines
- Practical insight in the development techniques

Below you will find excerpts from events related to this course:

V Mobile Machines
2114073, SS 2023, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Introduction of the required components and machines
- Basics of the structure of the whole system
- Practical insight in the development techniques

Knowledge in Fluid Power is required.

Recommendations:

It is recommended to attend the course *Fluid Power Systems* [2114093] beforehand.

- regular attendance: 42 hours
- self-study: 184 hours

T   8.168 Course: Mobility and Infrastructure [T-BGU-101791]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101067 - Mobility and Infrastructure

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each term	2

Events					
ST 2023	6200404	Spatial Planning and Planning Law	2 SWS	Lecture / ⛭	Wilske
ST 2023	6200405	Exercises to Spatial Planning and Planning Law	1 SWS	Practice / 🗣	Wilske, Mitarbeiter/innen
ST 2023	6200406	Transportation Systems	2 SWS	Lecture / 🗣	Vortisch
ST 2023	6200407	Exercises to Transportation Systems		Practice / 🗣	Vortisch, Mitarbeiter/innen
ST 2023	6200408	Design Basics in Highway Engineering	2 SWS	Lecture / 🗣	Plachkova-Dzhurova, Zimmermann
ST 2023	6200409	Exercises to Design Basics in Highway Engineering		Practice / 🗣	Plachkova-Dzhurova, Zimmermann
Exams					
WT 22/23	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   8.169 Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

Responsible:	Prof. Dr. Stefan Nickel
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101413 - Applications of Operations Research

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2023	2550490	Modellieren und OR-Software: Einführung	3 SWS	Practical course / 🧩	Nickel, Linner, Pomes
Exams					
WT 22/23	7900014	Modeling and OR-Software: Introduction			Nickel
ST 2023	7900153	Modeling and OR-Software: Introduction			Nickel

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
The assessment is a written examination. The examination is held in every semester. The prerequisite can only be obtained in semesters in which the course exercises are offered.

Prerequisites
Prerequisite for admission to the exam is the successful participation in the exercises. This includes the processing and presentation of exercises.

Recommendation
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 2023, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, ...), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis. Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

Organizational issues
Die Teilnehmerzahl für diese Veranstaltung ist begrenzt.
Bewerbung bis 31.03. möglich:

http://go.wiwi.kit.edu/OR_Bewerbung

T 8.170 Course: Nonlinear Optimization I [T-WIWI-102724]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR
	M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 22/23	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 22/23	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Schwarze
Exams					
WT 22/23	7900001_WS2223_HK	Nonlinear Optimization I			Stein
ST 2023	7900202_SS2023_NK	Nonlinear Optimization I			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam. The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

Annotation
Part I and II of the lecture are held consecutively in the *same* semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization I
2550111, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 8.171 Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	6

Events					
WT 22/23	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🎤	Stein
WT 22/23	2550112	Exercises Nonlinear Optimization I + II		Practice / 🎤	Stein, Schwarze
WT 22/23	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🎤	Stein
Exams					
WT 22/23	7900003_WS2223_HK	Nonlinear Optimization I and II			Stein
ST 2023	7900204_SS2023_NK	Nonlinear Optimization I and II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

Prerequisites

None.

Annotation

Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization I

2550111, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

| V | **Nonlinear Optimization II**
2550113, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**
On-Site |

Content

The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 8.172 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible:	Prof. Dr. Oliver Stein
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101414 - Methodical Foundations of OR

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 22/23	2550112	Exercises Nonlinear Optimization I + II		Practice / 🌳	Stein, Schwarze
WT 22/23	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🌳	Stein
Exams					
WT 22/23	7900002_WS2223_HK	Nonlinear Optimization II			Stein
ST 2023	7900203_SS2023_NK	Nonlinear Optimization II			Stein

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🌳 On-Site, ✗ Cancelled

Competence Certificate

The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization II
2550113, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 8.173 Course: Novel Actuators and Sensors [T-MACH-102152]

Responsible: Prof. Dr. Manfred Kohl
                     Dr. Martin Sommer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 3

Events					
WT 22/23	2141865	Novel actuators and sensors	2 SWS	Lecture / 🗣	Kohl, Sommer
Exams					
WT 22/23	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 22/23, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Literature

- Vorlesungsskript "Neue Aktoren" und Folienskript "Sensoren"

- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007

- "Sensors Update", Edited by H.Baltes, W. Göpel, J. Hesse, VCH, 1996, ISBN: 3-527-29432-5

- "Multivariate Datenanalyse – Methodik und Anwendungen in der Chemie", R. Henrion, G. Henrion, Springer 1994, ISBN 3-540-58188-X

T 8.174 Course: Operative CRM [T-WIWI-102597]

Responsible:	Prof. Dr. Andreas Geyer-Schulz
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101422 - Specialization in Customer Relationship Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	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 steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites

None

Recommendation

The attendance of courses Customer Relationship Management and Analytical CRM is advised.

T	8.175 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 22/23	2550464	Optimization Under Uncertainty	2 SWS	Lecture / 📱	Rebennack
WT 22/23	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	1 SWS	Practice / 👊	Rebennack, Füllner
WT 22/23	2550466		2 SWS	Others (sons	Rebennack, Füllner
Exams					
WT 22/23	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   8.176 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 2023	2309486	Optoelectronic Components	2 SWS	Lecture / ❖	Freude
ST 2023	2309487	Optoelectronic Components (Tutorial)	1 SWS	Practice / ❖	Freude
Exams					
WT 22/23	7300014	Optoelectronic Components			Freude
WT 22/23	7309486	Optoelectronic Components			Freude
ST 2023	7309486	Optoelectronic Components			Freude

Legend: 📱 Online, ❖ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Prerequisites

T 8.177 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 2023	2573001	Personnel Policies and Labor Market Institutions	2 SWS	Lecture / 🗣	Nieken
ST 2023	2573002	Übungen zu Personalpolitik und Arbeitsmarktinstitutionen	1 SWS	Practice / 🗣	Nieken, Mitarbeiter, Gorny
Exams					
WT 22/23	7900202	Personnel Policies and Labor Market Institutions			Nieken
ST 2023	7900133	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** 2573001, SS 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

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

T   8.178 Course: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T   8.178 Course: PH APL-ING-TL01 [T-WIWI-106291]

T   8.179 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 8.180 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 8.181 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   8.182 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 8.183 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   **8.184 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   **8.184 Course: PH APL-ING-TL07 [T-WIWI-108384]**

T   8.185 Course: Photovoltaic System Design [T-ETIT-100724]

Responsible: Dipl.-Ing. Robin Grab
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101165 - Energy Generation and Network Components

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2023	2307380	Photovoltaische Systemtechnik	2 SWS	Lecture / 🗣	Grab
Exams					
ST 2023	7307380	Photovoltaics			Leibfried, Grab

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites

T   8.186 Course: Physical Basics of Laser Technology [T-MACH-102102]

Responsible:	Dr.-Ing. Johannes Schneider
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	4

Events					
WT 22/23	2181612	Physical basics of laser technology	3 SWS	Lecture / Practice (/ 🗣	Schneider
Exams					
WT 22/23	76-T-MACH-102102	Physical Basics of Laser Technology			Schneider
ST 2023	76-T-MACH-102102	Physical Basics of Laser Technology			Schneider

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with brick Laser Material Processing [T-MACH-112763], brick Laser Application in Automotive Engineering [T-MACH-105164] and brick Physical Basics of Laser Technology [T-MACH-109084]

Recommendation
Basic knowledge of physics, chemistry and material science

Below you will find excerpts from events related to this course:

V	**Physical basics of laser technology** 2181612, WS 22/23, 3 SWS, Language: German, Open in study portal	Lecture / Practice (VÜ) On-Site

Content

Based on the description of the physical basics about the formation and the properties of laser light the lecture goes through the different types of laser beam sources used in industry these days. The lecture focuses on the usage of lasers especially in materials engineering. Other areas like measurement technology or medical applications are also mentioned.

- physical basics of laser technology
- laser beam sources (solid state, diode, gas, liquid and other lasers)
- beam properties, guiding and shaping
- lasers in materials processing
- lasers in measurement technology
- lasers for medical applications
- savety aspects

The lecture is complemented by a tutorial.

The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of different laser sources.
- can describe the influence of laser, material and process parameters for the most important methods of laser-based materials processing and choose laser sources suitable for specific applications.
- can illustrate the possible applications of laser sources in measurement and medicine technology
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

regular attendance: 33,5 hours
self-study: 116,5 hours

The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

It is allowed to select only one of the lectures "Laser in automotive engineering" (2182642) or "Physical basics of laser technology" (2181612) during the Bachelor and Master studies.

Organizational issues

Termine für die Übung werden in der Vorlesung bekannt gegeben!

Literature

F. K. Kneubühl, M. W. Sigrist: Laser, 2008, Vieweg+Teubner

T. Graf: Laser - Grundlagen der Laserstrahlerzeugung 2015, Springer Vieweg

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

H. Hügel, T. Graf: Laser in der Fertigung, 2014, Springer Vieweg

J. Eichler, H.-J. Eichler: Laser - Bauformen, Strahlführung, Anwendungen, 2015, Springer

W. T. Silfvast: Laser Fundamentals, 2004, Cambridge University Press

W. M. Steen: Laser Material Processing, 2010, Springer

T 8.187 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 2023	2142890	Physics for Engineers	4 SWS	Lecture / Practice (/ 🗣	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch
Exams					
WT 22/23	76-T-MACH-100530	Physics for Engineers			Gumbsch, Dienwiebel, Nesterov-Müller, Weygand
ST 2023	76-T-MACH-100530	Physics for Engineers			Gumbsch, Weygand, Nesterov-Müller, Dienwiebel

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
written exam 90 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Physics for Engineers**	Lecture / Practice (VÜ)
	2142890, SS 2023, 4 SWS, Language: German, Open in study portal	**On-Site**

Content

1) Foundations of solid state physics

- Wave particle dualism
- Tunnelling
- Schrödinger equation
- H-atom

2) Electrical conductivity of solids

- solid state: periodic potentials
- Pauli Principle
- band structure
- metals, semiconductors and isolators
- p-n junction / diode

3) Optics

- quantum mechanical principles of the laser
- linear optics
- non-linear optics

Exercises are used for complementing and deepening the contents of the lecture as well as for answering more extensive questions raised by the students and for testing progress in learning of the topics.

The student

- has the basic understanding of the physical foundations to explain the relationship between the quantum mechanical principles and the optical as well as electrical properties of materials
- can describe the fundamental experiments, which allow the illustration of these principles

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises)
self-study: 105 hours

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Organizational issues
Kontakt: daniel.weygand@kit.edu

Literature

- Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
- Haken und Wolf: Atom- und Quantenphysik. Einführung in die experimentellen und theoretischen Grundlagen, 7. Aufl., Springer, 2000
- Harris, Moderne Physik, Pearson Verlag, 2013

T 8.188 Course: Platform Economy [T-WIWI-107506]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101421 - Supply Chain Management
                     M-WIWI-101434 - eBusiness and Service Management
                     M-WIWI-105981 - Information Systems & Digital Business

Type Examination of another type	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 3

Events					
WT 22/23	2540468	Platform Economy	2 SWS	Lecture / 🔊	Weinhardt
WT 22/23	2540469	Übung zu Platform Economy	1 SWS	Practice / 🔊	Knierim
Exams					
WT 22/23	7900213	Platform Economy			Weinhardt
WT 22/23	7900214	Platform Economy			Weinhardt

Legend: 🔲 Online, 🕸 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate
Alternative exam assessment. The assessment is carried out in the form of a one-hour written examination and by carrying out a case study. Details on the assessment will be announced during the lecture.

Prerequisites
see below

Recommendation
None

Below you will find excerpts from events related to this course:

V Platform Economy
2540468, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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 8.189 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	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	3

Events					
WT 22/23	2121357	PLM-CAD Workshop	4 SWS	Project (P / 🎤	Ovtcharova, Mitarbeiter
ST 2023	2121357	PLM-CAD Workshop	4 SWS	Project (P / 🎤	Ovtcharova, Mitarbeiter
Exams					
WT 22/23	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 22/23, 4 SWS, Language: German, Open in study portal

**Project (PRO)
On-Site**

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.

Literature
Workshop-Unterlagen / workshop materials

V PLM-CAD Workshop
2121357, SS 2023, 4 SWS, Language: German, Open in study portal

**Project (PRO)
On-Site**

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   8.190 Course: Polymer Engineering I [T-MACH-102137]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type Oral examination	Credits 4	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	2173590	Polymer Engineering I	2 SWS	Lecture / ⚙	Liebig
Exams					
WT 22/23	76-T-MACH-102137	Polymer Engineering I			Liebig
ST 2023	76-T-MACH-102137	Polymer Engineering I			Liebig

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

Below you will find excerpts from events related to this course:

V   Polymer Engineering I
2173590, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
1. Economical aspects of polymers
2. Introductiom of mechanical,
chemical end electrical properties
3. Processing of polymers
(introduction)
4. Material science of polymers
5. Synthesis

learning objectives:

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material "polymer" meeting its requirements in an economical and ecological way.

The students

- are able to describe and classify polymers
  based on the fundamental synthesis processing techniques
- can find practical applications for state-of-the-art polymers and manufacturing technologies
- are able to apply the processing techniques, the application of polymers and polymer composites regarding to the basic principles of material science
- can describe the special mechanical, chemical and elctrical prooperties of polymers and correlate these properties to the chemical bindings.
- can define application areas and the limitation in the use of polymers

requirements:
none

workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.

