# Module Handbook
# Economics Engineering B.Sc.

SPO 2015

Winter term 2022/23

Date: 04/10/2022

KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT

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# 1 General information

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

## 1.1 Structural elements

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

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

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

## 1.2 Begin and completion of a module

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

## 1.3 Module versions

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

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

## 1.4 General and partial examinations

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

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

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

## 1.5 Types of exams

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

**Caution: exam type dependent on further pandemic developments**

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

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

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

## 1.6 Repeating exams

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

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

## 1.7 Examiners

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

## 1.8 Additional accomplishments

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

## 1.9 Further information

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

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

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

## 1.10 Contact

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

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# 2 Study plan

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

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

| Term | Credits | Business Administration | Economics | | Informatics | Operations Research | Law | Physics ODER Chemistry | | Statistics | Mathematics | Electives | | Internship Bachelor Thesis |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 (WT) | 33 | Mangement and Marketing 5 LP | ECON 1 5 CP | | PROG 1 5 CP | | Civil Law 5 CP Public Law 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 | Public Law 2 3 CP | | | STAT 1 5 CP | MATH 2 7 CP | | | |
| 3 (WT) | 30 | Production, Logistics and Inf. Systems 5 CP | | | INFO 2 5 CP | | | Physics 14 LP | Gen./Inorg. Chemistry 7 CP | STAT 2 5 CP | MATH 3 4 CP | | | |
| 4 (ST) | 30,5 | | ECON 3 5 CP | | | | | | Gen./Inorg. Prac. 7 CP | | | Seminar Module 3 CP | | Internship 10 CP |
| 5 (WT) | 27 | BUS | ECON | ECON | | | | | | | | Elect. Module 9 CP | Elect. Module 9 CP | |
| 6 (ST) | 25,5 | 9 CP | 9 CP | 9 CP | | | | | | | | | | Bachelor Thesis 12 CP |
| | 180 | | | | | | | | | | | | | |

Figure 2: Structure of the Bachelor's degree program in Engineering Economics SPO2015 as of winter semester 2021/2022 (recommended)

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

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

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

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

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

## 3 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 Economics Engineering

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

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

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

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

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

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

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

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

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

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

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

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

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

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

# 5 Key Skills

The Bachelor's degree course in Economics Engineering at the Department of Economics and Management distinguishes itself by an exceptionally high level of interdisciplinarity. With the combination of business science, economics, informatics, operations research, mathematics as well as engineering and natural science, the integration of knowledge of different disciplines is an inherent element of the programme. As a result, interdisciplinary and connected thinking is encouraged in a natural way. The integrative taught key skills, which are acquired throughout the entire programme, can be classified into the following fields:

**Soft skills**

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

**Enabling skills**

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

**Orientational knowledge**

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

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

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

# 6 Field of study structure

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

## 6.1 Preliminary Exam

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

## 6.2 Bachelor's Thesis

Credits
12

| Mandatory | | |
|---|---|---:|
| M-WIWI-101612 | Module Bachelor's Thesis | 12 CR |

## 6.3 Internship

Credits
10

| Mandatory | | |
|---|---|---:|
| M-WIWI-101610 | 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: 1 item)** | | |
| M-WIWI-101467 | Design, Construction and Sustainability Assessment of Buildings | 9 CR |
| M-WIWI-101498 | Management Accounting | 9 CR |
| M-WIWI-101434 | eBusiness and Service Management | 9 CR |
| M-WIWI-101402 | eFinance | 9 CR |
| M-WIWI-101464 | Energy Economics | 9 CR |
| M-WIWI-101435 | Essentials of Finance | 9 CR |
| M-WIWI-105610 | Financial Data Science | 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-101466 | Real Estate Management | 9 CR |
| M-WIWI-101425 | Strategy and Organization | 9 CR |
| M-WIWI-101465 | Topics in Finance I | 9 CR |
| M-WIWI-101423 | Topics in Finance II | 9 CR |
| M-WIWI-105482 | Machine Learning and Data Science | 9 CR |

## 6.5 Economics

**Credits 33**

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

## 6.6 Informatics

**Credits 15**

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

## 6.7 Operations Research

**Credits 9**

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

## 6.8 Law

**Credits 11**

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

## 6.9 Physics or Chemistry

**Credits 14**

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

## 6.10 Statistics

**Credits 10**

| Mandatory | | |
|---|---|---|
| M-WIWI-101432 | Introduction to Statistics | 10 CR |

## 6.11 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 |

| 6.12 Compulsory Elective Modules | Credits |
|---|---|
| | 21 |

**Election notes**

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

| Mandatory | | |
|---|---|---|
| M-WIWI-101816 | Seminar Module | 3 CR |
| **Economics (Election: at most 18 credits)** | | |
| M-WIWI-101499 | Applied Microeconomics | 9 CR |
| M-WIWI-101403 | Public Finance | 9 CR |
| M-WIWI-101420 | Econometrics and Economics | 9 CR |
| M-WIWI-101608 | Statistics and Econometrics | 9 CR |
| M-WIWI-105414 | Statistics and Econometrics II | 9 CR |
| M-WIWI-101668 | Economic Policy I | 9 CR |
| M-WIWI-101501 | Economic Theory | 9 CR |
| **Business Administration (Election: at most 18 credits)** | | |
| M-WIWI-101498 | Management Accounting | 9 CR |
| M-WIWI-101434 | eBusiness and Service Management | 9 CR |
| M-WIWI-101402 | eFinance | 9 CR |
| M-WIWI-101464 | Energy Economics | 9 CR |
| M-WIWI-101435 | Essentials of Finance | 9 CR |
| M-WIWI-105610 | Financial Data Science | 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-101466 | Real Estate Management | 9 CR |
| M-WIWI-101425 | Strategy and Organization | 9 CR |
| M-WIWI-101421 | Supply Chain Management | 9 CR |
| M-WIWI-101465 | Topics in Finance I | 9 CR |
| M-WIWI-101423 | Topics in Finance II | 9 CR |
| M-WIWI-105482 | Machine Learning and Data Science | 9 CR |
| **Informatics (Election: at most 18 credits)** | | |
| M-WIWI-101426 | Electives in Informatics | 9 CR |
| M-WIWI-105112 | Applied Informatics | 9 CR |
| **Operations Research (Election: at most 18 credits)** | | |
| M-WIWI-101413 | Applications of Operations Research | 9 CR |
| M-WIWI-101414 | Methodical Foundations of OR | 9 CR |
| M-WIWI-103278 | Optimization under Uncertainty | 9 CR |
| **Engineering Sciences (Election: at most 18 credits)** | | |
| M-WIWI-101404 | Extracurricular Module in Engineering | 9 CR |
| M-WIWI-104838 | Introduction to Natural Hazards and Risk Analysis | 9 CR |
| M-ETIT-102379 | Power Network | 9 CR |
| M-MACH-101276 | Manufacturing Technology | 9 CR |
| M-BGU-101004 | Fundamentals of Construction | 9 CR |
| M-MACH-101272 | Integrated Production Planning | 9 CR |
| M-MACH-105298 | Logistics and Supply Chain Management | 9 CR |
| M-MACH-101299 | Mechanical Design | 8 CR |
| M-MACH-101277 | Material Flow in Logistic Systems | 9 CR |
| M-MACH-101287 | Microsystem Technology | 9 CR |
| M-BGU-101067 | Mobility and Infrastructure | 9 CR |
| M-MACH-101270 | Product Lifecycle Management | 9 CR |
| M-MACH-101279 | Technical Logistics | 9 CR |

| M-MACH-101275 | Combustion Engines I | 9 CR |
|---|---|---|
| M-MACH-101303 | Combustion Engines II | 9 CR |
| M-MACH-101284 | Specialization in Production Engineering | 9 CR |
| M-MACH-101286 | Machine Tools and Industrial Handling | 9 CR |
| **Statistics (Election: at most 9 credits)** | | |
| M-WIWI-101608 | Statistics and Econometrics | 9 CR |
| M-WIWI-105414 | Statistics and Econometrics II | 9 CR |
| **Law or Sociology (Election: at most 9 credits)** | | |
| M-INFO-101217 | Public Business Law | 9 CR |
| M-INFO-101215 | Intellectual Property Law | 9 CR |
| M-INFO-101216 | Private Business Law | 9 CR |
| M-GEISTSOZ-101167 | Sociology/Empirical Social Research | 9 CR |
| M-INFO-101191 | Commercial Law | 9 CR |

# 7 Modules

## M  7.1 Module: Applications of Operations Research [M-WIWI-101413]

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

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

| 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   7.2 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:**   Compulsory Elective Modules (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 7.3 Module: Applied Microeconomics [M-WIWI-101499]

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

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

| 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.