T   8.191 Course: Polymer Engineering II [T-MACH-102138]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2023	2174596	Polymer Engineering II	2 SWS	Lecture / 🗣	Liebig
Exams					
WT 22/23	76-T-MACH-102138	Polymerengineering II			Liebig
ST 2023	76-T-MACH-102138	Polymerengineering II			Liebig

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

Recommendation
Knowledge in Polymerengineering I

Below you will find excerpts from events related to this course:

V	**Polymer Engineering II** 2174596, SS 2023, 2 SWS, Language: German, Open in study portal	Lecture (V) On-Site

Content
1. Processing of polymers
2. Properties of polymer components
Based on practical examples and components
2.1 Selection of material
2.2 Component design
2.3 Tool engineering
2.4 Production technology
2.5 Surface engineering
2.6 Sustainability, recycling

learning objectives:

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, that the students gather knowledge and technical skills to use the material "polymer" meeting its requirements in an economical and ecological way.

The students

- can describe and classify different processing techniques
  and can exemplify mould design principles based on technical parts.
- know about practical applications and processing of polymer parts
- are able to design polymer parts according to given restrictions
- can choose appropriate polymers based on the technical requirements
- can decide how to use polymers regarding the production, economical and ecological requirements

requirements:
Polymerengineering I
workload:

The workload for the lecture Polymerengineering II is 120 h per semester and consists of the presence during the lecture (21 h) as well as preparation and rework time at home (99 h).

Literature
Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.

Recommended literature and selected official lecture notes are provided in the lecture.

T   8.192 Course: Power Generation [T-ETIT-101924]

Responsible:	Dr.-Ing. Bernd Hoferer
Organisation:	KIT Department of Electrical Engineering and Information Technology
Part of:	M-ETIT-101165 - Energy Generation and Network Components

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	2

Events					
WT 22/23	2307356	Power Generation	2 SWS	Lecture / 🗣	Hoferer
Exams					
WT 22/23	7307356	Power Generation			Hoferer
ST 2023	7307356	Power Generation			Hoferer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites

T   8.193 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 22/23	2307371	Power Network	2 SWS	Lecture / 🗣	Leibfried
WT 22/23	2307373	Tutorial for 2307371 Power Network	2 SWS	Practice / 🗣	Leibfried, Geis-Schroer
Exams					
WT 22/23	7307371	Power Network			Leibfried
ST 2023	7307371	Power Network			Leibfried

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T **8.194 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
	M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	1

Events					
WT 22/23	2540555	Practical Seminar: Digital Services (Ba)	3 SWS	Lecture / ⚙	Mädche
Exams					
WT 22/23	00061	Practical Seminar: Empirische Evaluation von emotionalen Signalen in Biofeedback-Visualisierungen			Weinhardt

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion. In the seminar, a maximum score of 60 points can be achieved, consisting of

- maximum 25 points for the documentation (written examination)
- maximum 25 points for the practical assessment
- maximum 10 points for the participation during the discussion sessions

The practical seminar is passed when at least a score of 30 points is achieved.

Prerequisites
None

Recommendation
None

Annotation
The current range of seminar topics is announced on the following Website:
www.dsi.iism.kit.edu.

T 8.195 Course: Practical Seminar: Interactive Systems [T-WIWI-111914]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105928 - HR Management & Digital Workplace
M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Competence Certificate

Alternative exam assessment.

The assessment of this course consists of the implementation of a practical component, the preparation of a written documentation, and active participation in the discussions.

A total of 60 points can be achieved, of which:

- maximum 25 points for the written documentation
- maximum 25 points for the practical component
- maximum 10 points for active participation in the discussions

A minimum of 30 points must be achieved to pass this course.

Please note that a practical component, such as conducting a survey or implementing an application, is also part of the course. Please refer to the institute website issd.iism.kit.edu for the current offer of practical seminar theses.

T 8.196 Course: Practical Seminar: Platform Economy [T-WIWI-112154]

Responsible:	Prof. Dr. Gerhard Satzger
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105981 - Information Systems & Digital Business

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Competence Certificate

The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Prerequisites

None.

T 8.197 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 22/23	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
WT 22/23	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
ST 2023	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
ST 2023	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🎤	Last
Exams					
WT 22/23	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology		Last	
ST 2023	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 22/23, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **On-Site**

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V	**Introduction to Microsystem Technology - Practical Course** 2143877, WS 22/23, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **On-Site**

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V	**Introduction to Microsystem Technology - Practical Course** 2143875, SS 2023, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **On-Site**

Content

In the practical training includes ten experiments:

1. Röntgenoptik
2. UVL + REM
3. Mischerbauteil
4. Rasterkraftmikroskopie
5. 3D-Printing
6. Lichtstreuung an Chrommasken
7. Abformung
8. SAW-Biosensorik
9. Nano3D-Drucker - Materialtransfer dünnster Schichten
10. Elektrospinning

Each student takes part in only four experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Organizational issues

Das Praktikum findet in den Laboren des IMT am CN statt. Treffpunkt: Bau 301, vor dem Eingang.

Teilnahmeanfragen an arndt.last@kit.edu

Literature

Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V	**Introduction to Microsystem Technology - Practical Course** 2143877, SS 2023, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **On-Site**

Content

In the practical training includes nine experiments:

1. X-ray optics
2. UVL + REM
3. Micromixer
4. Atomic force microscopy
5. 3D-Printing
6. Light dirffraction at Chromium masks
7. Moulding
8. SAW-bio-sensors
9. Nano3D-printer - material transfer of thin foils
10. Electro spinning

Each student takes part in only four experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Organizational issues

Das Praktikum findet in den Laboren des IMT am KIT-CN statt. Treffpunkt: Eingang Bau 301.

Teilnahmeanfragen an Dr. A. Last, arndt.last@kit.edu

Literature

Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T	**8.198 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 Written examination	Credits 2	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2023	2577910	Problem solving, communication and leadership	1 SWS	Lecture / 🗣	Lindstädt
Exams					
WT 22/23	7900070	Problem Solving, Communication and Leadership			Lindstädt
ST 2023	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** 2577910, SS 2023, 1 SWS, Language: German, Open in study portal	Lecture (V) On-Site

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   **8.199 Course: Procedures of Remote Sensing [T-BGU-103542]**

Responsible:	Dr.-Ing. Uwe Weidner
Organisation:	KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of:	M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Grading scale	Version
Oral examination	3	Grade to a third	2

T   **8.199 Course: Procedures of Remote Sensing [T-BGU-103542]**

T	**8.200 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 2023	6020244	Procedures of Remote Sensing, Excercise	1 SWS	Practice / 🗣	Weidner
Exams					
ST 2023	8284101638	Procedures of Remote Sensing, Prerequisite			Weidner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 8.201 Course: Process Fundamentals by the Example of Food Production [T-CIWVT-106058]

Responsible:	PD Dr. Volker Gaukel
Organisation:	KIT Department of Chemical and Process Engineering
Part of:	M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Grading scale	Version
Written examination	3	Grade to a third	1

Events					
WT 22/23	22213	Verfahrenstechnische Grundlagen am Beispiel der Lebensmittelverarbeitung (für LmCh, WiWi)	2 SWS	Lecture / 🗣	Gaukel
Exams					
WT 22/23	7220007	Process fundamentals by the example of food production			Gaukel
ST 2023	7220007	Process fundamentals by the example of food production			Gaukel

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites

T   8.202 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 22/23	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture / ⚙	Steegmüller, Kienzle

Exams			
WT 22/23	76-T-MACH-110318	Product- and Production-Concepts for modern Automobiles	Steegmüller, Kienzle

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
T-MACH-105166 - Materials and Processes for Body Leightweight Construction in the Automotive Industry must not have been started.

Below you will find excerpts from events related to this course:

| V | **Product- and Production-Concepts for modern Automobiles**
2149670, WS 22/23, 2 SWS, Language: German, Open in study portal | Lecture (V)
Blended (On-Site/Online) |
|---|---|---|

Content

The lecture illuminates the practical challenges of modern automotive engineering. As former leaders of the automotive industry, the lecturers refer to current aspects of automotive product development and production.

The aim is to provide students with an overview of technological trends in the automotive industry. In this context, the course also focuses on changes in requirements due to new vehicle concepts, which may be caused by increased demands for individualisation, digitisation and sustainability. The challenges that arise in this context will be examined from both a production technology and product development perspective and will be illustrated with practical examples thanks to the many years of industrial experience of both lecturers.

The topics covered are:

- General conditions for vehicle and body development
- Integration of new drive technologies
- Functional requirements (crash safety etc.), also for electric vehicles
- Development Process at the Interface Product & Production, CAE/Simulation
- Energy storage and supply infrastructure
- Aluminium and lightweight steel construction
- FRP and hybrid parts
- Battery, fuel cell and electric motor production
- Joining technology in modern car bodies
- Modern factories and production processes, Industry 4.0.

Learning Outcomes:

The students …

- are able to name the presented general conditions of vehicle development and are able to discuss their influences on the final product using practical examples.
- are able to name the various lightweight approaches and identify possible areas of application.
- are able to identify the different production processes for manufacturing lightweight structures and explain their functions.
- are able to perform a process selection based on the methods and their characteristics.

Workload:

regular attendance: 25 hours
self-study: 95 hours

Organizational issues

Termine werden über Ilias bekannt gegeben.

Bei der Vorlesung handelt es sich um eine Blockveranstaltung. Eine Anmeldung über Ilias ist erforderlich.

The lecture is a block course. An application in Ilias is mandatory.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.
Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T   8.203 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	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 22/23	2121350	Product Lifecycle Management	2 SWS	Lecture / 🗣	Ovtcharova, Elstermann
Exams					
WT 22/23	76-T-MACH-105147	Product Lifecycle Management			Ovtcharova, Elstermann
ST 2023	76-T-MACH-105147	Product Lifecycle Management			Ovtcharova, Elstermann

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 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

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	**8.204 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 2023	2123364	Product, Process and Resource Integration in the Automotive Industry	2 SWS	Lecture / Practice (/ 🔊	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 2023, 2 SWS, Language: German, Open in study portal	**Lecture / Practice (VÜ)** **On-Site**

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	**8.205 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 Written examination	**Credits** 3,5	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 22/23	2581960	Production Economics and Sustainability	2 SWS	Lecture / 🗣	Volk
Exams					
WT 22/23	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 22/23, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

The analysis and management of material flows on the company level and above will be the focus of this lecture. Herein, the discussion will be about cost-effective and environmentally acceptable steps to avoid, abate and recycle emissions and waste as well as ways of efficient resources handling. As methods material flow analysis (MFA), life cycle assessment (LCA) and OR methods, e.g. for decision support, are introduced.

Topics:
- regulations related to materials and substances
- raw materials, reserves and their availabilities/lifetimes
- material and substance flow analysis (MFA/SFA)
- material related ecoprofiles, e.g. Carbon Footprint
- LCA
- resource efficiency
- emission abatement
- waste management and closed-loop recycling
- raw material oriented production systems
- environmental management (EMAS, ISO 14001, Ecoprofit), eco-controlling

Organizational issues
Seminarraum Uni-West, Geb. 06.33

Literature
wird in der Veranstaltung bekannt gegeben

T	8.206 Course: Production Technology for E-Mobility [T-MACH-110984]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type Written examination	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 2

Events					
ST 2023	2150605	Production Technology for E-Mobility	2 SWS	Lecture / ❀	Fleischer
Exams					
WT 22/23	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer
ST 2023	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer

Legend: 📱 Online, ❀ Blended (On-Site/Online), 🖐 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V	Production Technology for E-Mobility	Lecture (V)
	2150605, SS 2023, 2 SWS, Language: German, Open in study portal	Blended (On-Site/Online)

Content
In the lecture Production Engineering for Electromobility the students should be enabled to design, select and develop production processes for the production of the components of an electric drive train (electric motor, battery cells, fuel cells) by using research-oriented teaching.

Learning Outcomes:

The students are able to:

- describe the structure and function of a fuel cell, an electric traction drive and a batterysystem.
- reproduce the process chains for the production of the components fuel cell, battery and electric traction drive.
- apply methodical tools to solve problems along the process chain.
- derive the challenges in the production of electric drives for electric mobility.
- describe the factors influencing the individual process steps on each other using the process chain of Li-ion battery cells.
- enumerate or describe the necessary process parameters to counteract the influencing factors of the process steps in Li-ion battery cell production.
- apply methodical tools to solve problems along the process chain for the production of Li-ion battery cells.
- derive the challenge of mounting and dismounting battery modules.
- derive the challenges in the production of fuel cells for use in mobility.

Workload:

regular attendance: 42 hours
self-study: 78 hours

Organizational issues
Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature

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 **8.207 Course: Production, Logistics and Information Systems [T-WIWI-111602]**

Responsible:	Prof. Dr. Wolf Fichtner
	Prof. Dr. Andreas Geyer-Schulz
	Prof. Dr. Alexander Mädche
	Prof. Dr. Stefan Nickel
	Prof. Dr. Frank Schultmann
	Prof. Dr. Christof Weinhardt
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-105770 - Production, Logistics and Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2600004		2 SWS	Lecture	Mädche
WT 22/23	2600005	Produktion und Logistik	2 SWS	Lecture / 🎤	Fichtner, Nickel, Schultmann
WT 22/23	2610029		2 SWS	Tutorial (	
Exams					
WT 22/23	7900154	Production, Logistics and Information Systems			Schultmann, Nickel, Weinhardt, Mädche, Geyer-Schulz, Fichtner
ST 2023	7900077	Production, Logistics and Information Systems			Schultmann, Nickel, Fichtner, Weinhardt, Mädche, Geyer-Schulz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Written Exam. The examination is offered at the beginning of each lecture-free period. Repeat examinations are possible at any regular examination date.

Below you will find excerpts from events related to this course:

V 2600004, WS 22/23, 2 SWS, Open in study portal   **Lecture (V)**

T 8.208 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 Completed coursework	**Credits** 1	**Grading scale** pass/fail	**Version** 1

Events					
ST 2023	6020245	Projektübung angewandte Fernerkundung	2 SWS	Practice / 🔊	Mitarbeiter/innen, Hinz, Weidner
Exams					
ST 2023	8284101814	Project in Applied Remote Sensing			Weidner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T 8.209 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	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each winter term	2

Events					
WT 22/23	2149700	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	2 SWS	Practical course / ✄	Zanger, Lubkowitz
Exams					
WT 22/23	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)

The competence certificate is a project work; alternative test achievement according to § 4 Abs. 2 No. 3 of the SPO. Here, the project work, the milestone-based presentation of the results in presentation form (10 min each) and a final oral examination (15 min) are included in the assessment.

Prerequisites
none

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 22/23, 2 SWS, Language: German, Open in study portal	**Practical course (P)** **Blended (On-Site/Online)**

Content

The lecture "Project Internship Additive Manufacturing: Development and Production of an Additive Component" combines the basics of metallic laser powder bed fusion (LPBF) with a development project in cooperation with an industrial company.
The students learn the basics of the following topics in the project-related lecture:

- Influence of different process variables on the component quality of parts produced in the LPBF process
- Preparation and simulation of the LPBF process
- Production of additive metallic components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- CAM for subtractive rewor

The topics addressed in the course will be applied practically in various workshops on the individual topics and transferred to the developmental task in self-study.
Finally, the results of the elaborations are produced additively and post-processed subtractively.

Learning Outcomes:

The students …

- are able to describe the properties and applications of the additive manufacturing processes laser powder bed fusion (LPBF) and lithography assisted ceramic manufacturing (LCM).
- are able to select the appropriate manufacturing process for a technical application.
- are able to describe and implement the creation of a product along the entire additive process chain (CAD, simulation, work preparation, CAM) from the idea to the production.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- are able to perform topology optimization.
- are able to simulate the additive process, compensate for process-related distortions and determine the ideal alignment on the building platform.
- are able to create necessary support structures for the additive process and to derive a building order file.
- are able to create a CAM model for the subtractive rework process of additive parts.

Workload:

regular attendance: 12 hours
self-study: 108 hours

Organizational issues

Termine werden über die Vorlesungsankündigung des wbk mitgeteilt: http://www.wbk.kit.edu/studium-und-lehre.php

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Der Link zur Bewerbung wird in der Vorlesungsankündigung über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php) zur Verfügung gestellt.

Literature

Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T 8.210 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 22/23	6200106	Project Management	2 SWS	Lecture / Practice (/ 🎤	Haghsheno, Schneider

Exams			
WT 22/23	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

Below you will find excerpts from events related to this course:

V Project Management
6200106, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The module provides an introduction to construction project management. Here, the organization and delivery of a construction project from the owner's perspective is dealt with in more detail. In this context, various competencies are presented that should be available for the implementation of successful project management. In addition, selected project management methods for individual competencies are presented and applied in the context of case studies.

Organizational issues
Vorlesungen: Mittwochs (26.10.2022 bis 08.02.2023), jeweils 09:45 – 11:15 Uhr (hybrid - Raum: siehe ILIAS-Kurs)

Übungen: Mittwochs (an vier Terminen: 16.11.2022, 07.12.2022, 11.01.2023, 08.02.2023), jeweils 11:30 – 13:00 (hybrid - Raum: siehe ILIAS-Kurs)

Literature
Ahrens, Hannsjörg; Bastian, Klemens; Muchowski, Lucian (Hrsg.) (2021) Handbuch Projektsteuerung - Baumanagement: Ein praxisorientierter Leitfaden mit zahlreichen Hilfsmitteln und Arbeitsunterlagen, 6. Auflage, Fraunhofer IRB Verlag, Stuttgart

GPM Deutsche Gesellschaft für Projektmanagement e. V. (Hrsg.) (2017) Individual Competence Baseline für Projektmanagement (Version 4.0), 1. Auflage, GPM Deutsche Gesellschaft für Projektmanagement e. V., Nürnberg

Haghsheno, Shervin; John, Paul Christian (2022) Bau-Projektmanagement in Deutschland (*Skriptum*)

Kochendörfer, Bernd; Liebchen, Jens H.; Viering, Markus G. (2021) Bau-Projekt-Management: Grundlagen und Vorgehensweisen, 5. Auflage, Spinger Vieweg, Wiesbaden

Schulz, Markus (2020) Projektmanagement: Zielgerichtet. Effizient. Klar., 2. Auflage, UVK Verlag, Tübingen

T **8.211 Course: Project Workshop: Automotive Engineering [T-MACH-102156]**

Responsible:	Dr.-Ing. Michael Frey
	Prof. Dr. Frank Gauterin
	Dr.-Ing. Martin Gießler
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles
M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each term	1

Events					
WT 22/23	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture / 🔊	Gauterin, Gießler, Frey
ST 2023	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture / 🔊	Gauterin, Gießler, Frey
Exams					
WT 22/23	76-T-MACH-102156	Project Workshop: Automotive Engineering			Gauterin

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

Oral examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites

Below you will find excerpts from events related to this course:

V **Project Workshop: Automotive Engineering**
2115817, WS 22/23, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Learning Objectives:

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Organizational issues

Begrenzte Teilnehmerzahl mit Auswahlverfahren, in deutscher Sprache. Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.
Termin und Raum: siehe Institutshomepage.

Limited number of participants with selection procedure, in German language. Please send the application at the end of the previous semester

Date and room: see homepage of institute.

Literature

Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

Skripte werden beim Start-up Meeting ausgegeben.

The scripts will be supplied in the start-up meeting.

V	**Project Workshop: Automotive Engineering** 2115817, SS 2023, 3 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Learning Objectives:

The students are familiar with typical industrial development processes and working style. They are able to apply knowledge gained at the university to a practical task. They are able to analyze and to judge complex relations. They are ready to work self-dependently, to apply different development methods and to work on approaches to solve a problem, to develop practice-oriented products or processes.

Organizational issues

Begrenzte Teilnehmerzahl mit Auswahlverfahren, die Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.

Raum und Termine: s. Aushang bzw. Homepage

Literature
Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

Skripte werden beim Start-up Meeting ausgegeben.

T 8.212 Course: Public Economics [T-WIWI-112721]

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 summer term	1

Events					
ST 2023	2600013	Public Economics	3 SWS	Lecture / 🗣	Wigger, Okulicz
Exams					
ST 2023	790pube	Public Economics			Wigger

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam, or of an 1h written exam.

Prerequisites
None

Annotation
The lecture will be held in English in the summer semester 2023.

T   8.213 Course: Public Law I & II [T-INFO-110300]

Responsible:	Prof. Dr. Thomas Dreier
Organisation:	KIT Department of Informatics
Part of:	M-INFO-105084 - Public and Civil Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
WT 22/23	24016	Öffentliches Recht I - Grundlagen	2 SWS	Lecture / 🔀	Werner-Kappler
ST 2023	24520	Öffentliches Recht II - Öffentliches Wirtschaftsrecht	2 SWS	Lecture / 🔊	Kasper
Exams					
WT 22/23	7500138	Public Law I & II			Dreier

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

T 8.214 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 2023	2560120	Public Revenues	2 SWS	Lecture / 🗣	Wigger
ST 2023	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice / 🗣	Wigger, Schmelzer
Exams					
WT 22/23	790oeff	Public Revenues			Wigger
ST 2023	790oeff	Public Revenues			Wigger

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V Public Revenues
2560120, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

Learning goals:
See German version.

Workload:
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Literatur:

- Homburg, S.(2000): *Allgemeine Steuerlehre,* Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4. Aufl., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* und *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2. Aufl., Springer

T　8.215 Course: Python Algorithm for Vehicle Technology [T-MACH-110796]

Responsible:	Stephan Rhode
Organisation:	
Part of:	M-MACH-101265 - Vehicle Development
	M-MACH-101266 - Automotive Engineering

Type Written examination	**Credits** 4	**Grading scale** Grade to a third	**Recurrence** Each summer term	**Version** 1

Events					
ST 2023	2114862	Python Algorithms for Automotive Engineering	2 SWS	Lecture / ⚙	Rhode
Exams					
WT 22/23	76-T-Mach-110796	Python Algorithm for Vehicle Technology			Rhode
ST 2023	76-T-MACH-110796	Python Algorithm for Vehicle Technology			Rhode

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Written Examination

Duration: 90 minutes

Prerequisites

Below you will find excerpts from events related to this course:

V　Python Algorithms for Automotive Engineering
2114862, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

Teaching content:

- Introduction to Python and useful tools and libraries for creating algorithms, graphical representation, optimization, symbolic arithmetic and machine learning
  - Anaconda, Pycharm, Jupyter
  - NumPy, Matplotlib, SymPy, Scikit-Learn
- Methods and tools for creating software
  - Version management GitHub, git
  - Testing software pytest, Pylint
  - Documentation Sphinx
  - Continuous Integration (CI) Travis CI
  - Workflows in Open Source and Inner Source, Kanban, Scrum
- Practical programming projects to:
  - Road sign recognition
  - Vehicle state estimation
  - Calibration of vehicle models by mathematical optimization
  - Data-based modelling of the powertrain of an electric vehicle

Objectives:

The students have an overview of the programming language Python and important Python libraries to solve automotive engineering problems with computer programs. The students know current tools around Python to create algorithms, to apply them and to interpret and visualize their results. Furthermore, the students know
basics in the creation of software to be used in later programming projects in order to develop high-quality software solutions in teamwork. Through practical programming projects (road sign recognition, vehicle state estimation, calibration, data-based modelling), the students can perform future complex tasks from the area of driver assistance systems.

Organizational issues

Die 1.Vorlesung findet in Präsenz am Campus Ost, Geb. 70.04, Raum 219 statt.

Literature

- A Whirlwind Tour of Python, Jake VanderPlas, Publisher: O'Reilly Media, Inc. Release Date: August 2016, ISBN: 9781492037859 link
- Scientific Computing with Python 3, Olivier Verdier, Jan Erik Solem, Claus Führer, Publisher: Packt Publishing, Release Date: December 2016, ISBN: 9781786463517 link
- Introduction to Machine Learning with Python, Sarah Guido, Andreas C. Müller, Publisher: O'Reilly Media, Inc., Release Date: October 2016, ISBN: 9781449369880, link
- Clean Code, Robert C. Martin, Publisher: Prentice Hall, Release Date: August 2008, ISBN: 9780136083238, link

T 8.216 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	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	3

Events					
WT 22/23	2149667	Quality Management	2 SWS	Lecture / ⚃	Lanza
Exams					
WT 22/23	76-T-MACH-102107	Quality Management			Lanza
ST 2023	76-T-MACH-102107	Quality Management			Lanza

Legend: 🗔 Online, ⚃ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
It is not possible to combine this brick with brick Quality Management [T-MACH-112586].

Below you will find excerpts from events related to this course:

V	**Quality Management**	Lecture (V)
	2149667, WS 22/23, 2 SWS, Language: German, Open in study portal	**Blended (On-Site/Online)**

Content

Based on the quality philosophies Total Quality Management (TQM) and Six Sigma, the lecture deals with the requirements of modern quality management. Within this context, the process concept of a modern enterprise and the process-specific fields of application of quality assurance methods are presented. The lecture covers the current state of the art in preventive and non-preventive quality management methods in addition to manufacturing metrology, statistical methods and service related quality management. The content is completed with the presentation of certification possibilities and legal quality aspects.

Main topics of the lecture:

- The term "Quality"
- Total Quality Management (TQM) and Six Sigma
- Universal methods and tools
- QM during early product stages – product denition
- QM during product development and in procurement
- QM in production – manufacturing metrology
- QM in production – statistical methods
- QM in service
- Quality management systems
- Legal aspects of QM

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 24.10.2022

Vorlesungstermine montags 09:45 Uhr
Übung erfolgt während der Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt:

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T   8.217 Course: Rail System Technology [T-MACH-102143]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101274 - Rail System Technology

Type Oral examination	Credits 9	Grading scale Grade to a third	Recurrence Each term	Version 3

Events					
WT 22/23	2115919	Rail System Technology	2 SWS	Lecture / 🔊	Heckele, Gratzfeld
WT 22/23	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🔊	Reimann, Gratzfeld
ST 2023	2115919	Rail System Technology	2 SWS	Lecture / 🔊	Cichon
ST 2023	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🔊	Cichon
Exams					
WT 22/23	76-T-MACH-102143	Rail System Technology			Heckele, Reimann, Gratzfeld
ST 2023	76-T-MACH-102143	Rail System Technology			Cichon, Heckele, Reimann

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🔊 On-Site, ✗ Cancelled

Competence Certificate

Oral examination

Duration: ca. 45 minutes

No tools or reference materials may be used during the exam.