**Prerequisites**
None.

**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 7.4 Module: Combustion Engines I [M-MACH-101275]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Compulsory Elective Modules (Engineering Sciences)

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

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

**Competence Certificate**

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

**Prerequisites**

None

**Competence Goal**

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

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

**Content**

Working Principle og ICE

Characteristic Parameters

Characteristic parameters

Engine parts

Crank drive

Fuels

Gasolien engine operation modes

Diesel engine operation modes

Emissions

Fundamentals of ICE combustion

Thermodynamics of ICE

Flow field

Wall heat losses

Combsution in Gasoline and Diesel engines

Heat release calculation

Waste heat recovery

CO2-free engine technology

**Workload**

regular attendance: 62 hours
self-study: 208 hours

## M    7.5 Module: Combustion Engines II [M-MACH-101303]

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

**Part of:**    Compulsory Elective Modules (Engineering Sciences)

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

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

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

**Prerequisites**
None

**Competence Goal**
See courses.

**Content**
Compulsory:

Supercharging and air management

Engine mapsEmissions and Exhaust gas aftertreatment

Transient engine operationECU application

Electrification and alternative powertrains

Elective:

Fuels and lubricants for ICE

Fundamentals of catalytic EGA

Analysis tools for combustion diagnostics

Engine measurement techniques

Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines

**Workload**
regular attendance: 62 h

self-study: 208 h

**Learning type**
Lecture, Tutorial

## M   7.6 Module: Commercial Law [M-INFO-101191]

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

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

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

## M   7.7 Module: Constitutional and Administrative Law [M-INFO-101192]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|---|
| 6 | Grade to a tenth | Each term | 2 terms | German | 3 | 5 |

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

**Workload**
See German version.

## M 7.8 Module: Design, Construction and Sustainability Assessment of Buildings [M-WIWI-101467]

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

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

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

**Competence Certificate**
**The module will be discontinued in the winter semester 2022/2023.**

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

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

**Prerequisites**
None

**Competence Goal**
The student

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

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

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

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

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

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

Furthermore a combination with courses in the area of

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

is recommended.

## 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)

| 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, Weinhardt |
| T-WIWI-110797 | eFinance: Information Systems for Securities Trading | 4,5 CR | Weinhardt |
| T-WIWI-109816 | Foundations of Interactive Systems | 4,5 CR | Mädche |
| T-WIWI-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: Econometrics and Economics [M-WIWI-101420]

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

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

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

**Competence Certificate**
See German version.

**Prerequisites**
For further information see German version.

**Competence Goal**
See German version.

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

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

**Recommendation**
None

## M 7.11 Module: Economic Policy I [M-WIWI-101668]

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

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

| **Mandatory** | | | |
|---|---|---|---|
| T-WIWI-103213 | Basic Principles of Economic Policy | 4,5 CR | Ott |
| **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  7.12 Module: Economic Theory [M-WIWI-101501]

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

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

| 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  7.13 Module: Economics [M-WIWI-105204]

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

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

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

**Competence Certificate**

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

**Prerequisites**

None

**Competence Goal**

The student

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

**Content**

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

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

**Annotation**

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

**Workload**

The total workload for this module is approximately 300 hours.

**Recommendation**

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

## M  7.14 Module: eFinance [M-WIWI-101402]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|---|
| 9 | Grade to a tenth | Each term | 2 terms | German/English | 3 | 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-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  7.15 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 7.16 Module: Energy Economics [M-WIWI-101464]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|---|
| 9 | Grade to a tenth | Each term | 1 term | German/English | 3 | 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  7.17 Module: Essentials of Finance [M-WIWI-101435]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|---|
| 9 | Grade to a tenth | Each summer term | 1 term | German | 3 | 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  7.18 Module: Experimental Physics [M-PHYS-100283]

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

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

| Mandatory | | | |
|-----------|--|-------|------------------|
| T-PHYS-100278 | Experimental Physics | 14 CR | Pilawa, Schimmel |

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

**Prerequisites**
none

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

## M  7.19 Module: Extracurricular Module in Engineering [M-WIWI-101404]

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

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

| 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  7.20 Module: Financial Data Science [M-WIWI-105610]

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

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

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

**Competence Certificate**

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

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

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

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

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

**Competence Goal**

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

**Content**

The module covers the following topics:

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

**Annotation**

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

**Workload**

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

## M   7.21 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 | 1 |

| Mandatory | | | |
|---|---|---|---|
| T-WIWI-111595 | Financing 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   7.22 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

| 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   7.23 Module: Foundations of Marketing [M-WIWI-101424]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each term | 1 term | German/English | 3 | 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  7.24 Module: Fundamentals of Construction [M-BGU-101004]

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

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

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

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

| | |
|---|---|
| **Responsible:** | Prof. Dr. Gerhard Satzger<br>Prof. Dr. Christof Weinhardt |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | Business Administration (Specialisation Program Business Administration)<br>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, Weinhardt |
| T-WIWI-109816   Foundations of Interactive Systems | 4,5 CR | Mädche |
| T-WIWI-110888   Practical Seminar: Digital Services | 4,5 CR | Satzger, Weinhardt |

### Competence Certificate

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

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

### 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 | **7.26 Module: General and Inorganic Chemistry [M-CHEMBIO-102335]** |
|---|---|

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

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

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

**Prerequisites**

## M  7.27 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) |

| 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    7.28 Module: Human Resources and Organizations [M-WIWI-101513]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|---|
| 9 | Grade to a tenth | Each term | 2 terms | German | 3 | 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  7.29 Module: Industrial Production I [M-WIWI-101437]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each term | 2 terms | German/English | 3 | 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  7.30 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) |

| 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, Weinhardt |
| T-WIWI-110797 | eFinance: Information Systems for Securities Trading | 4,5 CR | Weinhardt |
| T-WIWI-109816 | Foundations of Interactive Systems | 4,5 CR | Mädche |
| T-WIWI-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  7.31 Module: Integrated Production Planning [M-MACH-101272]

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

**Part of:**   Compulsory Elective Modules (Engineering Sciences)

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

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

**Competence Certificate**
Written Exam (120 min)

**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   7.32 Module: Intellectual Property Law [M-INFO-101215]

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

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

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

**Prerequisites**
None

## M  7.33 Module: Internship [M-WIWI-101610]

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

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

| Mandatory | | | |
|-----------|---|---|---|
| T-WIWI-102756 | Internship | 10 CR | Studiendekan 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**
The student

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

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

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

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

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

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

Vacation days are not figured into the internship.

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

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

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

**Recommendation**
None

## M  7.34 Module: Introduction in Econometrics [M-WIWI-105203]

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

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

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

**Competence Certificate**
See course description.

**Prerequisites**
None.

**Competence Goal**

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

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

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

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

## M   7.35 Module: Introduction to Civil Law [M-INFO-101190]

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

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

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

## M   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:** 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: between 9 and 12 credits) | | | |
|---|---|---|---|
| T-BGU-101500 | Introduction to Engineering Geology | 5 CR | Blum |
| T-BGU-103541 | Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite | 3 CR | Rösch, Wursthorn |
| T-BGU-101681 | Introduction to GIS for Students of Natural, Engineering and Geo Sciences | 3 CR | Rösch, Wursthorn |
| T-BGU-101637 | Systems of Remote Sensing, Prerequisite | 1 CR | Hinz, Weidner |
| T-BGU-101638 | Procedures of Remote Sensing, Prerequisite | 1 CR | Weidner |
| T-BGU-101636 | Remote Sensing, Exam | 4 CR | Hinz, Weidner |
| T-BGU-103542 | Procedures of Remote Sensing | 3 CR | Weidner |
| T-PHYS-103525 | Geological Hazards and Risk | 8 CR | 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

| 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) 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.

**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

| 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: Laboratory Work in Inorganic Chemistry [M-CHEMBIO-104026]** |

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

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

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

**Prerequisites**

## M  7.41 Module: Logistics and Supply Chain Management [M-MACH-105298]

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

**Part of:**    Compulsory Elective Modules (Engineering Sciences)

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each summer term | 1 term | 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  7.42 Module: Machine Learning and Data Science [M-WIWI-105482]

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

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

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

**Competence Certificate**

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

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

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

**Part of:**    Compulsory Elective Modules (Engineering Sciences)

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each winter term | 1 term | German | 4 | 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  7.44 Module: Management Accounting [M-WIWI-101498]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each term | 2 terms | English | 3 | 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    7.45 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  7.46 Module: Manufacturing Technology [M-MACH-101276]

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

**Part of:**   Compulsory Elective Modules (Engineering Sciences)

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

| Mandatory | | |
|-----------|---|---|
| T-MACH-102105   Manufacturing Technology | 9 CR | Schulze |

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

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

**Part of:**  Compulsory Elective Modules (Engineering Sciences)

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

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

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

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

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

**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  7.48 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:**   Compulsory Elective Modules (Engineering Sciences)

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 8 | Grade to a tenth | Each winter term | 2 terms | German | 3 | 4 |

| Mandatory | | | |
|-----------|-----------------------------|--------|-------------|
| T-MACH-112225 | Mechanical Design I and II | 6 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: Methodical Foundations of OR [M-WIWI-101414]

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

| Credits | Grading scale | Recurrence | Duration | Level | Version |
|---|---|---|---|---|---|
| 9 | Grade to a tenth | Each term | 1 term | 3 | 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    7.53 Module: Microsystem Technology [M-MACH-101287]

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

**Part of:**    Compulsory Elective Modules (Engineering Sciences)

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

| Mikrosystemtechnik (Election: at least 9 credits) | | | |
|---|---|---|---|
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers | 3 CR | Heckele, Mappes |
| T-MACH-100967 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II | 3 CR | Guber |
| T-MACH-100968 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III | 3 CR | Guber |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists | 3 CR | Hölscher |
| T-MACH-105182 | Introduction to Microsystem Technology I | 3 CR | Badilita, Jouda, Korvink |
| T-MACH-105183 | Introduction to Microsystem Technology II | 3 CR | Jouda, Korvink |
| T-MACH-101910 | Microactuators | 3 CR | Kohl |
| T-MACH-102080 | Nanotechnology with Clusterbeams | 3 CR | Gspann |
| T-MACH-102152 | Novel Actuators and Sensors | 4 CR | Kohl, Sommer |
| T-ETIT-101907 | Optoelectronic Components | 4 CR | Freude |
| T-MACH-100530 | Physics for Engineers | 6 CR | Dienwiebel, Gumbsch, Nesterov-Müller, Weygand |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology | 3 CR | Last |

**Competence Certificate**
The assessment is carried out as partial exams

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

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

**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  7.54 Module: Mobility and Infrastructure [M-BGU-101067]

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

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

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

**Prerequisites**
none

**Annotation**
none

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

| **M** | **7.55 Module: Module Bachelor's Thesis [M-WIWI-101612]** |
|-------|----------------------------------------------------------|

**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 | Once | 1 term | German | 3 | 6 |

| **Mandatory** | | | |
|---------------|---|---|---|
| T-WIWI-103096 | 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 Economics Engineering and has to refer to subject-specific or interdisciplinary problems.