Prerequisites

Below you will find excerpts from events related to this course:

V   Rail System Technology

2115919, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V) On-Site

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V   Rail Vehicle Technology

2115996, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V) On-Site

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V	**Rail System Technology** 2115919, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V	**Rail Vehicle Technology** 2115996, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Literature

Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

T 8.218 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 2023	6020241	Remote Sensing Systems	1 SWS	Lecture / 🎙	Hinz, Cermak
ST 2023	6020242	Systems of Remote Sensing, Excercise	1 SWS	Practice / 🎙	N.N.
ST 2023	6020243	Procedures of Remote Sensing	2 SWS	Lecture / 🎙	Weidner
ST 2023	6020244	Procedures of Remote Sensing, Excercise	1 SWS	Practice / 🎙	Weidner
Exams					
WT 22/23	8284101636	Remote Sensing, exam			Hinz, Weidner
ST 2023	8284101636	Remote Sensing, exam			Weidner, Hinz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎙 On-Site, ✘ Cancelled

Recommendation
None

T   8.219 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	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	5

Events					
WT 22/23	2581012	Renewable Energy – Resources, Technologies and Economics	2 SWS	Lecture / 🗣	Jochem
Exams					
WT 22/23	7981012	Renewable Energy-Resources, Technologies and Economics			Fichtner
ST 2023	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   Lecture (V) On-Site
2581012, WS 22/23, 2 SWS, Language: English, Open in study portal

Content

1. General introduction: Motivation, Global situation

2. Basics of renewable energies: Energy balance of the earth, potential definition

3. Hydro

4. Wind

5. Solar

6. Biomass

7. Geothermal

8. Other renewable energies

9. Promotion of renewable energies

10. Interactions in systemic context

11. Excursion to the "Energieberg" in Mühlburg

Learning Goals:

The student

- understands the motivation and the global context of renewable energy resources.
- gains detailed knowledge about the different renewable resources and technologies as well as their potentials.
- understands the systemic context and interactions resulting from the increased share of renewable power generation.
- understands the important economic aspects of renewable energies, including electricity generation costs, political promotion and marketing of renewable electricity.
- is able to characterize and where required calculate these technologies.

Organizational issues

Blockveranstaltung, freitags 14:00-17:00 Uhr, 28.10., 11.11., 25.11., 09.12., 13.01., 27.01., 10.02.

Literature
Weiterführende Literatur:

- Kaltschmitt, M., 2006, Erneuerbare Energien : Systemtechnik, Wirtschaftlichkeit, Umweltaspekte, aktualisierte, korrigierte und ergänzte Auflage Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg.
- Kaltschmitt, M., Streicher, W., Wiese, A. (eds.), 2007, Renewable Energy: Technology, Economics and Environment, Springer, Heidelberg.
- Quaschning, V., 2010, Erneuerbare Energien und Klimaschutz : Hintergründe - Techniken - Anlagenplanung – Wirtschaftlichkeit München : Hanser, Ill.2., aktualis. Aufl.
- Harvey, D., 2010, Energy and the New Reality 2: Carbon-Free Energy Supply, Eathscan, London/Washington.
- Boyle, G. (ed.), 2004, Renewable Energy: Power for a Sustainable Future, 2nd Edition, Open University Press, Oxford.

T   8.220 Course: Seminar Application of Artificial Intelligence in Production [T-MACH-112121]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type Examination of another type	Credits 4	Grading scale Grade to a third	Recurrence Each summer term	Version 3

Events					
ST 2023	2150910	Seminar Application of Artificial Intelligence in Production	2 SWS	Seminar / 🧩	Fleischer

Exams			
ST 2023	76-T-MACH-112121	Seminar Application of Artificial Intelligence in Production	Fleischer

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
Alternative test achievement (graded):

- Presentation of the results (approx. 20 min) followed by a colloquium (approx. 15 min) with weighting 75%
- Written processing of the results with weighting 25%

Prerequisites
none

Below you will find excerpts from events related to this course:

V	**Seminar Application of Artificial Intelligence in Production** 2150910, SS 2023, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

The module AI in Production is designed to teach students the practical, holistic integration of machine learning methods and the application of artificial intelligence in production. The course is oriented towards the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content-related aspects (methods) within the individual phases. In addition to teaching the practical aspects of integrating the most important machine learning methods, the focus here is primarily on the necessary steps for data generation and data preparation as well as the implementation and validation of the methods in an industrial environment.

The lecture "Seminar Application of Artificial Intelligence in Production" aims at the practical integration of current machine learning methods based on realistic industrial use cases. The content framework of the lecture results from the holistic, practical implementation of an AI project in production. First, the necessary Deep Learning programming basics are taught using the Keras software package. Subsequently, practice-relevant use cases are defined, which are to be implemented practically with the methods of machine learning and especially deep learning.

Learning Outcomes:

The Students

- are able to independently analyze a practical problem in production with regard to the application of machine learning methods.
- will be able to independently apply common deep learning algorithms to practical data sets, validate them, and analyze the results.
- understand the challenges of using deep learning methods in production.
- will know the main action areas and open research questions for the successful implementation of AI in production and for the implementation of autonomous machines.
- are able to evaluate the results of current deep learning methods and, based on these, to develop and practically apply proposed solutions (from the field of machine learning).

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Das Seminar wird erstmals im SS 2023 angeboten.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 8.221 Course: Seminar Data-Mining in Production [T-MACH-108737]

Responsible:	Prof. Dr.-Ing. Gisela Lanza
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 22/23	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🧩	Lanza
ST 2023	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🧩	Lanza
Exams					
WT 22/23	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza
ST 2023	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 22/23, 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 2023, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

Learning Outcomes:

The students …

- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues

Die Teilnehmerzahl ist auf zwölf Studierende begrenzt. Termine und Fristen zur Veranstaltung werden unter https://www.wbk.kit.edu/studium-und-lehre.php bekanntgegeben.

The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

| T | **8.222 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 Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Events					
WT 22/23	2500019	Digital Citizen Science	2 SWS	Seminar / ♧	Mädche, Nieken
WT 22/23	2500028	Literature Seminar - Empirical Asset Pricing: Modeling Equity Markets	2 SWS	Seminar	Ulrich
WT 22/23	2500045	Digital Democracy - Challenges and Opportunities of the Digital Society	2 SWS	Seminar / ♧	Fegert
WT 22/23	2500125	Current Topics in Digital Transformation Seminar	3 SWS	Seminar / ♧	Mädche
WT 22/23	2530580	Seminar in Finance	2 SWS	Seminar / ♣	Uhrig-Homburg
WT 22/23	2530610	Seminar in Financial Economics (Bachelor)	2 SWS	Seminar / ♧	Thimme
WT 22/23	2540473	Business Data Analytics	2 SWS	Seminar / ♣	Badewitz, Grote, Jaquart
WT 22/23	2540475	Digital Platforms, Markets & Work	2 SWS	Seminar / ♣	Knierim, del Puppo, Bartholomeyczik
WT 22/23	2540477	Digital Experience and Participation	2 SWS	Seminar / ♣	Peukert, Fegert, Greif-Winzrieth, Stein, Bezzaoui
WT 22/23	2540478	Smart Grids and Energy Markets	2 SWS	Seminar / ♣	Golla, Henni, Bluhm, Semmelmann
WT 22/23	2540524	Bachelor Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz, Nazemi, Schweizer
WT 22/23	2540557	Information Systems and Design (ISSD) Seminar	2 SWS	Seminar / ♧	Mädche
WT 22/23	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar / ♧	Hirte
WT 22/23	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar / ♣	Böhrer, Terzidis
WT 22/23	2571180	Seminar in Marketing and Sales (Bachelor)	2 SWS	Seminar / ♣	Klarmann, Mitarbeiter
WT 22/23	2573010	Seminar: Human Resources and Organizations (Bachelor)	2 SWS	Seminar / ♣	Nieken, Mitarbeiter
WT 22/23	2573011	Seminar: Human Resource Management (Bachelor)	2 SWS	Seminar / ♣	Nieken, Mitarbeiter
WT 22/23	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar / ♣	Wouters, Dickemann, Letmathe
WT 22/23	2581030	Seminar in Energy Economics	2 SWS	Seminar / ♣	Dehler-Holland, Fichtner
WT 22/23	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar / ♣	Schultmann, Rudi
WT 22/23	2581980	Seminar in Energy Economics	2 SWS	Seminar / ♣	Fichtner, Kraft, Zimmermann
WT 22/23	2581981	Seminar in Energy Economics	2 SWS	Seminar / ♣	Ardone, Finck, Fichtner, Slednev
WT 22/23	2581990		2 SWS	Seminar	Schultmann
ST 2023	2500027	Design Seminar: Digital Citizen Science	2 SWS	Seminar	Mädche

ST 2023	2500125	Engineering Seminar: Human-Centered Systems	3 SWS	Seminar / ⚙	Mädche
ST 2023	2500165	Student2Startup	2 SWS	Seminar / ⚙	Terzidis, Böhrer
ST 2023	2530293	Seminar in Finance (Bachelor, Prof. Ruckes)	2 SWS	Seminar / ⚙	Ruckes, Luedecke, Hoang, Benz, Wiegratz, Silbereis, Kohl
ST 2023	2530610	Seminar Financial Economics		Seminar / 🗣	Thimme
ST 2023	2540472	Digital Citizen Science	2 SWS	Seminar	Weinhardt, Knierim, Mädche
ST 2023	2540475	Positive Information Systems	2 SWS	Seminar	Knierim, del Puppo, Bartholomeyczik
ST 2023	2540477	Digital Experience & Participation	2 SWS	Seminar	Peukert, Fegert
ST 2023	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Henni, Semmelmann, Bluhm, Golla
ST 2023	2540524	Bachelor Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz, Schweizer
ST 2023	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar / ⚙	Mädche, Beigl
ST 2023	2540557	Research Seminar: Human-Centered Systems	3 SWS	Seminar / ⚙	Mädche
ST 2023	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar / 🗣	Terzidis, Hirte
ST 2023	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar / 🗣	Terzidis, Wohlfeil
ST 2023	2571187	Seminar Digital Marketing (Bachelor)	2 SWS	Seminar / 🗣	Kupfer
ST 2023	2573010	Seminar Human Resources and Organizations (Bachelor)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter, Walther
ST 2023	2573011	Seminar Human Resource Management (Bachelor)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter, Gorny
ST 2023	2579909	Seminar Management Accounting - Special Topics	2 SWS	Seminar / 🗣	Wouters, Jaedeke, Kepl
ST 2023	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar / 🗣	Letmathe
ST 2023	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar / 🗣	Fichtner
ST 2023	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar / 🗣	Volk, Schultmann
ST 2023	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar / 🗣	Kraft, Fichtner
Exams					
WT 22/23	00071	Seminar Digital Democracy – Challenges and Opportunities of the Digital Society			Weinhardt
WT 22/23	00072	Seminar Digital Platforms, Markets & Work			Weinhardt
WT 22/23	00073	Seminar Digital Experience and Participation			Weinhardt
WT 22/23	00074	Seminar Business Data Analytics			Weinhardt
WT 22/23	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 22/23	7900069	Current Topics in Digital Transformation Seminar			Mädche
WT 22/23	7900085	Entrepreneurship Basics (Track 1)			Terzidis
WT 22/23	7900087	Entrepreneurship Basics (Track 2)			Terzidis
WT 22/23	7900138	Seminar in Marketing and Sales (Bachelor)			Klarmann
WT 22/23	7900157	Seminar Human Resources and Organizations (Bachelor)			Nieken
WT 22/23	7900161	Seminar Human Resource Management (Bachelor)			Nieken
WT 22/23	7900165	Seminar Digital Experience and Participation			Weinhardt
WT 22/23	7900168	Bachelor Seminar in Data Science and Machine Learning			Geyer-Schulz
WT 22/23	7900175	Seminar in Finance: Green Finance - What Does Sustainability Cost?			Uhrig-Homburg
WT 22/23	7900203	Seminar in Finance			Uhrig-Homburg
WT 22/23	7900233	Information Systems and Design (ISSD) Seminar			Mädche
WT 22/23	7900277	Seminar: Digital Citizen Science			Woll

WT 22/23	7900315	Seminar Financial Economics "Financial crises over the past 100 years" (Bachelor)	Thimme
WT 22/23	7900335	Seminar Energy Economics IV	Fichtner
WT 22/23	7900338	Seminar in Business Administration (Bachelor)- Data Sharing & Data Trading	Satzger
WT 22/23	7900350	Seminar in Business Administration (Bachelor)	Ulrich
WT 22/23	7900361	Seminar in Business Administration (Bachelor)	Satzger
WT 22/23	7900374	Seminar Digital Citizen Science	Weinhardt
WT 22/23	79-2579919-B	Seminar Management Accounting - Security of Supply and Resilient Supply Chain	Wouters
WT 22/23	7981976	Seminar in Production and Operations Management I	Schultmann
WT 22/23	7981978	Seminar in Production and Operations Management III	Schultmann
WT 22/23	7981979	Seminar Energy Economics I	Fichtner
WT 22/23	7981980	Seminar Energy Economics II	Fichtner
WT 22/23	7981981	Seminar Energy Economics III	Fichtner
ST 2023	00004	Seminar Financial Economics	Thimme
ST 2023	7900003	Seminar in Finance (Bachelor, Prof. Ruckes)	Ruckes
ST 2023	7900056	Entrepreneurship Basics (Track 1)	Terzidis
ST 2023	7900057	Entrepreneurship Basics (Track 2)	Terzidis
ST 2023	7900058	Student2Startup	Terzidis
ST 2023	7900100	Seminar Human Resource Management (Bachelor)	Nieken
ST 2023	7900167	Design Seminar: Digital Citizen Science	Mädche
ST 2023	7900190	Engineering Seminar: Human-Centered Systems	Mädche
ST 2023	7900230	Seminar Human Resources and Organizations (Bachelor)	Nieken
ST 2023	7900261	Research Seminar: Human-Centered Systems	Mädche
ST 2023	7900265	User-adaptive Systems Seminar	Mädche
ST 2023	79-2579909-B	Seminar Management Accounting - Special Topics (Bachelor)	Wouters
ST 2023	79-2579919-B	Seminar Management Accounting - Sustainability Topics (Bachelor)	Wouters
ST 2023	792581030	Seminar Energy Economics IV	Fichtner
ST 2023	792581031	Seminar Energy Economics V	Plötz
ST 2023	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2023	7981979	Seminar Energy Economics I	Fichtner
ST 2023	7981980	Seminar Energy Economics II	Fichtner
ST 2023	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 22/23, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Scheibehenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

V	**Literature Seminar - Empirical Asset Pricing: Modeling Equity Markets** 2500028, WS 22/23, 2 SWS, Language: English, Open in study portal	**Seminar (S)**

Organizational issues

Geb. 09.21 Raum E009, Termine werden bekannt gegeben

V	**Business Data Analytics** 2540473, WS 22/23, 2 SWS, Language: German/English, Open in study portal	**Seminar (S)** **On-Site**

Content

wird auf deutsch und englisch gehalten

Organizational issues

Blockveranstaltung, siehe WWW

V	**Bachelor Seminar in Data Science and Machine Learning** 2540524, WS 22/23, 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 22/23, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
Course Content:

This seminar explains important factors for becoming an entrepreneur and guides you through a structured process from the first business idea to a pitch of your final business model. Therefore, a business idea will be developed in the context of the UN Sustainable Development Goals. In small teams you create, develop, validate and present your business model. It simulates the basics of a start-up process up to the investor pitch.

Learning Objectives

After completing this course, the course participants will be able to

- Reflect on and define your personal and team core values
- Reflect on and define your personal and team competencies
- Reflect on and recall a definition for business opportunity
- Define your field of interest for opportunity recognition using the UN SDGs
- Analyze a specific domain to identify business opportunities
- Develop a first draft for your business model by using the Business Model Canvas
- Pitch / present your business idea

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

Organizational issues
Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of max. 5 persons. The groups are formed in the seminar

V	**Entrepreneurship Basics (Track 2)** 2545011, WS 22/23, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Course Content:

This seminar shows what is important for entrepreneurs and it guides you through a structured process from the first business idea to a pitch of your final business model. In teams you create, develop, validate and present your business model. It partially simulates a start-up process up to the investor pitch.

Starting with a rough business idea, you learn to understand and validate the customer problems. Together with your teammates and the feedback from the other teams and the lecturer, you will create a sharp business model by using tools like the Value Proposition Canvas, the Business Model Canvas and customer interviews. With some further information about rapid prototyping and structuring a pitch and a one-pager for business angels, you will learn, how to present the developed business. This seminar is teamwork. You grow as a team, learn to communicate and to work efficient in a team so all your results (the pitch and the written outline) are presented by the team.

Learning Objectives

- Learning of entrepreneurial skills.
- Understanding of value creation importance.
- Experience on how to derive and test hypothesis.
- Transition from ideas to a business model that works.
- Leaning how to pitch and to convince investors.

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

Organizational issues
Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation.

| V | **Seminar: Human Resources and Organizations (Bachelor)**
2573010, WS 22/23, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
On-Site |

Content

The topics are redefined each semester on basis of current research topics.The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

| V | **Seminar: Human Resource Management (Bachelor)**
2573011, WS 22/23, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
On-Site |

Content

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

| V | **Seminar Management Accounting - Special Topics**
2579919, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
On-Site |

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 16 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

V	**Design Seminar: Digital Citizen Science** 2500027, SS 2023, 2 SWS, Open in study portal	**Seminar (S)**

Content
TBA

V	**Student2Startup** 2500165, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
Content:

In this seminar, five pre-seed startup projects will define strategic challenges and ask students to work on solutions. Mentors from the industry will support the teams. In addition to a kick-off and final event, we will organize regular seminar sessions to provide background and help the student teams in their tasks.

Learning Objectives:

After completing this course, the course participants will be able to

- Understand and apply basic concepts of entrepreneurship, including business modeling, lean startup approaches, and market analysis
- Work in a team, organize the division of labor into separate tasks, and coordinate the tasks to attain a result
- Understand specific challenges of startup projects
- Interact with experts from the industry and potential users to develop answers/solutions to a given challenge
- Present the results to the startups and experts from the industry

Exam:

Team presentation at the final event, detailed presentation appendix with background information, and active participation in all sessions

Target group:

Bachelor students

Organizational issues
Registration is via the Wiwi-Portal.

In the seminar, you will work on a project in teams of max five people. The groups are formed in the seminar.

V	**User-Adaptive Systems Seminar** 2540553, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
User-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a user-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). It is offered as part of the DFG-funded graduate school "KD2School: Designing Adaptive Systems for Economic Decisions" (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-adaptive system prototype

Prerequisites

Strong analytical abilities and profound software development skills are required.

Organizational issues
Termine werden bekannt gegeben

Literature
Required literature will be made available in the seminar.

V	**Research Seminar: Human-Centered Systems** 2540557, SS 2023, 3 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Formerly known as "Information Systems and Service Design Seminar"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group IS I (Prof. Mädche). The research group "Information Systems I" (IS I) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues
Termine werden bekannt gegeben

V	**Entrepreneurship Basics (Track 1)** 2545010, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Content

This seminar explains important factors for becoming an entrepreneur and guides you through a structured process from the first business idea to a pitch of your final business model. Therefore, a business idea will be developed in the context of the UN Sustainable Development Goals. In small teams you create, develop, validate and present your business model. It simulates the basics of a start-up process up to the investor pitch.

Learning Objectives

After completing this course, the course participants will be able to

- Reflect on and define your personal and team core values
- Reflect on and define your personal and team competencies
- Reflect on and recall a definition for business opportunity
- Define your field of interest for opportunity recognition using the UN SDGs
- Analyze a specific domain to identify business opportunities
- Develop a first draft for your business model by using the Business Model Canvas
- Pitch / present your business idea

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

Organizational issues
Registration is via the Wiwi-Portal.

In the seminar you will work on a project in teams of max. 5 persons. The groups are formed in the seminar.

V	**Entrepreneurship Basics (Track 2)** 2545011, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
Course Content:

This seminar shows what is important for entrepreneurs and it guides you through a structured process from the first business idea to a pitch of your final business model. In teams you create, develop, validate and present your business model. It partially simulates a start-up process up to the investor pitch.

Starting with a rough business idea, you learn to understand and validate the customer problems. Together with your teammates and the feedback from the other teams and the lecturer, you will create a sharp business model by using tools like the Value Proposition Canvas, the Business Model Canvas and customer interviews. With some further information about rapid prototyping and structuring a pitch and a one-pager for business angels, you will learn, how to present the developed business. This seminar is teamwork. You grow as a team, learn to communicate and to work efficient in a team so all your results (the pitch and the written outline) are presented by the team.

Learning Objectives

- Learning of entrepreneurial skills.
- Understanding of value creation importance.
- Experience on how to derive and test hypothesis.
- Transition from ideas to a business model that works.
- Leaning how to pitch and to convince investors.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

Organizational issues
Registration is via the Wiwi-Portal.

In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation.

V	**Seminar Human Resources and Organizations (Bachelor)** 2573010, SS 2023, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content
The topics are redefined each semester on basis of current research topics.The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V	**Seminar Human Resource Management (Bachelor)** 2573011, SS 2023, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

V	**Seminar Management Accounting - Special Topics** 2579909, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

V **Seminar Management Accounting - Sustainability Topics**   **Seminar (S)**
2579919, SS 2023, 2 SWS, Language: English, Open in study portal   **On-Site**

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues

Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature

Will be announced in the course.

T 8.223 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 22/23	2520405	Topics in Experimental Economics		Seminar / 🔲	Reiß, Peters
WT 22/23	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter, Görgen
WT 22/23	2560140	Moral Wiggle Room and Info Avoidance - Topics in Political Economy (Bachelor)	2 SWS	Seminar / 🔀	Szech, Rosar, Rau
WT 22/23	2560141	Shaping AI and Digitization for Society - Morals & Social Behavior (Bachelor)	2 SWS	Seminar / 🔀	Szech, Zhao
WT 22/23	2560145	Disruption and the Digital Economy: Markets, Strategies, and Society (Bachelor & Master)	2 SWS	Seminar / 🔀	Szech, Rosar, Ehrlich
WT 22/23	2560400	Seminar in Macroeconomics I	2 SWS	Seminar / 🔀	Brumm, Krause, Pegorari, Hußmann
WT 22/23	2560401	Seminar in Macroeconomics II	2 SWS	Seminar / 🔀	Brumm, Krause, Pegorari, Hußmann
WT 22/23	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba
ST 2023	2500004	Predictive Data Analytics - An Introduction to Statistical Machine Learning	2 SWS	Seminar / 🔀	Schienle, Lerch
ST 2023	2500009	Seminar in Economic Theory I	2 SWS	Seminar / 🎤	Müller, Ammann, Kretz
ST 2023	2520367	Strategische Entscheidungen	2 SWS	Seminar / 🔀	Ehrhart
ST 2023	2520535	Seminar in Economic Theory I	2 SWS	Seminar / 🎤	Müller, Ammann, Kretz
ST 2023	2560241	Digital IT Solutions and Services transforming the Field of Public Transportation	2 SWS	Seminar	Janoshalmi
ST 2023	2560259	Organisation and Management of Development Projects	2 SWS	Seminar / 🔀	Sieber
ST 2023	2560553	Shaping AI and Digitization for Society (Bachelor)	2 SWS	Seminar / 🔀	Zhao
ST 2023	2560554	Bounded Rationality - Theory and Experiments (Master)	2 SWS	Seminar / 🔀	Szech, Rau
ST 2023	2560556	Law and Economics (Bachelor)	2 SWS	Seminar / 🔀	Okulicz
ST 2023	2560560	Co-Opetiton: A practical perspective to game theory in the game of business (Bachelor & Master)	2 SWS	Seminar / 🎤	Rosar
Exams					
WT 22/23	7900073	Seminar in Economics (Bachelor): Nudging			Puppe
WT 22/23	7900076	Economic Choices Over the Life Cycle			Brumm
WT 22/23	7900124	Seminar Moral Wiggle Room and Info Avoidance (Bachelor)			Szech
WT 22/23	7900139	Selected Aspects of European Transport Planning and Modelling			Mitusch
WT 22/23	7900178	Seminar in Economics (Bachelor): Distributive Justice			Puppe
WT 22/23	7900212	Seminar in Economic Policy			Ott

WT 22/23	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)	Schienle
WT 22/23	7900274	The Synthetic Control Method in Macroeconomics	Brumm
WT 22/23	7900278	Seminar Shaping AI and Digitization (Bachelor)	Szech
WT 22/23	7900298	Seminar Disruption and the Digital Economy (Bachelor & Master)	Szech
WT 22/23	7910005	Topics in Experimental Economics	Reiß
WT 22/23	79sefi1	Seminar Unified Welfare Analysis of Public Policies (Bachelor)	Wigger
ST 2023	7900051	Seminar in Economic Policy	Ott
ST 2023	7900060	Bounded Rationality - Theory and Experiments (Bachelor)	Szech
ST 2023	7900130	Shaping AI and Digitization for Society (Bachelor)	Szech
ST 2023	7900164	Seminar in Economics (Bachelor)	Mitusch
ST 2023	7900204	Seminar in Statistics (Bachelor)	Lerch
ST 2023	7900208	Law and Economics (Bachelor)	Szech
ST 2023	7900222	Co-Opetition (Bachelor & Master)	Szech
ST 2023	7900226	What's up Inflation? Recent Advances in Theory and Empirics	Brumm
ST 2023	7900228	Digitalization, AI, and the Future Economy	Brumm

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 Experimental Economics** 2520405, WS 22/23, SWS, Language: English, Open in study portal	**Seminar (S)** **Online**

Organizational issues
(im WS2021/22 online; sonst Blockseminar; Blücherstraße 17); Termine werden separat bekannt gegeben

Literature
Als Pflichtliteratur dienen ausgewählte Paper.

V	**Topics in Econometrics** 2521310, WS 22/23, 2 SWS, Language: German, Open in study portal	**Seminar (S)**

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

| V | **Moral Wiggle Room and Info Avoidance - Topics in Political Economy (Bachelor)**
2560140, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
Blended (On-Site/Online) |

Content

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Application is possible via https://portal.wiwi.kit.edu/Seminare

| V | **Shaping AI and Digitization for Society - Morals & Social Behavior (Bachelor)**
2560141, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
Blended (On-Site/Online) |

Content

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Application is possible via https://portal.wiwi.kit.edu/Seminare

| V | **Disruption and the Digital Economy: Markets, Strategies, and Society (Bachelor & Master)**
2560145, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
Blended (On-Site/Online) |

Content

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Application is possible via https://portal.wiwi.kit.edu/Seminare

| V | **Predictive Data Analytics - An Introduction to Statistical Machine Learning**
2500004, SS 2023, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)**
Blended (On-Site/Online) |

Organizational issues

Blockveranstaltung, Termine werden bekannt gegeben

| V | **Shaping AI and Digitization for Society (Bachelor)**
2560553, SS 2023, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
Blended (On-Site/Online) |

Content

Participation will be limited to 12 students.

For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockveranstaltung:

Introductory Meeting April 19 (online)

Seminar Presentations June 7 (in person)

V	**Bounded Rationality - Theory and Experiments (Master)** 2560554, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

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 + individual abstract (60%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockveranstaltung:

Introductory Meeting: April 18, at 2:45pm (in person)

Seminar Presentations (June 5) (in person)

V	**Law and Economics (Bachelor)** 2560556, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

Participation will be limited to 12 students.

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockseminar:

Kick-off 19.04.2023, 10.00 - 10.45 h (online)

Präsentation 26.05.2023, 08.00 - 13.00 (in person)

V	Co-Opetiton: A practical perspective to game theory in the game of business (Bachelor & Master)	Seminar (S) On-Site
	2560560, SS 2023, 2 SWS, Language: English, Open in study portal	

Content

Participation will be limited to 12 students.