**Workload**
See German version.

**Recommendation**
None

## M  7.56 Module: Optimization under Uncertainty [M-WIWI-103278]

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

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

| 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   7.57 Module: Power Network [M-ETIT-102379]

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

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

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

## M  7.58 Module: Preliminary Exam [M-WIWI-101726]

**Organisation:** University
**Part of:** Preliminary Exam

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

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

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

**Prerequisites**
none

**Annotation**
*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   7.59 Module: Private Business Law [M-INFO-101216]

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

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

| Private Business Law (Election: at least 1 item as well as at least 9 credits) | | | |
|---|---|---|---|
| T-INFO-111405 | Seminar: Commercial and Corporate Law in the IT Industry | 3 CR | Dreier, Nolte |
| T-INFO-101288 | Corporate Compliance | 3 CR | Herzig |
| T-INFO-102036 | Computer Contract Law | 3 CR | Menk |
| T-INFO-111436 | Employment Law | 3 CR | Hoff |
| T-INFO-111437 | Tax Law | 3 CR | Dietrich |

**Prerequisites**
None

**Competence Goal**
The student

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

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

| M | **7.60 Module: Product Lifecycle Management [M-MACH-101270]** |

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

**Part of:** Compulsory Elective Modules (Engineering Sciences)

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

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

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

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

**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   7.61 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  7.62 Module: Public Business Law [M-INFO-101217]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each term | 2 terms | German | 3 | 6 |

| Public Business Law (Election: at least 1 item as well as at least 9 credits) | | | |
|---|---|---|---|
| T-INFO-101309 | Telecommunications Law | 3 CR | |
| T-INFO-101312 | European and International Law | 3 CR | Brühann |
| T-INFO-111404 | Seminar: IT- Security Law | 3 CR | Schallbruch |
| T-INFO-111406 | Data Protection Law | 3 CR | |

**Competence Certificate**

see course description.

## M  7.63 Module: Public Finance [M-WIWI-101403]

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

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

| 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-109590 | Public Sector Finance | 4,5 CR | Wigger |

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

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

**Competence Goal**
See German version.

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

**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  7.64 Module: Real Estate Management [M-WIWI-101466]

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

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

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

**Competence Certificate**
**The module will be discontinued in the winter semester 2022/2023**

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

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

**Prerequisites**
None

**Competence Goal**
The student

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

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

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

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

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

Furthermore a combination with courses in the area of

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

is recommended.

## M  7.65 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  7.66 Module: Sociology/Empirical Social Research [M-GEISTSOZ-101167]

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

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

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

**Competence Goal**
The student

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

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

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

## M  7.67 Module: Specialization in Production Engineering [M-MACH-101284]

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

**Part of:** Compulsory Elective Modules (Engineering Sciences)

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each term | 2 terms | German | 4 | 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**
none

**Competence Goal**
The students

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

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

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

**Learning type**
Lectures, seminars, workshops, excursions

## M   7.68 Module: Statistics and Econometrics [M-WIWI-101608]

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

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

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

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

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

**Competence Certificate**

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

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

**Competence Goal**

The student

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

**Content**

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

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours.

**Recommendation**

None

## M  7.69 Module: Statistics and Econometrics II [M-WIWI-105414]

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

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

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

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

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

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

**Competence Goal**
The student

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

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

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

## M  7.70 Module: Strategy and Organization [M-WIWI-101425]

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

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

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

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

**Competence Goal**

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

**Content**

The module has a practical and action-oriented structure and provides the student with an up-to-date overview of basic skills concepts and models of strategic management and a realistic picture of possibilities and limitations rational design approaches of the organization.
The focus is firstly on internal and external strategic analysis, concept and sources of competitive advantage, Formulation of competitive and corporate strategies as well as strategy assessment and implementation. Secondly strengths and weaknesses of organizational structures and regulations are assessed on the basis of systematic criteria. Concepts for the organization of organizational structures, the regulation of organizational processes and the control organizational changes are presented.

**Workload**

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

## M    7.71 Module: Supply Chain Management [M-WIWI-101421]

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---------|---------------|------------|----------|----------|-------|---------|
| 9 | Grade to a tenth | Each term | 1 term | German/English | 3 | 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  7.72 Module: Technical Logistics [M-MACH-101279]

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

**Part of:** Compulsory Elective Modules (Engineering Sciences)

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

| Mandatory | | | |
|---|---|---|---|
| T-MACH-109919 | Basics of Technical Logistics I | 4 CR | Mittwollen, Oellerich |
| T-MACH-109920 | Basics of Technical Logistics II | 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  7.73 Module: Topics in Finance I [M-WIWI-101465]

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

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

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

| Credits | Grading scale | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|---|
| 9 | Grade to a tenth | Each term | 1 term | German/English | 3 | 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-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  7.74 Module: Topics in Finance II [M-WIWI-101423]

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

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

| 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-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.

# 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 | | | | |
|---|---|---|---|---|
| ST 2022 | 7900096 | Advanced Lab Blockchain Hackathon (Bachelor) | | Sunyaev |
| WT 22/23 | 7900086 | 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<br>Examination of another type | Credits<br>4,5 | Grading scale<br>Grade to a third | Recurrence<br>Each term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2512204 | Lab Realisation of innovative services (Bachelor) | 3 SWS | Practical course / ⚙ | Schiefer, Schüler, Toussaint |
| ST 2022 | 2512400 | Advanced Lab Development of Sociotechnical Information Systems (Bachelor) | 3 SWS | Practical course / ▯ | Sunyaev, Pandl, Goram |
| ST 2022 | 2512402 | Advanced Lab Blockchain Hackathon (Bachelor) | | Practical course / ▯ | Sunyaev, Beyene, Kannengießer |
| ST 2022 | 2512602 | Project Course Coding da Vinci - Cultural Heritage Hackathon (Bachelor) | 3 SWS | Practical course / ⚙ | Sack, Bruns, Tietz |
| ST 2022 | 2612554 | Practical lab Security, Usability and Society (Bachelor) | 3 SWS | Practical course / ▯ | Volkamer, Strufe, Mayer, Berens, Mossano, Düzgün, Hennig, Veit |
| WT 22/23 | 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 |
| 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, Düzgün, Veit, Hennig |
| WT 22/23 | 2512555 | Praktikum Security, Usability and Society (Master) | 3 SWS | Practical course / ▯ | Volkamer, Mayer, Berens, Mossano, Düzgün, Veit, Hennig |
| **Exams** | | | | | |
| ST 2022 | 7900016 | Advanced Lab Development of Sociotechnical Information Systems (Bachelor) | | | Sunyaev |
| ST 2022 | 7900028 | Advanced Lab Coding da Vinci - Cultural Heritage Hackathon (Bachelor) | | | Sack |
| ST 2022 | 7900029 | Practical lab Security, Usability and Society (Bachelor) | | | Volkamer |
| ST 2022 | 7900085 | Advanced Lab Realization of innovative services (Bachelor) | | | Oberweis |
| ST 2022 | 7900096 | Advanced Lab Blockchain Hackathon (Bachelor) | | | Sunyaev |
| 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 |

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)**<br>2512204, SS 2022, 3 SWS, Language: German, Open in study portal | **Practical course (P)**<br>**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)**<br>2512400, SS 2022, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**<br>**Online** |
|---|---|---|

**Content**
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

| V | **Project Course Coding da Vinci - Cultural Heritage Hackathon (Bachelor)**<br>2512602, SS 2022, 3 SWS, Language: English, Open in study portal | **Practical course (P)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**

**Cultural heritage** includes tangible and intangible heritage assets inherited from past generations. Cultural heritage data are usually stored in galleries, museums, archives and libraries (GLAM institutions) and in recent years, efforts by culture domain experts and computer scientists have begun to make this data more findable, accessible, interoperable and reusable by the general public, but also by researchers in the domains of history, social science, etc. This seminar follows up on these efforts by having student groups participate in the official Coding da Vinci culture hackathon with guidance and coaching by the course tutors.

**The culture hackathon Coding da Vinci** has brought together the cultural sector with creative technology communities to explore the creative potential of digital cultural heritage. Over a sprint of seven weeks the hackathon teams, together with representatives of cultural institutions, develop working prototypes that show surprising and inspiring new ways to make use of institutions' collections and artifacts in the digital age.