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues

Blockseminar:

Kick-off 19.04.2023

Präsentation 22.05.2023, 14.00 - 18.30 Uhr

T   8.224 Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

Responsible:	Fachvertreter ingenieurwissenschaftlicher Fakultäten
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101816 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Competence Certificate
See German version.

Prerequisites
See module description.

Recommendation
None

| T | **8.225 Course: Seminar in Informatics (Bachelor) [T-WIWI-103485]** |

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

Type Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 22/23	2513200	Seminar Programming 3 (Bachelor)	2 SWS	Seminar / 🗣	Oberweis, Fritsch, Frister, Forell, Rybinski
WT 22/23	2513214	Seminar Information security and Data protection (Bachelor)	2 SWS	Seminar / ❖	Oberweis, Volkamer, Boehm, Alpers, Düzgün, Schiefer, Veit, Ballreich, Gottschalk
WT 22/23	2513216	Seminar Enabling technologies of digital process-oriented change (Bachelor)	2 SWS	Seminar / ❖	Oberweis, Alpers, Becker, Sauer, Take, Wins
WT 22/23	2513312	Seminar Linked Data and the Semantic Web (Bachelor)	3 SWS	Seminar / 🗣	Färber, Käfer, Braun
WT 22/23	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/ 🗣	Färber, Höllig, Thoma
WT 22/23	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/ 🗣	Färber, Höllig, Thoma
ST 2023	2513308	Seminar Knowledge Discovery and Data Mining (Bachelor)	3 SWS	Seminar / 🗣	Färber, Noullet, Saier, Popovic, Qu
ST 2023	2513310	Seminar Data Science & Real-time Big Data Analytics (Bachelor)	2 SWS	Seminar / 🗣	Färber, Käfer, Kulbach, Thoma
ST 2023	2513316	Seminar Anwendungen von Semantic MediaWiki (Bachelor)	3 SWS	Seminar / 🗣	Färber, Saier
ST 2023	2513318	Seminar Graph Representation Learning (Bachelor)	3 SWS	Seminar / 🗣	Färber, Shao
ST 2023	2513402	Seminar Emerging Trends in Internet Technologies (Bachelor)	2 SWS	Seminar / ❖	Sunyaev, Toussaint, Brecker, Danylak
ST 2023	2513404	Seminar Emerging Trends in Digital Health (Bachelor)	2 SWS	Seminar / ❖	Sunyaev, Toussaint, Brecker, Danylak
ST 2023	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar / ❖	Mädche, Beigl
Exams					
WT 22/23	7900034	Seminar Enabling technologies of digital process-oriented change (Bachelor)			Oberweis
WT 22/23	7900038	Seminar Linked Data and the Semantic Web (Bachelor)			Färber
WT 22/23	7900042	Seminar Programming 3 (Bachelor)			Oberweis
WT 22/23	7900129	Security and Privacy Awareness			Volkamer
WT 22/23	7900174	Seminar IT Security and Privacy (Bachelor)			Oberweis, Volkamer
WT 22/23	7900187	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)			Sure-Vetter
ST 2023	7900090	Seminar Data Science & Real-time Big Data Analytics (Bachelor)			Färber
ST 2023	7900094	Seminar Knowledge Discovery and Data Mining (Bachelor)			Färber
ST 2023	7900135	Seminar Applications of Semantic MediaWiki (Bachelor)			Färber
ST 2023	7900136	Seminar Emerging Trends in Digital Health (Bachelor)			Sunyaev
ST 2023	7900187	Seminar Emerging Trends in Internet Technologies (Bachelor)			Sunyaev
ST 2023	7900199	Seminar Graph Representation Learning (Bachelor)			Färber

ST 2023	7900265	User-adaptive Systems 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 22/23, 2 SWS, Open in study portal	**Seminar (S)** **On-Site**

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 22/23, 3 SWS, Language: German/English, Open in study portal	**Seminar (S)** **On-Site**

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

| V | **Seminar Real-World Challenges in Data Science and Analytics (Bachelor)**
2513314, WS 22/23, 3 SWS, Language: German/English, Open in study portal | **On-Site** |

Content

In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

| V | **Seminar Real-World Challenges in Data Science and Analytics (Master)**
2513315, WS 22/23, 3 SWS, Language: German/English, Open in study portal | **On-Site** |

Content

In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

| V | **Seminar Knowledge Discovery and Data Mining (Bachelor)**
2513308, SS 2023, 3 SWS, Language: English, Open in study portal | **Seminar (S)**
On-Site |

Content

In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science

The exact dates and information for registration will be announced at the event page.

Organizational issues
Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu/.

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 2023, 2 SWS, Language: English, Open in study portal | **Seminar (S)**
On-Site |

Content

In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues

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	**Seminar Graph Representation Learning (Bachelor)** 2513318, SS 2023, 3 SWS, Language: English, Open in study portal	**Seminar (S)** **On-Site**

Content

Graphs are a natural way to represent the information of objects and the topological relationship between them. They are the basis for various applications ranging from recommender systems, finance, social networks, and personal assistants (e.g., Alexa).

In this seminar, students will read, discuss, and work on graph algorithms based on scientific literature, including most recent methods for analyzing and creating large graphs (e.g., link prediction on knowledge graphs using graph neural networks), and methods for making the behavior of neural networks based on graphs explainable (e.g., generating text based on a subgraph).

V	**User-Adaptive Systems Seminar** 2540553, SS 2023, 2 SWS, Language: English, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content

User-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a user-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). It is offered as part of the DFG-funded graduate school "KD2School: Designing Adaptive Systems for Economic Decisions" (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-adaptive system prototype

Prerequisites

Strong analytical abilities and profound software development skills are required.

Organizational issues

Termine werden bekannt gegeben

Literature
Required literature will be made available in the seminar.

T 8.226 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 8.227 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 22/23	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
WT 22/23	2550461	Seminar on Trending Topics in Optimization and Machine Learning (Bachelor)	2 SWS	Seminar / ⚙	Rebennack, Warwicker
WT 22/23	2550472	Seminar on Energy and Power Systems Optimization (Bachelor)	2 SWS	Seminar / ⚙	Rebennack, Warwicker
WT 22/23	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / ⚙	Nickel, Mitarbeiter
ST 2023	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
ST 2023	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
ST 2023	2550461	Seminar: Trending Topics in Machine Learning and Optimization (Bachelor)	2 SWS	Seminar / ⚙	Rebennack, Warwicker
ST 2023	2550472	Seminar: Energy and Power Systems Optimization (Bachelor)	2 SWS	Seminar / ⚙	Rebennack, Warwicker
ST 2023	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / ⚙	Nickel, Mitarbeiter
Exams					
WT 22/23	7900011_WS2223	Seminar in Operations Research B (Bachelor)			Stein
WT 22/23	7900012_WS2223	Seminar in Operations Research A (Master)			Stein
WT 22/23	7900113	Seminar Trending Topics in Optimization and Machine Learning (Bachelor)			Rebennack
WT 22/23	7900342	Seminar Modern OR and Innovative Logistics			Nickel
ST 2023	7900200_SS2023	Seminar in Operations Research A (Master)			Stein
ST 2023	7900201_SS2023	Seminar in Operations Research (Bachelor)			Stein

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V	**Seminar on Methodical Foundations of Operations Research (B)** 2550131, WS 22/23, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **On-Site**

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V	**Seminar: Modern OR and Innovative Logistics** 2550491, WS 22/23, 2 SWS, Language: German, Open in study portal	**Seminar (S)** **Blended (On-Site/Online)**

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
wird auf der Homepage bekannt gegeben

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

| V | **Seminar on Methodical Foundations of Operations Research (B)**
2550131, SS 2023, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
On-Site |

Content

The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature

Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

| V | **Seminar: Modern OR and Innovative Logistics**
2550491, SS 2023, 2 SWS, Language: German, Open in study portal | **Seminar (S)**
Blended (On-Site/Online) |

Content

The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:

If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:

The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Organizational issues

wird auf der Homepage dol.ior.kit.edu bzw. auf dem WiWi-Portal bekannt gegeben

Literature

Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

T 8.228 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 Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 22/23	2500042	Interpretable Statistical and Machine Learning Models	2 SWS	Seminar / 🧩	Lerch
WT 22/23	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter, Görgen
ST 2023	2500004	Predictive Data Analytics - An Introduction to Statistical Machine Learning	2 SWS	Seminar / 🧩	Schienle, Lerch
ST 2023	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Buse, Rüter, Pavlova, Bracher
ST 2023	2550560	Spezielle Themen der Datenanalyse und Statistik	2 SWS	Seminar / 🗣	Grothe, Kaplan, Kächele
Exams					
WT 22/23	7900216	Interpretable Statistical and Machine Learning Models			Lerch
WT 22/23	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)			Schienle
ST 2023	7900204	Seminar in Statistics (Bachelor)			Lerch

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✖ Cancelled

Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Topics in Econometrics
2521310, WS 22/23, 2 SWS, Language: German, Open in study portal   **Seminar (S)**

Organizational issues

Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

| V | **Predictive Data Analytics - An Introduction to Statistical Machine Learning**
2500004, SS 2023, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)**
Blended (On-Site/Online) |

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

| V | **Advanced Topics in Econometrics**
2521310, SS 2023, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)** |

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

T 8.229 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 Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
ST 2023	2149665	Seminar Production Technology	1 SWS	Seminar / 🧩	Fleischer, Lanza, Schulze, Zanger
Exams					
WT 22/23	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze
ST 2023	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 2023, 1 SWS, Language: German, Open in study portal	**Seminar (S) Blended (On-Site/Online)**

Content

In course of the seminar Production Technology current issues of the wbk main fields of research "Manufacturing and Materials Technology", "Machines, Equipment and Process Automation" as well as "Production Systems" are discussed.

The specific topics are published on the homepage of the wbk Institute of Production Science.

Learning Outcomes:

The students ...

- are in a position to independently handle current, research-based tasks according to scientific criteria.
- are able to research, analyze, abstract and critically review the information.
- can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues

siehe http://www.wbk.kit.edu/seminare.php

T	**8.230 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 Examination of another type	Credits 3	Grading scale Grade to a third	Recurrence Each term	Version 1

Events					
WT 22/23	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / 🎤	Reussner, Raabe, Werner, Müller-Quade
WT 22/23	2400142	Seminar Urheberrecht	2 SWS	Seminar / 🎤	Dreier
WT 22/23	2513214	Seminar Information security and Data protection (Bachelor)	2 SWS	Seminar / ❀	Oberweis, Volkamer, Boehm, Alpers, Düzgün, Schiefer, Veit, Ballreich, Gottschalk
ST 2023	2400005	Governance, Risk & Compliance	2 SWS	Seminar / 🎤	Herzig, Siddiq
ST 2023	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar / 🎤	Bless, Boehm, Hartenstein, Mädche, Volkamer, Zitterbart
ST 2023	2400078	Intelligente Chatbots und Recht	2 SWS	Seminar / 🎤	Raabe
ST 2023	2400149	„Vom Original zur Kopie und vom Analogen zum Digitalen"	2 SWS	Seminar / 🎤	Dreier
ST 2023	24820	Current Issues in Patent Law	2 SWS	Seminar / 🎤	Melullis
Exams					
WT 22/23	7500182	Seminar: Legal Studies II			Dreier, Boehm, Raabe
WT 22/23	7500232	Seminar Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection			Reussner
ST 2023	7500106	Title not available			Bless, Hartenstein, Mädche, Zitterbart, Boehm, Sunyaev
ST 2023	7500140	Seminar: Legal Studies I			Dreier, Melullis, Matz

Legend: 🖥 Online, ❀ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Below you will find excerpts from events related to this course:

V	**Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung** 2400061, SS 2023, 2 SWS, Open in study portal	Seminar (S) On-Site

Content

- Registration via https://portal.wiwi.kit.edu/ys/5877

Organizational issues
nach Vereinbarung

T 8.231 Course: Simulation of Coupled Systems [T-MACH-105172]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2023	2114095	Simulation of Coupled Systems	2 SWS	Lecture / 👤	Geimer, Breitfuß
Exams					
WT 22/23	76T-MACH-105172	Simulation of Coupled Systems			Geimer
ST 2023	76T-MACH-105172	Simulation of Coupled Systems			Geimer

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 👤 On-Site, ✗ Cancelled

Competence Certificate

The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at very ordinary examination date.

A registration in mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines.* In case of too many applications, attendance will be granted based on pre-qualification.

Prerequisites

Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108888 must have been passed.

Recommendation

- Knowledge of ProE (ideally in actual version)
- Basic kniwledge of Matlab/Simulink
- Basic knowledge of dynamics of machnies
- Basic knowledge of hydraulics

Annotation

After completion of course, students are able to:

- build a coupled simulation
- parametrize models
- perform simulations
- conduct troubleshooting
- check results for plausibility

The number of participants is limited.

Content:

- Basics of multi-body and hydralics simulation programs
- Possibilities of coupled simulations
- Modelling and Simulation of Mobile Machines using a wheel loader
- Documentation of the result in a short report

Literature:

Software guide books (PDFs)

Information about wheel-type loader specifications

Below you will find excerpts from events related to this course:

V	**Simulation of Coupled Systems** 2114095, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

- Knowledge of the basics of multi-body and hydraulic simulation programs
- Possibilities of coupled simulations
- Development of a simulation model by using the example of a wheel loader
- Documentation of the result in a short report

It is recommended to have:

- Knowledge of ProE (ideally in current version)
- Basic knowledge of Matlab/Simulink
- Basic knowledge of dynamics of machines
- Basic knowledge of hydraulics

- regular attendance: 21 hours
- total self-study: 92 hours

Literature
Weiterführende Literatur:

- Diverse Handbücher zu den Softwaretools in PDF-Form
- Informationen zum verwendeten Radlader

T 8.232 Course: Simulation of Coupled Systems - Advance [T-MACH-108888]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Yusheng Xiang

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type Completed coursework	Credits 0	Grading scale pass/fail	Recurrence Each summer term	Version 1

Exams			
WT 22/23	76-T-MACH-108888	Simulation of Coupled Systems - Advance	Geimer
ST 2023	76-T-MACH-108888	Simulation of Coupled Systems - Advance	Geimer

Competence Certificate
Preparation of semester report

Prerequisites

T 8.233 Course: Social Science A (WiWi) [T-GEISTSOZ-109048]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	5011011	Patterns of ideological polarization in opinion surveys	2 SWS	Seminar / 🧩	Mäs, Banisch
WT 22/23	5011014	Sociology of Technology		Seminar / 🎤	Lösch
ST 2023	5011003	Ego-centered networks	2 SWS	Block / 🎤	Repke
ST 2023	5011013	Digital democracy: worries, opportunities, and challenges	2 SWS	Seminar / 🧩	Mäs
ST 2023	5011019	How to control algorithms?	2 SWS	Seminar / 🎤	Mäs
Exams					
WT 22/23	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 Digital democracy: worries, opportunities, and challenges
5011013, SS 2023, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content

Democracy is under pressure. Populists celebrated election victories in various countries. Studies report dropping trust in institutions. Events such as Brexit, the Capitol-Riots, and the occupation of the entrance to the Bundestag lower confidence in the ability of democratic societies to master the great challenges they face.

It has been argued that not less but more democracy may be the solution. In particular, there is hope that digital methods will allow citizens to participate more in democratic debate and decision making. In contrast, experts warn that existing digital tools such as online social networks demonstrate that a digital approach also has important disadvantages.

This seminar, we will ask whether digital tools can enhance democratic debate and decision making. We will develop quality criteria and apply them to existing digital approaches such as the Conference on the Future of Europe.

V How to control algorithms?
5011019, SS 2023, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content

It has been warned that algorithms might have undesired effects on societies, fostering, for instance, the polarization of political opinions, the spreading of fake news, and the influence of foreign powers on democratic elections.

In this seminar, we will analyze these warning and research testing them. In addition, we will focus on the question how undesired effects of algorithms can be prevented. How should users react? Should governments intervene? Are companies like Facebook and Google responsible?

Organizational issues
Teilnehmende halten einen Kurzvortrag und erstellen einen Seminararbeit.

T 8.234 Course: Social Science B (WiWi) [T-GEISTSOZ-109049]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 22/23	5011011	Patterns of ideological polarization in opinion surveys	2 SWS	Seminar / ⟐	Mäs, Banisch
WT 22/23	5011014	Sociology of Technology		Seminar / 🗣	Lösch
ST 2023	5011003	Ego-centered networks	2 SWS	Block / 🗣	Repke
Exams					
WT 22/23	7400046	Social Science B (WiWi)			Nollmann

Legend: 📱 Online, ⟐ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

T 8.235 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 22/23	00068	Practical Seminar: Eye-based Interaction	Weinhardt
WT 22/23	7900263	Special Topics in Information Systems	Weinhardt

Competence Certificate

The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.

Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

Prerequisites

see below

Recommendation

None

Annotation

All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in "Information Systems" so far. With this course students majoring in "Industrial Engineering and Management" and "Economics Engineering" also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 8.236 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

Responsible:	apl. Prof. Dr. Wolf-Dieter Heller
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101599 - Statistics and Econometrics
	M-WIWI-105414 - Statistics and Econometrics II

Type Written examination	Credits 4,5	Grading scale Grade to a third	Recurrence Each winter term	Version 1

Events					
WT 22/23	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture	Heller

Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites

None

Recommendation

Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Below you will find excerpts from events related to this course:

V	**Statistical Modeling of Generalized Regression Models** 2521350, WS 22/23, 2 SWS, Open in study portal	**Lecture (V)**

Content

Learning objectives:

The student has profound knowledge of generalized regression models.

Requirements:

Knowledge of the contents covered by the course *Economics III: Introduction in Econometrics" [2520016]*.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

T 8.237 Course: Statistics I [T-WIWI-102737]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-100950 - Preliminary Exam
M-WIWI-101432 - Introduction to Statistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2023	2600008	Statistics I	4 SWS	Lecture / 🗣	Krüger
Exams					
ST 2023	7900021	Statistics I			Krüger, Lerch
ST 2023	7900026	Statistics I			Krüger, Lerch

Legend: 🗔 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites

None

Below you will find excerpts from events related to this course:

V Statistics I
2600008, SS 2023, 4 SWS, Language: German, Open in study portal

**Lecture (V)
On-Site**

Content

Learning objectives:

Students understand and apply

- basic concepts of statistical data exploration as well as
- basic definitions and theorems of probability theory.

Content:

A. Descriptive Statistics: univariate und bivariate analysis

B. Probability Theory: probability space, conditional and product probabilities

C. Random variables: location and shape parameters, dependency measures, concrete distribution models

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 60 hours

Preparation and follow-up: 90 hours

Literature

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 8.238 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 22/23	2610020	Statistics II	4 SWS	Lecture / 🗣	Grothe, Lerch
WT 22/23	2610021		2 SWS	Tutorial (	Grothe, Lerch
WT 22/23	2610022	PC-Praktikum zu Statistik II	2 SWS		Grothe, Lerch
Exams					
WT 22/23	7900001	Statistics II			Grothe, Lerch
WT 22/23	7900081	Statistics II			Grothe, Lerch

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 22/23, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives:

The student

- understands and applies the basic definitions and theorems of probability theory,
- transfers these theoretical foundations to problems in parametrical mathematical statistics.

Content:

D. Sampling and Estimation Theory: Sampling distributions, estimators, point and interval estimation
E. Test Theory: General Principles of Hypothesis Testing, Concrete 1- and 2-Sampling Tests
F. Regression analysis: Simple and multiple linear regression, statistical inference

Requirements:

It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2600020].

Workload:

Total workload: 150 hours (5.0 Credits).

Attendance: 30 hours

Preparation and follow-up: 90 hours

Literature

Skriptum: Kurzfassung Statistik II

Weiterführende Literatur:

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

T 8.239 Course: Steuerung mobiler Arbeitsmaschinen [T-MACH-111821]

Responsible:	Simon Becker
	Prof. Dr.-Ing. Marcus Geimer
Organisation:	KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Exams			
ST 2023	76-T-MACH-111821	Control of mobile machines	Becker, Geimer

Competence Certificate

The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites

A prerequisite for participation in the examination is the preparation of a semester report. The preexamination with the code T-MACH-111820 must be passed.

T 8.240 Course: Steuerung mobiler Arbeitsmaschinen-Vorleistung [T-MACH-111820]

Responsible: Simon Becker
                     Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Competence Certificate
Preparation of a report on the completion of the semester task

Prerequisites

T 8.241 Course: Strategic Finance and Technology Change [T-WIWI-110511]

Responsible:	Prof. Dr. Martin Ruckes
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-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 22/23	7900219	Strategic Finance and Technoloy Change		Ruckes
ST 2023	7900268	Strategic Finance and Technoloy Change		Ruckes

Competence Certificate

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

Prerequisites

None

Recommendation

Attending the lecture "Financial Management" is strongly recommended.

## T 8.242 Course: Structural and Phase Analysis [T-MACH-102170]

Responsible: Dr. Manuel Hinterstein
Dr.-Ing. Susanne Wagner

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2125763	Structural and phase analysis	2 SWS	Lecture / 🕪	Wagner
Exams					
WT 22/23	76-T-MACH-102170	Structural and Phase Analysis			Wagner, Hinterstein
ST 2023	76-T-MACH-102170	Structural and Phase Analysis			Wagner, Hinterstein

Legend: 📱 Online, 🕸 Blended (On-Site/Online), 🕪 On-Site, ✗ Cancelled

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V Structural and phase analysis
2125763, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

1. Moderne Röntgenbeugung - Röntgendiffraktometrie für Materialwissenschaftler, Physiker und Chemiker, Spieß, Lothar / Schwarzer, Robert / Behnken, Herfried / Teichert, Gerd B.G. Teubner Verlag 2005
2. H. Krischner: Einführung in die Röntgenfeinstrukturanalyse. Vieweg 1990.
3. B.D. Cullity and S.R. Stock: Elements of X-ray diffraction. Prentice Hall New Jersey, 2001.

T 8.243 Course: Structural Ceramics [T-MACH-102179]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Exams			
WT 22/23	76-T-MACH-102179	Structural Ceramics	Hoffmann, Wagner, Schell

Competence Certificate
Oral examination, 20 min

Prerequisites

T   8.244 Course: Supplement Applied Informatics [T-WIWI-110711]

Responsible:	Professorenschaft des Instituts AIFB
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101426 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate

The assessment of this course is a written or (if necessary) oral examination.

Depending on the particular course associated with this placeholder a bonus on the examination grade is possible.

Prerequisites

None

Annotation

This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but is not equivalent to another course of this topic.

## T 8.245 Course: Sustainable Vehicle Drivetrains [T-MACH-111578]

Responsible:	Prof. Dr. Thomas Koch
	Dr.-Ing. Olaf Toedter
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 22/23	2133132	Sustainable Vehicle Drivetrains	2 SWS	Lecture / 🎤	Toedter
Exams					
WT 22/23	76-T-MACH-105655	Sustainable Vehicle Drivetrains			Toedter

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate
oral exam (20 minutes)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Sustainable Vehicle Drivetrains
2133132, WS 22/23, 2 SWS, Open in study portal

Lecture (V)
On-Site

Content
Sustainability

Environmental balance

Legislation

Alternative fuels

BEV

Fuel cell

Hybrid drives

T 8.246 Course: System Dynamics and Control Engineering [T-ETIT-101921]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101156 - Control Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	2

Events					
WT 22/23	2303155	Systemdynamik und Regelungstechnik	2 SWS	Lecture / ⚙	Hohmann
WT 22/23	2303156	Tutorien zu 2303155 Systemdynamik und Regelungstechnik		Tutorial (/ ⚙	Schneider
WT 22/23	2303157	Übungen zu 2303155 Systemdynamik und Regelungstechnik	1 SWS	Practice / ⚙	Schneider
Exams					
WT 22/23	7303155	System Dynamics and Control Engineering			Hohmann
ST 2023	7303155	System Dynamics and Control Engineering			Hohmann

Legend: ▤ Online, ⚙ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

Prerequisites

T 8.247 Course: Systematic Materials Selection [T-MACH-100531]

Responsible: Dr.-Ing. Stefan Dietrich
                    Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis Materials Science

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	4

Events					
ST 2023	2174576	Systematic Materials Selection	3 SWS	Lecture / 🗣	Dietrich
ST 2023	2174577	Excercises in Systematic Materials Selection	1 SWS	Practice / 🗣	Dietrich
Exams					
WT 22/23	76-T-MACH-100531	Systematic Materials Selection			Dietrich
ST 2023	76-T-MACH-100531	Systematic Materials Selection			Dietrich

Legend: 📱 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
The assessment is carried out as a written exam of 2 h.

Prerequisites
none

Recommendation
Basic knowledge in materials science, mechanics and mechanical design due to the lecture Materials Science I/II.

Below you will find excerpts from events related to this course:

V	**Systematic Materials Selection**	**Lecture (V)**
	2174576, SS 2023, 3 SWS, Language: German, Open in study portal	**On-Site**

Content
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are deeloped. The following topics are covered:

- Information and introduction
- Necessary basics of materials
- Selected methods / approaches of the material selection
- Examples for material indices and materials property charts
- Trade-off and shape factors
- Sandwich materials and composite materials
- High temperature alloys
- Regard of process influences
- Material selection for production lines
- Incorrect material selection and the resulting consequences
- Abstract and possibility to ask questions

learning objectives:
The students are able to select the best material for a given application. They are proficient in selecting materials on base of performance indices and materials selection charts. They can identify conflicting objectives and find sound compromises. They are aware of the potential and the limits of hybrid material concepts (composites, bimaterials, foams) and can determine whether following such a concept yields a useful benefit.

requirements:

WiIng SPO 2007 (B.Sc.)

The course Material Science I [21760] has to be completed beforehand.

WiIng (M.Sc.)

The course Material Science I [21760] has to be completed beforehand.

workload:

The workload for the lecture is 120 h per semester and consists of the presence during the lecture (30 h) as well as preparation and rework time at home (30 h) and preparation time for the oral exam (60 h).

Literature
Vorlesungsskriptum; Übungsblätter; Lehrbuch: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.);
Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen
Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006
ISBN: 3-8274-1762-7

Lecture notes; Problem sheets; Textbook: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.);
Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen
Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006
ISBN: 3-8274-1762-7

T   8.248 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 2023	6020242	Systems of Remote Sensing, Excercise	1 SWS	Practice / 🗣	N.N.
Exams					
WT 22/23	8284101637-1	Systems of Remote Sensing, Prerequisite			Andersen
ST 2023	8284101637	Systems of Remote Sensing, Prerequisite			Andersen

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T   8.249 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 2023	2550486	Tactical and operational SCM	3 SWS	Lecture / ⚙	Nickel
ST 2023	2550487	Übungen zu Taktisches und operatives SCM	1,5 SWS	Practice / ⚙	Pomes, Linner
Exams					
WT 22/23	00021	Tactical and Operational Supply Chain Management			Nickel
ST 2023	7900036	Tactical and Operational Supply Chain Management			Nickel

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Depending on further pandemic developments, the exam will be offered either as an open-book exam, or as a written exam (60 min).

The exam takes place in every semester.

Prerequisite for admission to examination is the successful completion of the online assessments.