As part of this "Projektpraktikum", the students will take part in the official hackathon "Coding da Vinci Baden-Württemberg" (https://codingdavinci.de/index.php/de/events/baden-wuerttemberg-2022). They will form groups and implement their own interesting culture project by using the dataset(s) provided by Coding da Vinci. The goal is to create a project that is useful for the culture community and helps to explore and experience cultural heritage data in an interesting, innovative and fun way.

This "Projektpraktikum" is furthermore a chance to network with the community of culture enthusiasts and developers while creating a working application that adds value to the community. The groups will present their work at the official Codings da Vinci kick-off event and the award ceremony.

**Contributions of the students:**

The students will form groups of 3-4 people. They will be expected to first get familiar with datasets presented in the event, the technologies and methods they will utilize and will develop their own project idea. Each group will present their **project idea on May 07, 2022** at the Coding da Vinci BW kick-off and will officially start the implementation of their project. On **June 24, 2022**, each group will present their **final projec**t at the official Coding da Vinci BW award ceremony. Following the event, each group will prepare a scientific seminar paper of not more than 16 pages.

**Implementation:**

Each group will implement their project idea based on the datasets given in the event  using open source software and will publish their code using an open license via github.

**Learning Goals:**

- Basic understanding of knowledge graphs and Natural Language Processing
- Independent and self-organized realization of a group project
- Planning and execution of design, implementation and quality assurance of the group project
- Preparation of a scientific seminar paper for the group  project of 16 pages
- Presentation of the group project  in a comprehensible and structured manner

**Registration:**

The registration period for this course lasts from 01.02.2022 until 22.04.2022. The places are expected to be allocated on 25.04.2022 and must be accepted by the student within two days.
If you have any questions regarding the registration or course content, please contact tabea.tietz@kit.edu and oleksandra.bruns@kit.edu .

**Modules**: Informatik

**Timeline:**

20.04.2022 Plenary meeting: Introduction and Course Organization

27.04.2022 Plenary meeting: Forming of student groups and discussion of datasets

07.05.2022 Official Coding da Vinci Kick-off Event: Presentation of group idea

11.05.2022 Individual group sessions: Fixing a project plan and timeline

18.05.2022 Individual group sessions: Weekly progress meeting

25.05.2022 Individual group sessions: Weekly progress meeting

01.06.2022 Individual group sessions: Weekly progress meeting

08.06.2022 Individual group sessions: Weekly progress meeting

15.06.2022 Individual group sessions: Weekly progress meeting

22.06.2022 Individual group sessions: Weekly progress meeting

24.06.2022 Official Coding da Vinci Award Ceremony: Final Presentation

17.08.2022 Seminar paper submission and finalization (and documentation) of the code

**Organizational issues**
Considering the then current pandemic situation and in coordination with the participants the course will mostly taking place as online course with potentially a few "live" events (cf further description below).

| V | **Practical lab Security, Usability and Society (Bachelor)**<br>2612554, SS 2022, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**<br>**Online** |
|---|---|---|

**Content**

The internship Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on hte WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu before the kick-off. You can find a better description of the topics in ILIAS (link below). Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

ILIAS link: https://ilias.studium.kit.edu/goto.php?target=crs_1792110&client_id=produktiv

**Important dates**:

Kick-off: 19.04.2022, 9:00-10:00 CET Uhr Microsoft Teams - - Link

Report + code submission : 09.09.2022, 23:59 CET

Presentation deadline : 25.09.2022, 23:59 CET

Presentation day: 28.09.2022, 16:00 CET

Topics:

**Programming Usable Security Intervention**

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

- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Improving the PassSec+ browser extension by investigating a security vulnerability in Mozilla Firefox Relay
- Development of a tool for the automated search for tweets on the topic of "phishing"
- Hacking TORPEDO
- Restructuring TORPEDO

Please, note that registration is not required to participate in the kick-off meeting.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

| V | **Lab Realisation of innovative services (Bachelor)**<br>2512204, WS 22/23, 3 SWS, Language: German, Open in study portal | **Practical course (P)**<br>**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)**<br>2512554, WS 22/23, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**<br>**Online** |
|---|---|---|

**Content**

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

**Important dates:**

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

Presentation day: 01.02.2023

Topics:

**Programming Usable Security Intervention**

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

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

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

**Designing Security User studies**

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

Title: NoPhish Cardgame
Number of students: 1/2 Bachelor level
Description: Das NoPhish Konzept findet bereits in vielen Formen Anwendung. Es hilft dabei betrügerische Nachrichten von legitimen zu Unterscheiden. Die neueste Form ist ein Cardgame bei dem man spielerisch lernen kann Phishing zu erkennen. Hierbei wird sowohl grundlegendes Wissen, als auch konkretes Wissen vermittelt. Aufgabe: Erheben von Daten (Studiendesign ist bereits vorhanden) und Auswertung bestehender Daten mit neu erhobenen Daten

Title: Analysing the percetions on email subject extensions like 'Caution - This e-mail is sent from someone outside the company'
Number of students: 1/2 Bachelor or Master level
Description: Email subject extensions are used in myn organistions to reduce the risk to become a victim of a phishing email - why should your boss e.g. send you an external email? Likely to be a phish! The idea is to develope the study protocol and to collect first data which should be analysed.

Title: Benutzerstudie zur Erkennung von Angriffen auf die E-Mail Absicherung mit S/MIME-Zertifikaten
Number of students: 2 Bachelor or Master level
Description: Das KIT bietet den Beschäftigten und Studierenden die Möglichkeit, ihre E-Mail-Kommunikation mittels S/MIME-Zertifikaten abzusichern. Für die Nutzenden entsteht hierbei die Herausforderung, eingehende Nachrichten hinsichtlich gültiger Signatur und Verschlüsselung zu prüfen und mögliche Angriffe zu erkennen. Zielsetzung dieser Arbeit ist die Konzeption und Erstellung einer Nutzerstudie zur Evaluation von Schulungsmaterialien. Die Studie soll verschiedene Nutzungsszenarien bei der Erkennung von Angriffen (z.B. durch ungültige Zertifikate) und das Verhalten der Nutzenden innerhalb dieser Szenarien umfassen.

Title: Evaluation of the Sudoku Privacy Friendly App usability for users with rheumatoid arthritis (English only)
Number of students: 1 Bachelor or Master level
Description: The Privacy Friendly Apps are a set of applications developed by the SECUSO group that do not contain any advertisement or tracking mechanism, hence preserving the privacy of their users (https://secuso.aifb.kit.edu/english/105.php). One of these apps is "Sudoku", available for Android on both the Google Store and F-Droid. Although the app is friendlier to privacy that other alternatives, it requires multiple tactile interactions with the mobile device. This can be an issue for users with reduced hand mobility, such as those suffering from rheumatoid arthritis. To approximate the reduced mobility caused by reumatoid arthritis in healthy users, it is common to use arthritis simulation gloves (e.g., https://idarinstitute.com/products/arthritis-simulation-gloves). The task of the student is to design a lab study involving arthritis simulation gloves that evaluates the Sudoku app usability for users suffering from rheumatoid arthritis,.

Title: Replication and extension of "What is this URL's destination?" (English only)

Number of students: 1 Bachelor level

Description: Replication of studies is a fundamental part of the scientific process: it allows to confirm or deny experimental results and can open new lines of research. This topic is a replication of the study presented in Albakry, S., Vaniea, K. & Wolters, M.K. (2020) What is this URL's destination? Empirical Evaluation of Users' URL Reading" (https://doi.org/10.1145/3313831.3376168). The student will re-implement the study following the precise description from the original authors, run it and then compare the results with the previous iteration.

Title: Password Generator Defaults

Number of students: 2 Bachelor or Master level

Description: Password Managers are useful tools that help the use of complex passwords and avoid the password recycle practice. Moreover, they support users by providing password generator tools, that create random password of specific length. However, the defaults settings might be at odds with the password policies of popular website, e.g., they can contain forbidden characters or be too long/short. Moreover, we need to understand if Password Managers users change the default settings to generate passwords, in how many cases and for what reasons. The students task is therefore two-folds: (1) compare the default settings of several Password Managers to the privacy policies of popular websites; (2) design and implement a survey to collect the behavior of Password Managers users with regard to the password generator tools.

Title: Benutzerstudie zur Auswertung der PassSec+ Browser Extension mittels Eye-Tracking

Number of students: 1/2 Bachelor or Master level

Description: PassSec+ ist eine von SECUSO entwickelte Browser-Erweiterung für Firefox und Google Chrome, die hilft, Passwörter, Zahlungsdaten und andere sensible Daten besser zu schützen, indem es bereits vor der Eingabe dieser Daten prüft, ob eine sichere Dateneingabe gewährleistet ist und im Zweifel ein Dialog anzeigt, welcher den Nutzer bei der Entscheidung unterstützt. In der Nutzerstudie soll untersucht werden, wo der Fokus des Nutzers mit und ohne Benutzung von PassSec+ liegt und dabei die Effektivität zur Prävention vor Phishing untersucht werden. Es wird das Setup sowie der Aufbau der Studie bereits vorgegeben. Ziel ist es, die Nutzerstudie mit Probanden durchzuführen und die Daten entsprechend z.B. mit Heatmaps auszuwerten.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

| | | |
|---|---|---|
| **V** | **Praktikum Security, Usability and Society (Master)**<br>2512555, WS 22/23, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**<br>**Online** |

**Content**

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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.

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Number of students: 2 Bachelor or Master level
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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.

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Number of students: 2 Bachelor or Master level
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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.

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Title: User study on user's knowledge about brainwaves verification
Number of students: 1 Master level
Description: Brainwaves can be used to authenticate users. Hoerver, several questions are left unanswered regarding the users' stance on this: What is the prior knowledge of users about verification and brainwaves? Are they comfortable wearing a device to record their brainwaves? How are they feeling regarding storing their brainwaves samples? Which kind of information can be extracted from the smaples? How secure would such an authentication scheme be? The task of the student is to design, implement an pre-test a user study investigating these questions.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

# T  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<br>Examination of another type | Credits<br>4,5 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2612554 | Practical lab Security, Usability and Society (Bachelor) | 3 SWS | Practical course / 📱 | Volkamer, Strufe, Mayer, Berens, Mossano, Düzgün, Hennig, Veit |
| WT 22/23 | 2512554 | Praktikum Security, Usability and Society (Bachelor) | 3 SWS | Practical course / 📱 | Volkamer, Mayer, Berens, Mossano, Düzgün, Veit, Hennig |
| WT 22/23 | 2512555 | Praktikum Security, Usability and Society (Master) | 3 SWS | Practical course / 📱 | Volkamer, Mayer, Berens, Mossano, Düzgün, Veit, Hennig |
| **Exams** | | | | | |
| ST 2022 | 7900029 | Practical lab Security, Usability and Society (Bachelor) | | | Volkamer |
| WT 22/23 | 7900116 | Advanced Lab Security, Usability and Society (Bachelor) | | | Volkamer |
| WT 22/23 | 7900307 | Advanced Lab Security, Usability and Society (Master) | | | Volkamer |

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

## Competence Certificate

The alternative exam assessment consists of:

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

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

## Prerequisites

None

## Recommendation

Knowledge from the lecture "Information Security" is recommended.

## Annotation

The course is expected to be offered from winter term 2018/2019.

## Contents:

In the course of the programming lab, changing topics from the field of Human Factors in Security und Privacy will be worked on.

## Learning goals:

The student

- can apply the basics of information security
- is able to implement appropriate measures to achieve different protection goals
- can structure a software project in the field of information security
- can use the Human Centred Security and Privacy by Design technique to develop user-friendly software
- can explain and present technical facts and the results of the programming lab in oral and written form

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

| V | **Practical lab Security, Usability and Society (Bachelor)**<br>2612554, SS 2022, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**<br>**Online** |
|---|---|---|

**Content**

The internship Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on hte WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu before the kick-off. You can find a better description of the topics in ILIAS (link below). Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

ILIAS link: https://ilias.studium.kit.edu/goto.php?target=crs_1792110&client_id=produktiv

**Important dates**:

Kick-off: 19.04.2022, 9:00-10:00 CET Uhr Microsoft Teams - - Link

Report + code submission : 09.09.2022, 23:59 CET

Presentation deadline : 25.09.2022, 23:59 CET

Presentation day: 28.09.2022, 16:00 CET

Topics:

**Programming Usable Security Intervention**

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

- Portfolio Graphical Recognition-Based Passwords with Gamepads
- Improving the PassSec+ browser extension by investigating a security vulnerability in Mozilla Firefox Relay
- Development of a tool for the automated search for tweets on the topic of "phishing"
- Hacking TORPEDO
- Restructuring TORPEDO

Please, note that registration is not required to participate in the kick-off meeting.

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| V | **Praktikum Security, Usability and Society (Bachelor)**<br>2512554, WS 22/23, 3 SWS, Language: German/English, Open in study portal | **Practical course (P)**<br>**Online** |
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Presentation deadline : 30.01.2023, 23:59 CET

Presentation day: 01.02.2023

Topics:

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**Content**

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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) .

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2512400 | Practical Course Sociotechnical Information Systems Development (Bachelor) | 3 SWS | Practical course / 📱 | Sunyaev, Pandl, Goram |

| Exams | | | | |
|---|---|---|---|
| ST 2022 | 7900016 | Advanced Lab Development of Sociotechnical Information Systems (Bachelor) | Sunyaev |
| WT 22/23 | 7900080 | 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 | | | |
|-------|--------|--------------------------------------------------------|-------|
| ST 2022 | 7900049 | Advanced Programming - Application of Business Software | Klink |
| WT 22/23 | 7900019 | Advanced Programming - Application of Business Software | |

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 2022 | 2511020 | Advanced Programming - Java Network Programming | 2 SWS | Lecture / 🗣 | Ratz, Stegmaier, Polley |
| ST 2022 | 2511021 | Tutorium zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java | 1 SWS | Tutorial ( / ⛓ | Ratz, Stegmaier, Polley |
| ST 2022 | 2511023 | Rechnerpraktikum zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java | 2 SWS | / ⛓ | Ratz, Stegmaier, Polley |
| **Exams** | | | | | |
| ST 2022 | 7900041 | Advanced Programming - Java Network Programming | | | Ratz |
| WT 22/23 | 7900020 | 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** | Lecture (V) |
|---|---|---|
| | 2511020, SS 2022, 2 SWS, Language: German, Open in study portal | **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 |

| **Events** | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2520527 | Advanced Topics in Economic Theory | 2 SWS | Lecture / 🗣 | Mitusch, Brumm |
| ST 2022 | 2520528 | Übung zu Advanced Topics in Economic Theory | 1 SWS | Practice / 🗣 | Pegorari, Corbo |
| **Exams** | | | | | |
| ST 2022 | 00227 | Advanced Topics in Economic Theory | | | Mitusch, Brumm |
| ST 2022 | 7900269 | Advanced Topics in Economic Theory | | | Mitusch, Brumm |

Legend: 📱 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

**Prerequisites**
None

**Recommendation**
This course is designed for advanced Master students with a strong interest in economic theory and mathematical models. Bachelor students who would like to participate are free to do so, but should be aware that the level is much more advanced than in other courses of their curriculum.

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

| V | **Advanced Topics in Economic Theory** | Lecture (V) |
|---|---|---|
| | 2520527, SS 2022, 2 SWS, Language: English, Open in study portal | On-Site |

**Literature**
Die Veranstaltung wird in englischer Sprache angeboten:

The course is based on the excellent textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

## T  8.8 Course: Agile Product Innovation Management - Value-driven Planning of New Products [T-MACH-106744]

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

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

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

**Competence Certificate**
Oral examination, 20 min.

**Prerequisites**
None

## T  8.9 Course: Analalysis of Social Structurs (WiWi) [T-GEISTSOZ-109047]

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

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 5011007 | Analysis of Social Structures | 2 SWS | Practice / 📱 | Nollmann |

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

## T   8.10 Course: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

**Responsible:**    Dr.-Ing. Marcus Gohl
**Organisation:**   KIT Department of Mechanical Engineering

**Part of:**    M-MACH-101303 - Combustion Engines II

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 4 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2134150 | Gas, lubricating oil and operating media analysis in drive train development | 2 SWS | Lecture / 🔊 | Gohl |
| **Exams** | | | | | |
| ST 2022 | 76--T-Mach-105173 | Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines | | | Gohl |
| WT 22/23 | 76-T-MACH-105173 | Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines | | | Koch |

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

**Competence Certificate**
Letter of attendance or oral exam (25 minutes, no auxillary means)

**Prerequisites**
none

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

| V | **Gas, lubricating oil and operating media analysis in drive train development** <br> 2134150, SS 2022, 2 SWS, Language: German, Open in study portal | Lecture (V) <br> On-Site |
|---|---|---|

**Literature**
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.

## T    8.11 Course: Analysis of Multivariate Data [T-WIWI-103063]

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

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

| Exams | | | | |
|-------|-------|-------------------------------|--------|
| ST 2022 | 7900344 | Analysis of Multivariate Data | Grothe |

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

**Prerequisites**
None

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

**Annotation**
The lecture is not offered regularly. The courses planned for three years in advance can be found online.

## T  8.12 Course: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

**Responsible:** Jürgen Pfeil
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101303 - Combustion Engines II

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Oral examination | 4 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|--------|--------|--------------------------------|--------|----------------|-------|
| ST 2022 | 2134134 | Analysis tools for combustion diagnostics | 2 SWS | Lecture / 🗣 | Pfeil |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105167 | Analysis Tools for Combustion Diagnostics | | | Koch |
| WT 22/23 | 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**<br>2134134, SS 2022, 2 SWS, Language: German, Open in study portal | Lecture (V)<br>On-Site |
|---|---|---|

**Literature**
Skript, erhältlich in der Vorlesung

## 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** | | | | | |
| ST 2022 | 79AIFB_AKI_C1 | Applied Informatics - Applications of AI (Registration until 18 July 2022) | | | Färber |
| WT 22/23 | 79AIFB_AKI_C1 | Applied Informatics - Applications of Artificial Intelligence | | | 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**<br>2511314, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**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** <br> 2511315, WS 22/23, 1 SWS, Language: German, Open in study portal | **Practice (Ü)** <br> **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 2022 | 2511200 | Applied Informatics - Database Systems | 2 SWS | Lecture / 🗣 | Sommer |
| ST 2022 | 2511201 | Exercises Applied Informatics - Database Systems | 1 SWS | Practice / 🗣 | Sommer |
| **Exams** | | | | | |
| ST 2022 | 79AIFB_DBS_B1 | Applied Informatics - Database Systems (Registration until 18 July 2022) | | | Oberweis |
| WT 22/23 | 79AIFB_DBS_C3 | Applied Informatics - Database Systems | | | 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 2022, 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**<br>2511201, SS 2022, 1 SWS, Language: German, Open in study portal | **Practice (Ü)**<br>**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 | Each summer term | 4 |

| Events | | | | | |
|--------|--------|-------------------------------------------|--------|--------------|-----------------|
| ST 2022 | 2511550 | Applied Informatics - Information Security | 2 SWS | Lecture / 🗣 | Volkamer, Mayer |
| ST 2022 | 2511551 | Exercise Applied Informatics - Information Security | 1 SWS | Practice / 🗣 | Volkamer, Berens |
| **Exams** | | | | | |
| ST 2022 | 79AIFB_IS_A1 | Applied Informatics - Information Security (Registration until 18 July 2022) | | | Volkamer |
| WT 22/23 | 79AIFB_IS_A3 | Applied Informatics - Information Security | | | Volkamer |

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation, 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.