Prerequisites

Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation

None

Annotation

The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V	**Tactical and operational SCM**	**Lecture (V)**
	2550486, SS 2023, 3 SWS, Language: German, Open in study portal	**Blended (On-Site/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.

Passing the online exercise is a prerequisite for admission to the exam.

Literature
Weiterführende Literatur

- Domschke: Logistik: Transporte, 5. Auflage, Oldenbourg, 2005
- Domschke: Logistik: Rundreisen und Touren, 4. Auflage, Oldenbourg, 1997
- Ghiani, Laporte, Musmanno: Introduction to Logistics Systems Planning and Control, Wiley, 2004
- Gudehus: Logistik, 3. Auflage, Springer, 2005
- Simchi-Levi, Kaminsky, Simchi-Levi: Designing and Managing the Supply Chain, 3rd edition, McGraw-Hill, 2008
- Silver, Pyke, Peterson: Inventory management and production planning and scheduling, 3rd edition, Wiley, 1998

T 8.250 Course: Team Project Management and Technology [T-WIWI-110968]

Responsible: Prof. Dr. Martin Klarmann
Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105440 - Team Project Management and Technology

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	9	Grade to a third	Each term	1 terms	1

Exams			
WT 22/23	7900207	Team Project Management and Technology	Mädche, Klarmann
ST 2023	7900048	Team Project Management and Technology	Klarmann, Mädche

Competence Certificate
Alternative exam assessment. The basis for grading is the documents produced, the presentations during the course of the project, the artifact to be produced (e.g. algorithm, method, model, software, component) and the final presentation.

T 8.251 Course: Team Project Management and Technology (BUS/ENG) [T-WIWI-110977]

Responsible: Prof. Dr. Martin Klarmann
Prof. Dr. Alexander Mädche

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105447 - Team Project Management and Technology (BUS/ENG)

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	9	Grade to a third	Each term	1 terms	1

Exams			
WT 22/23	7900208	Team Project Management and Technology (BUS/ENG)	Mädche, Klarmann
ST 2023	7900050	Team Project Management and Technology (BUS/ENG)	Klarmann, Mädche

Competence Certificate

Alternative exam assessment. The basis for grading is the documents produced, the presentations during the course of the project, the artifact to be produced (e.g. algorithm, method, model, software, component) and the final presentation.

T   8.252 Course: Tires and Wheel Development for Passenger Cars [T-MACH-102207]

Responsible: Hon.-Prof. Dr. Günter Leister

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2023	2114845	Tires and Wheel Development for Passenger Cars	2 SWS	Lecture / 🗣	Leister
Exams					
WT 22/23	76-T-MACH-102207	Tires and Wheel Development for Passenger Cars			Leister
ST 2023	76-T-MACH-102207	Tires and Wheel Development for Passenger Cars			Leister

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate

Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites

Below you will find excerpts from events related to this course:

V   Tires and Wheel Development for Passenger Cars
2114845, SS 2023, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. The role of the tires and wheels in a vehicle
2. Geometrie of Wheel and tire, Package, load capacity and endurance, Book of requirement
3. Mobility strategy, Minispare, runflat systems and repair kit.
4. Project management: Costs, weight, planning, documentation
5. Tire testing and tire properties
6. Wheel technology incuding Design and manifacturing methods, Wheeltesting
7. Tire presssure: Indirect and direct measuring systems
8. Tire testing subjective and objective

Learning Objectives:

The students are informed about the interactions of tires, wheels and chassis. They have an overview of the processes regarding the tire and wheel development. They have knowledge of the physical relationships.

Organizational issues
Voraussichtliche Termine, nähere Informationen und eventuelle Terminänderungen:

siehe Institutshomepage.

Literature
Manuskript zur Vorlesung

Manuscript to the lecture

T 8.253 Course: Topics in Human Resource Management [T-WIWI-111858]

Responsible:	Prof. Dr. Petra Nieken
Organisation:	KIT Department of Economics and Management
Part of:	M-WIWI-101513 - Human Resources and Organizations
	M-WIWI-105928 - HR Management & Digital Workplace

Type Examination of another type	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each term	**Version** 1

Events					
ST 2023	2573015	Topics in Human Resource Management	2 SWS	Colloquium (K / 🎤	Nieken, Mitarbeiter

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

Competence Certificate

Alternative exam assessment.

The grade is composed of the presentation of a given research topic and active participation in the course discussions. The final grade will be composed of the graded and weighted performance reviews (the weighting depends on the course).

Prerequisites

This course cannot be combined with T-WIWI-102871 "Problem Solving, Communication and Leadership".

Recommendation

We recommend visiting the course "Human Resource Management" before taking this course.
The course is strongly recommended for students interested in empirical research in the areas HRM, personnel economics, and leadership.

Below you will find excerpts from events related to this course:

V Topics in Human Resource Management

2573015, SS 2023, 2 SWS, Language: German, Open in study portal

Colloquium (KOL)
On-Site

Content

The students will discuss and analyze selected research papers in the areas HRM, personnel economics, and leadership. The students will present research papers and discuss research methods and designs as well as content.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of HRM.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
-

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues
Geb. 05.20, Raum 2A-12.1

T   8.254 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	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each winter term	2

Events					
WT 22/23	2149611	Tutorial Global Production	1 SWS	Practice / 🖧	Lanza, Peukert
Exams					
WT 22/23	76-T-MACH-110981	Tutorial Global Production			Lanza
ST 2023	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 22/23, 1 SWS, Language: German, Open in study portal	**Practice (Ü)** **Blended (On-Site/Online)**

Content

The exercise serves as a supplement to the lecture Global Production and deals with the practical implementation of the management of global production networks of manufacturing companies. The contents conveyed in the lecture are put into practice in the exercise and supplemented by lectures from industry and research. The exercise initially builds on a basic understanding of the influencing factors and challenges of global production. Common methods and procedures for planning, designing and managing global production networks are applied in online case studies based on the restructuring of a fictitious company.

According to the lecture, the exercise is divided into three aspects: production strategy, network configuration and network management.

First of all, the exercise shows the connections between the company strategy and the production strategy and highlights the tasks necessary to define a production strategy. Subsequently, in the context of the design of global production networks, methods for site selection, site-specific adaptation of product design and production technology as well as for the establishment of a new production site and the adaptation of existing production networks to changing conditions are taught. With regard to the management of global production networks, the exercise primarily addresses the topic of procurement and supplier management in greater depth.

The topics in detail are:

- Production strategies for global production Networks
- From corporate strategy to production strategy
- Tasks of the production strategy (product portfolio management, recycling management, vertical integration planning, production-related research and development)
- Design of global production Networks
- Ideal-typical network structures
- Planning process for designing the network structure
- Adaptation of the network structure
- Choice of Location
- Production adjustment to suit the Location
- Management of global production Networks
- Coordination in global production Networks
- Procurement process

Learning Outcomes

The students …

- are able to apply defined procedures for site selection and evaluate a site decision with the help of different Methods.
- are capable of selecting adequate design options for site-specific production and product design on a case-specific basis.
- can explain the central elements of the planning process when setting up a new production site.
- are capable of applying the methods for the design and layout of global production networks to individual Company problems.
- are able to show the challenges and potentials of the corporate divisions sales, procurement and research and development on a global level.

Workload:

e-Learning: ~ 20 h
regular attendance: ~ 10 h
self-study: covered in the course of the lecture.

Organizational issues
Start in der dritten Vorlesungswoche.

Termine werden vom Institut bekannt gegeben.

T	**8.255 Course: Vehicle Comfort and Acoustics I [T-MACH-105154]**

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type Oral examination	**Credits** 3	**Grading scale** Grade to a third	**Recurrence** Each winter term	**Version** 1

Events					
WT 22/23	2113806	Vehicle Comfort and Acoustics I	2 SWS	Lecture / 🗣	Gauterin
ST 2023	2114856	Vehicle Ride Comfort & Acoustics I	2 SWS	Lecture / 🗣	Gauterin
Exams					
WT 22/23	76-T-MACH-105154	Vehicle Comfort and Acoustics I			Gauterin
ST 2023	76-T-MACH-105154	Vehicle Comfort and Acoustics I			Gauterin

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Oral Examination

Duration: approx. 30 to 40 minutes

Auxiliary means: none

Prerequisites
Can not be combined with lecture T-MACH-102206

Below you will find excerpts from events related to this course:

V	**Vehicle Comfort and Acoustics I** 2113806, WS 22/23, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content
1. Perception of noise and vibrations
3. Fundamentals of acoustics and vibrations
3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations
4. The relevance of tire and chasis for the acoustic and mechanical driving comfort:
phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

Learning Objectives:

The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings.
They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Kann nicht mit der Veranstaltung [2114856] kombiniert werden.

Can not be combined with lecture [2114856]

Literature

1. Michael Möser, Technische Akustik, Springer, Berlin, 2005

2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

3. Manfred Mitschke, Dynamik der Kraftfahrzeuge, Band B: Schwingungen, Springer, Berlin, 1997

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt

V	**Vehicle Ride Comfort & Acoustics I** 2114856, SS 2023, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Perception of noise and vibrations

3. Fundamentals of acoustics and vibrations

3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations

4. The relevance of tire and chasis for the acoustic and mechanical driving comfort:
phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

Learning Objectives:

The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings.
They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

Organizational issues

Kann nicht mit der Veranstaltung [2113806] kombiniert werden.

Can not be combined with lecture [2113806]

Genaue Termine entnehmen Sie bitte der Institushomepage.

Scheduled dates:

see homepage of the institute.

Classroom attendence depends on the development of the pandemic situation.

Literature

1. Michael Möser, Technische Akustik, Springer, Berlin, 2005

2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

3. Manfred Mitschke, Dynamik der Kraftfahrzeuge, Band B: Schwingungen, Springer, Berlin, 1997

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt

T   8.256 Course: Vehicle Comfort and Acoustics II [T-MACH-105155]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2023	2114825	Vehicle Comfort and Acoustics II	2 SWS	Lecture / 🗣	Gauterin
ST 2023	2114857	Vehicle Ride Comfort & Acoustics II	2 SWS	Lecture / 🗣	Gauterin
Exams					
WT 22/23	76-T-MACH-105155	Vehicle Comfort and Acoustics II			Gauterin
ST 2023	76-T-MACH-105155	Vehicle Comfort and Acoustics II			Gauterin

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Oral Examination

Duration: approx. 30 to 40 minutes

Auxiliary means: none

Prerequisites
Can not be combined with lecture T-MACH-102205

Below you will find excerpts from events related to this course:

V	**Vehicle Comfort and Acoustics II** 2114825, SS 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
- phenomena
- influencing parameters
- types of construction
- optimization of components and systems
- conflicts of goals
- methods of development

3. Noise emission of motor vehicles
- noise stress
- sound sources and influencing parameters
- legal restraints
- optimization of components and systems
- conflict of goals
- methods of development

Learning Objectives:

The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

Organizational issues

Kann nicht mit der Veranstaltung [2114857] kombiniert werden.

Can not be combined with lecture [2114857]

Je nach Pandemie Lage wird evtl. kurzfristig auf "Online Veranstaltung" geändert.

Literature

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.

V	**Vehicle Ride Comfort & Acoustics II** 2114857, SS 2023, 2 SWS, Language: English, Open in study portal	**Lecture (V)** **On-Site**

Content

1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
- phenomena
- influencing parameters
- types of construction
- optimization of components and systems
- conflicts of goals
- methods of development

3. Noise emission of motor vehicles
- noise stress
- sound sources and influencing parameters
- legal restraints
- optimization of components and systems
- conflict of goals
- methods of development

Learning Objectives:

The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

Organizational issues

Genaue Termine entnehmen Sie bitte der Institushomepage.

Kann nicht mit der Veranstaltung [2114825] kombiniert werden.

Scheduled dates:

see homepage of the institute.

Can not be combined with lecture [2114825].

Classroom attendence depends on the development of the pandemic situation

Literature

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.

The script will be supplied in the lectures.

T 8.257 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 22/23	2123375	Virtual Reality Practical Course	3 SWS	Project (P / 🔊	Ovtcharova, Häfner
Exams					
WT 22/23	76-T-MACH-102149	Virtual Reality Practical Course			Ovtcharova, Häfner

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 22/23, 3 SWS, Language: German/English, Open in study portal

Project (PRO)
On-Site

Content

- Introduction in Virtual Reality (hardware, software, applications)
- Exercises in the task specific software systems
- Autonomous project work in the area of Virtual Reality in small groups

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Keine / None

T	**8.258 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 2023	2520517	Welfare Economics	2 SWS	Lecture / 🗣	Puppe
ST 2023	2520518	Übung zur Wohlfahrtstheorie	1 SWS	Practice / 🗣	Puppe, Ammann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
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 2023, 2 SWS, Language: German, Open in study portal	**Lecture (V)** **On-Site**

Content
The lecture "Welfare economics" deals with the question of efficiency and distributional properties of economic allocations, 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. distributional 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)

T 8.259 Course: Workshop Mechatronical Systems and Products (mach/etit/wiwi) [T-MACH-112648]

Responsible:	Prof. Dr.-Ing. Sören Hohmann
	Prof. Dr.-Ing. Sven Matthiesen
Organisation:	KIT Department of Mechanical Engineering
Part of:	M-MACH-106236 - Mechatronic Product Design

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each winter term	1

Events					
WT 22/23	2145162	Workshop Mechatronical Systems and Products	2 SWS	Practical course / 🌳	Matthiesen, Hohmann
Exams					
WT 22/23	76-T-MACH-112648	Titel (Enlisch): Workshop Mechatronical Systems and Products (mach/etit/wiwi)			Hohmann, Matthiesen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🌳 On-Site, ✗ Cancelled

Prerequisites

None