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

| V | **Applied Informatics - Information Security**<br>2511550, SS 2022, 2 SWS, Open in study portal | **Lecture (V)**<br>**On-Site** |
|---|---|---|

**Content**

- Basics and concepts of information security
- Understanding the protection objectives of information security and various attack models (including associated assumptions)
- introduction of measures to achieve the respective protection goals, taking into account different attack models
- Note: In contrast to the IT Security lecture, measures such as encryption algorithms are treated only abstractly, i. e. the idea of the measure, assumptions to the attacker and the deployment environment.
- Presentation and analysis of problems of information security arising from human-machine interaction and presentation of the Human Centered Security by Design approach.
- Introduction into organisational protective measures and standards to be observed for companies

**Learing objectives:**

The student

- can explain the basics of information security
- knows suitable measures to achieve different protection goals
- can assess the quality of organisational protective measures, i. e. among other things knows what has to be taken into account when using the individual measures
- understands the differences between information security in the organisational and in the private context
- knows the areas of application of different standards and knows their weaknesses
- knows and can explain the problems of information security that which arise from human-machine interaction
- is able to deal with messages concerning found security problems in a critical way.

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

**Literature**

- P. Gerber, M. Ghiglieri, B. Henhapl, O. Kulyk, K. Marky, P. Mayer, B. Reinheimer, and M. Volkamer, *Human Factors in Security*. Springer, Jan. 2018, pp. 83–98.
- C. Eckert, *IT-Sicherheit: Konzepte-Verfahren-Protokolle*. Walter de Gruyter, 2013

| **V** | **Exercise Applied Informatics - Information Security**<br>2511551, SS 2022, 1 SWS, Open in study portal | **Practice (Ü)**<br>**On-Site** |
|---|---|---|

**Content**

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

## 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 | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each winter term | 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** | | | | | |
| ST 2022 | 79AIFB_AI1_B2 | Applied Informatics - Modelling (Registration until 18 July 2022) | | | Oberweis |
| WT 22/23 | 79AIFB_AI1_C5 | Applied Informatics - Modelling | | | Oberweis, Färber |

Legend: 🗐 Online, ✥ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
The assessment consists of a written examination (60 min) in the first week after lecture period (according to Section 4 (2),1 of the examination regulation).

**Prerequisites**
None

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

| V | **Applied Informatics - Modelling** | Lecture (V) |
|---|---|---|
| | 2511030, WS 22/23, 2 SWS, Language: German, Open in study portal | 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.

| | **Exercises to Applied Informatics - Modelling** | **Practice (Ü)** |
|---|---|---|
| V | 2511031, WS 22/23, 1 SWS, Language: German, Open in study portal | **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 2022 | 2511032 | Applied Informatics - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services | 2 SWS | Lecture / 🗣 | Sunyaev |
| ST 2022 | 2511033 | Übungen zu Angewandte Informatik - Internet Computing | 1 SWS | Practice / 🗔 | Sunyaev, Teigeler, Beyene |
| **Exams** | | | | | |
| ST 2022 | 79AIFB_AI2_A2 | Applied Informatics - Internet Computing (Registration until 18 July 2022) | | | Sunyaev |
| WT 22/23 | 79AIFB_AI2_A1 | Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services | | | Sunyaev |

Legend: 🗔 Online, ⚛ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

Successful participation in the exercise by submitting correct solutions to 50% of the exercises can earn a grade bonus. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Prerequisites**

None

**Annotation**

Replaces from winter semester 2019/2020 T-WIWI-109445 "Applied Informatics - Internet Computing".

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

| V | **Applied Informatics - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services** <br> 2511032, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)** <br> **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** Written examination | **Credits** 4,5 | **Grading scale** Grade to a third | **Recurrence** Each summer term | **Version** 2 |
|---|---|---|---|---|

| **Events** | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2511206 | Applied Informatics - Software Engineering | 2 SWS | Lecture / 🗣 | Oberweis |
| ST 2022 | 2511207 | Übungen zu Angewandte Informatik - Software Engineering | 1 SWS | Practice / 🗣 | Oberweis, Forell, Frister, Schüler, Fritsch |
| **Exams** | | | | | |
| ST 2022 | 79AIFB_SE_B3 | Applied Informatics - Software Engineering (Registration until 18 July 2022) | | | Oberweis |
| WT 22/23 | 79AIFB_SE_B1 | Applied Informatics - Software Engineering | | | 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 2022, 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<br>Written examination | Credits<br>5 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Version<br>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 |

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**<br>2149921, WS 22/23, 2 SWS, Language: German, Open in study portal | Lecture (V)<br>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 2022 | 2560550 | Auction and Mechanism Design | 2 SWS | Lecture / 🗨 | Huber, Szech, Rosar |
| ST 2022 | 2560551 | Übung zu Auction and Mechanism Design | 1 SWS | Practice / 🗨 | Szech, Rau, Huber |
| **Exams** | | | | | |
| ST 2022 | 7900161 | Exam Auction & Mechanism Design | | | Szech |

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

**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A bonus can be earned through successful participation in the excercise. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**
None

**Recommendation**
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

**Annotation**
The lecture will be held in English.

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

| V | **Auction and Mechanism Design** | Lecture (V) |
|---|----------------------------------|-------------|
|   | 2560550, SS 2022, 2 SWS, Language: English, Open in study portal | **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: 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 |

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. The written exam will either take place in the lecture hall or online, depending on further pandemic developments. Further details will be announced during the lecture.

**Prerequisites**

None.

**Annotation**

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  8.22 Course: Bachelor's Thesis [T-WIWI-103096]

| | |
|---|---|
| **Responsible:** | Studiendekan des KIT-Studienganges |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101612 - 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 |

**Recommendation**
See module description

**Annotation**
See module description

## T  8.23 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 2022 | 2560280 | Basic Principles of Economic Policy | 2 SWS | Lecture / 🗣 | Ott |
| ST 2022 | 2560281 | Exercises of Basic Principles of Economic Policy | 1 SWS | Practice / 🗣 | Scheidt, Zoroglu |
| **Exams** | | | | | |
| ST 2022 | 7900106 | Basic Principles of Economic Policy | | | Ott |
| WT 22/23 | 7900079 | Basic Principles of Economic Policy | | | Ott |

Legend: 🗎 Online, ⚇ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
Depending on further pandemic developments, the examination will be offered 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**<br>2560280, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**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**<br>2560281, SS 2022, 1 SWS, Language: German, Open in study portal | **Practice (Ü)**<br>**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  8.24 Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

| | |
|---|---|
| **Responsible:** | Gerd Gutekunst |
| | Prof. Dr. Berthold Wigger |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101403 - Public Finance |
| | M-WIWI-101423 - Topics in Finance II |
| | M-WIWI-101465 - Topics in Finance I |

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2560134 | Basics of German Company Tax Law and Tax Planning | 3 SWS | Lecture / 🗣 | Wigger, Gutekunst |
| **Exams** | | | | | |
| ST 2022 | 790unbe | Basics of German Company Tax Law and Tax Planning | | | Wigger |
| WT 22/23 | 790unbe | Basics of German Company Tax Law and Tax Planning | | | Wigger |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5 h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course "Öffentliche Einnahmen" beforehand.

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

| V | **Basics of German Company Tax Law and Tax Planning** 2560134, WS 22/23, 3 SWS, Language: German, Open in study portal | **Lecture (V)** **On-Site** |
|---|---|---|

**Content**
**Workload:**

The total workload for this course is approximately 135.0 hours. For further information see German version.

## T  8.25 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 Written examination | Credits 4 | Grading scale Grade to a third | Recurrence Each winter term | Version 1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2117095 | Basics of Technical Logistics I | 3 SWS | Lecture / Practice ( / 🧩 | Mittwollen, Oellerich |

| Exams | | | | |
|---|---|---|---|---|
| ST 2022 | 76-T-MACH-109919 | Basics of Technical Logistics I | | Mittwollen |
| ST 2022 | 76-T-MACH-109919-mPr | 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   8.26 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** | | | | | |
| ST 2022 | 76-T-MACH-109920 | Basics of Technical Logistics II | | | Oellerich, Hochstein, Mittwollen |
| ST 2022 | 76-T-MACH-109920-mPr | Basics of Technical Logistics II | | | Mittwollen, Oellerich, Hochstein |
| 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  8.27 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<br>Written examination | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2142883 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II | 2 SWS | Lecture / 🖥 | Guber, Ahrens |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-100967 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II | | Guber | |

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

**Competence Certificate**
Written exam (75 Min.)

**Prerequisites**
none

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

## V  BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II
2142883, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

**Content**
Examples of use in Life-Sciences and biomedicine: Microfluidic Systems:
LabCD, Protein Cristallisation
Microarrys
Tissue Engineering
Cell Chip Systems
Drug Delivery Systems
Micro reaction technology
Microfluidic Cells for FTIR-Spectroscopy
Microsystem Technology for Anesthesia, Intensive Care and Infusion
Analysis Systems of Person´s Breath
Neurobionics and Neuroprosthesis
Nano Surgery

**Organizational issues**
Die Vorlesung findet im Sommersemester aufgrund der aktuellen Situation bis auf Weiteres **online** statt. Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

Die Vorlesung wird voraussichtlich mit der Software ZOOM oder MS Teams zu den im Vorlesungsverzeichnis angekündigten Terminen (hier: Montag 11:30 - 13:00 Uhr) durchgeführt werden. Weitere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

**Literature**
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994

M. Madou
Fundamentals of Microfabrication

## T  8.28 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<br>Written examination | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2142879 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III | 2 SWS | Lecture / 📱 | Guber, Ahrens |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-100968 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III | | Guber | |

Legend: 📱 Online, ✂ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

**Competence Certificate**
Written exam (75 Min.)

**Prerequisites**
none

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

## V  BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III
2142879, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

**Content**
Examples of use in minimally invasive therapy
Minimally invasive surgery (MIS)
Endoscopic neurosurgery
Interventional cardiology
NOTES
OP-robots and Endosystems
License of Medical Products and Quality Management

**Organizational issues**
Die Vorlesung findet im Sommersemester aufgrund der aktuellen Situation bis auf Weiteres **online** statt. Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.
Die Vorlesung wird voraussichtlich mit der Software ZOOM oder MS Teams zu den im Vorlesungsverzeichnis angekündigten Terminen (hier: Montag: 14:00 - 15:30 Uhr) durchgeführt werden. Weitere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

**Literature**
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994
M. Madou
Fundamentals of Microfabrication

## T  8.29 Course: Bionics for Engineers and Natural Scientists [T-MACH-102172]

| **Responsible:** | apl. Prof. Dr. Hendrik Hölscher |
|---|---|
| **Organisation:** | KIT Department of Mechanical Engineering |
| **Part of:** | M-MACH-101287 - Microsystem Technology |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 3 | Grade to a third | Each summer term | 1 |

| Exams | | | |
|---|---|---|---|
| ST 2022 | 76-T-MACH-102172 | Einführung in die Bionik | Hölscher |
| WT 22/23 | 76-T-MACH-102172 | Introduction into Biomimetics | Hölscher |

**Competence Certificate**
written or oral exam

**Prerequisites**

| T | **8.30 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 2022 | 2134153 | Boosting of Combustion Engines | 2 SWS | /🗣 | Kech |

Legend: 🗖 Online, 🕸 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
oral exam, 20 min

**Prerequisites**

## T  8.31 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 | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Examination of another type | 4,5 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2572190 | Brand Management | 2 SWS | Lecture / 🗣 | Kupfer |
| WT 22/23 | 2572191 | Brand Management Exercise | 1 SWS | Practice / 🗣 | Mitarbeiter |

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** | **8.32 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 |

| Exams | | | | |
|---|---|---|---|---|
| ST 2022 | 7900079 | Business Strategies of Banks | | Müller |

**Competence Certificate**
The lecture will be offered for the last time in the winter semester 2021/22. The exam will take place for the last time in the summer semester 2022 (only for repeaters).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The lecture will be offered for the last time in the winter semester 2021/22.

## T 8.33 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<br>Completed coursework (practical) | Credits<br>2 | Grading scale<br>pass/fail | Recurrence<br>Each term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2123357 | CAD-NX training course | 2 SWS | Practical course / 🧩 | Ovtcharova, Mitarbeiter |
| WT 22/23 | 2123357 | CAD-NX training course | 2 SWS | Practical course / 🧩 | Ovtcharova, Mitarbeiter |
| **Exams** | | | | | |
| ST 2022 | 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, SS 2022, 2 SWS, Language: German/English, Open in study portal

**Practical course (P)**
**Blended (On-Site/Online)**

**Content**

- Overview of the functional range
- Introduction to the work environment of NX
- Basics of 3D-CAD modelling
- Feature-based modelling
- Freeform modelling
- Generation of technical drawings
- Assembly modelling
- Finite element method (FEM) and multi-body simulation (MBS) with NX

Students are able to:

- create their own 3D geometric models in the CAD system NX and generate drawings due to the created geometry
- carry out FE-studies and kinematic simulations using the integrated CAE tools
- use advanced, knowledge-based functionalities of NX to automate the creation of geometry and thus to ensure the reusability of the models.

**Organizational issues**
Das Praktikum wird zum einen vorlesungsbegleitend sowie zum anderen als einwöchige Blockveranstaltung in der vorlesungsfreien Zeit angeboten. Weitere Informationen siehe ILIAS.

**Literature**
Praktikumsskript

| V | **CAD-NX training course** | **Practical course (P)** |
|---|---|---|
| | 2123357, WS 22/23, 2 SWS, Language: German, 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 kann entweder vorlesungsbegleitend oder als einwöchige Blockveranstaltung in der vorlesungsfreien Zeit absolviert werden. Weitere Informationen siehe ILIAS.

**Literature**
Praktikumsskript

| **T** | **8.34 Course: Civil Law for Beginners [T-INFO-103339]** |

**Responsible:**   Dr. Yvonne Matz
**Organisation:**  KIT Department of Informatics
**Part of:**       M-INFO-101190 - Introduction to Civil Law

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 5 | Grade to a third | Each winter term | 3 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 24012 | Civil Law for Beginners | 4 SWS | Lecture / 🗣 | Matz |
| **Exams** | | | | | |
| ST 2022 | 7500041 | Civil Law for Beginners | | | Dreier, Matz |

Legend: 🖥 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✘ Cancelled

## T  8.35 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<br>Completed coursework | Credits<br>1 | Grading scale<br>pass/fail | Recurrence<br>Each summer term | Version<br>4 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 4051111 | Klimatologie | 3 SWS | Lecture / ⚙ | Ginete Werner Pinto |
| ST 2022 | 4051112 | Übungen zu Klimatologie | 1 SWS | Practice / 🗣 | Ginete Werner Pinto, Ludwig, Stadelmaier, Kiefer |
| **Exams** | | | | | |
| ST 2022 | 7800005 | Climatology | | | Ginete Werner Pinto |

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

**Prerequisites**

## T 8.36 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<br>Oral examination | Credits<br>5 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Expansion<br>1 terms | Version<br>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  8.37 Course: CO2-Neutral Combustion Engines and their Fuels II [T-MACH-111560]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Thomas Koch |
| **Organisation:** | KIT Department of Mechanical Engineering |
| **Part of:** | M-MACH-101303 - Combustion Engines II |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 5 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2134151 | CO2-neutral combustion engines and their fuels II | 3 SWS | Lecture / Practice ( / 🗣 | Koch |

| Exams | | | |
|---|---|---|---|
| ST 2022 | 76-T-MACH-104609 | Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II | Koch, Kubach |
| WT 22/23 | 76-T-MACH-104609 | Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II | Kubach, Koch |

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
oral examination, duration: 25 minutes, no auxiliary means

**Prerequisites**
none

**Recommendation**
Fundamentals of Combustion Engines II helpful

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

| V | **CO2-neutral combustion engines and their fuels II**<br>2134151, SS 2022, 3 SWS, Language: German, Open in study portal | **Lecture / Practice (VÜ)**<br>**On-Site** |
|---|---|---|

## T 8.38 Course: Competition in Networks [T-WIWI-100005]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Kay Mitusch |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101499 - Applied Microeconomics |
| | M-WIWI-101668 - Economic Policy I |

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2561204 | Competition in Networks | 2 SWS | Lecture / ⚙ | Mitusch |
| WT 22/23 | 2561205 | Übung zu Wettbewerb in Netzen | 1 SWS | Practice / ⚙ | Wisotzky, Mitusch, Corbo |
| **Exams** | | | | | |
| ST 2022 | 7900274 | Competition in Networks | | | Mitusch |

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

**Competence Certificate**

Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

**Prerequisites**

None.

**Recommendation**

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

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

### V Competition in Networks
2561204, WS 22/23, 2 SWS, Language: German, Open in study portal

**Lecture (V)**
**Blended (On-Site/Online)**

**Content**

Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture

**Literature**

Literatur und Skripte werden in der Veranstaltung angegeben.

## T    8.39 Course: Computer Contract Law [T-INFO-102036]

| | |
|---|---|
| **Responsible:** | Michael Menk |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101216 - Private Business Law |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 3 | Grade to a third | Each winter term | 2 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2411604 | Computer Contract Law | 2 SWS | Lecture / 🗣 | Menk |
| **Exams** | | | | | |
| ST 2022 | 7500066 | Computer Contract Law | | | Dreier, Matz |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

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

| V | Computer Contract Law | Lecture (V) |
|---|---|---|
| | 2411604, WS 22/23, 2 SWS, Language: German, Open in study portal | On-Site |

### Content
The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

### Literature

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H.Beck, II. Aufl. 2002
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

### Weiterführende Literatur

Ergänzende Literatur wird in den Vorlesungsfolien angegeben.

## T   8.40 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 2022 | 6200410 | Construction Technology | 3 SWS | Lecture / 🧩 | Gentes, Haghsheno, Schneider |
| ST 2022 | 6200411 | Exercises to Construction Technology | 1 SWS | Practice / 🧩 | Gentes, Haghsheno, Schneider, Waleczko |

| Exams | | | | |
|-------|------------|--------------------------|---|-----------|
| ST 2022 | 8230101691 | Construction Technology | | Haghsheno |

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

**Competence Certificate**
written exam with 90 minutes

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None

## T  8.41 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 |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Once | 3 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2572174 | Consumer Behavior | 3 SWS | Lecture | Scheibehenne |
| ST 2022 | 2572176 | Übung zu Consumer Behavior | 1 SWS | Practice / 🗣 | Liu, Scheibehenne |
| **Exams** | | | | | |
| ST 2022 | 7900021 | Consumer Behavior | | | Scheibehenne |

Legend: 🗎 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None.

**Annotation**
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** 2572174, SS 2022, 3 SWS, Language: English, Open in study portal | Lecture (V) |
|---|---|---|

## Content
### 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

There will be a written exam at the last day of class. 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** | **8.42 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<br>Written examination | Credits<br>4 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|--------|--------|------------------|--------|-----------------|-------------|
| ST 2022 | 2150683 | Control Technology | 2 SWS | Lecture / ⚙ | Gönnheimer |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105185 | Control Technology | | | Gönnheimer |
| WT 22/23 | 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**<br>2150683, SS 2022, 2 SWS, Language: German, Open in study portal | Lecture (V)<br>Blended (On-Site/Online) |
|-------|------------------------------------------------------------------------------------------|------------------------------------------|

**Content**
The lecture control technology gives an integral overview of available control components within the field of industrial production systems.
The first part of the lecture deals with the fundamentals of signal processing and with control peripherals in the form of sensors and actors which are used in production systems for the detection and manipulation of process states.
The second part handles with the function of electric control systems in the production environment. The main focus in this chapter is laid on programmable logic controls, computerized numerical controls and robot controls. Finally the course ends with the topic of cross-linking and decentralization with the help of bus systems.
The lecture is very practice-oriented and illustrated with numerous examples from different branches.

The following topics will be covered:

- Signal processing
- Control peripherals
- Programmable logic controls
- Numerical controls
- Controls for industrial robots
- Distributed control systems
- Field bus
- Trends in the area of control technology

**Learning Outcomes:**

The students …

- are able to name the electrical controls which occur in the industrial environment and explain their function.
- can explain fundamental methods of signal processing. This involves in particular several coding methods, error protection methods and analog to digital conversion.
- are able to choose and to dimension control components, including sensors and actors, for an industrial application, particularly in the field of plant engineering and machine tools. Thereby, they can consider both, technical and economical issues.
- can describe the approach for projecting and writing software programs for a programmable logic control named Simatic S7 from Siemens. Thereby they can name several programming languages of the IEC 1131.

**Workload:**

regular attendance: 21 hours
self-study: 99 hours

**Literature**
**Medien**:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

**Media**:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

## T   8.43 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 | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Examination of another type | 3 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2119100 | Fördertechnik und Logistiksysteme | | Seminar / ⚙ | Furmans, Padhy |
| WT 22/23 | 2119100 | Fördertechnik und Logistiksysteme | | Seminar / ⚙ | Furmans |
| **Exams** | | | | | |
| ST 2022 | 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** | **Seminar (S)** |
|---|---|---|
| | 2119100, SS 2022, SWS, Language: German/English, Open in study portal | **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

| V | **Fördertechnik und Logistiksysteme** | **Seminar (S)** |
|---|---|---|
| | 2119100, WS 22/23, SWS, Language: German/English, Open in study portal | **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

| T | **8.44 Course: Copyright [T-INFO-101308]** |

**Responsible:**     Prof. Dr. Thomas Dreier
**Organisation:**    KIT Department of Informatics
**Part of:**         M-INFO-101215 - Intellectual Property Law

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 24121 | Copyright | 2 SWS | Lecture / 🗣 | Dreier |
| **Exams** | | | | | |
| ST 2022 | 7500064 | Copyright | | | Dreier, Matz |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

| T | **8.45 Course: Corporate Compliance [T-INFO-101288]** |

**Responsible:**     Andreas Herzig
**Organisation:**    KIT Department of Informatics
**Part of:**         M-INFO-101216 - Private Business Law

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2400087 | Corporate Compliance | 2 SWS | Lecture / ❀ | Herzig |
| **Exams** | | | | | |
| ST 2022 | 7500063 | Corporate Compliance | | | Dreier, Matz |

Legend: ▯ Online, ❀ Blended (On-Site/Online), ◉ On-Site, ✗ Cancelled

## T  8.46 Course: Data Mining and Applications [T-WIWI-103066]

| | |
|---|---|
| **Responsible:** | Rheza Nakhaeizadeh |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101608 - Statistics and Econometrics |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 4,5 | Grade to a third | see Annotations | 2 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2520375 | Data Mining and Applications | 2 SWS | Seminar | Nakhaeizadeh |
| **Exams** | | | | | |
| ST 2022 | 7900102 | Data Mining and Applications (Lecture) | | | Nakhaeizadeh |

**Competence Certificate**

The course will be held for the last time in the summer semester 2021. The last exam opportunity for first-timers will be in the summer semester 2021. A last exam opportunity (for repeaters only) will be offered in the winter semester 2021/2022.

- Conduction of a larger emprical study in groups
- reporting of milestones
- final presentation (app. 45 minutes)

**Prerequisites**

None

**Annotation**

The course will be held for the last time in the summer semester of 2021.

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

| V | **Data Mining and Applications**<br>2520375, SS 2022, 2 SWS, Language: German, Open in study portal | **Seminar (S)** |
|---|---|---|

**Content**
**Learning objectives:**

Students

- know the definition of Data Mining
- are familiar with the CRISP-DM
- are familiar with the most important Data Mining Algorithms like Decision Tree, K-Means, Artificial Neural Networks, Association Rules, Regression Analysis
- will be able to use a DM-Tool

**Content:**

Part one: Data Mining:

What is Data Mining?; History of Data Mining; Conferences and Journals on Data Mining; Potential Applications; Data Mining Process; Business Understanding; Data Understanding; Data Preparation; Modeling; Evaluation; Deployment; Interdisciplinary aspects of Data Mining; Data Mining tasks; Data Mining Algorithms (Decision Trees, Association Rules, Regression, Clustering, Neural Networks); Fuzzy Mining; OLAP and Data Warehouse; Data Mining Tools; Trends in Data Mining

Part two: Examples of application of Data Mining

Success parameters of Data Mining Projects; Application in industry; Application in Commerce

**Workload:**

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Exam preparation: 40 hours

**Organizational issues**
Blockveranstaltung, Termine werden über ILIAS bekannt gegeben

**Literature**
U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, R. Uthurusamy, editors, Advances in Knowledge Discovery and Data Mining, AAAI/MIT Press, 1996 (order online from Amazon.com or from MIT Press).

Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016 , 2006.

David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000

Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.

Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367

Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.

Ian Witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070 , 2005.

## T  8.47 Course: Data Protection Law [T-INFO-111406]

**Organisation:**  KIT Department of Informatics
**Part of:**  M-INFO-101217 - Public Business Law

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 3 | Grade to a third | Each winter term | 2 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2400238 | Bereichsdatenschutz | 2 SWS | Lecture / 🗣 | Boehm |
| **Exams** | | | | | |
| ST 2022 | 7500168 | Data Protection Law | | | Boehm |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

## T 8.48 Course: Decision Theory [T-WIWI-102792]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Karl-Martin Ehrhart |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101420 - Econometrics and Economics |
| | M-WIWI-101499 - Applied Microeconomics |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2520365 | Decision Theory | 2 SWS | Lecture / 🗎 | Ehrhart |
| ST 2022 | 2520366 | Übungen zu Entscheidungstheorie | 1 SWS | Practice / ⚙ | Ehrhart |
| **Exams** | | | | | |
| ST 2022 | 7900254 | Decision Theory | | | Ehrhart |
| WT 22/23 | 7900159 | Decision Theory | | | Ehrhart |

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

### Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

### Prerequisites
None

### Recommendation
Knowledge in mathematics and statistics is required.

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

### V Decision Theory
2520365, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

### Literature

- Ehrhart, K.-M. und S.K. Berninghaus (2012): Skript zur Vorlesung Entscheidungstheorie, KIT.
- Hirshleifer und Riley (1997): The Analytics of Uncertainty and Information. London: Cambridge University Press, 4. Aufl.
- Berninghaus, S.K., K.-M. Ehrhart und W. Güth (2006): Strategische Spiele. Berlin u.a.: Springer, 2., überarbeitete und erweiterte Aufl. (oder erste Auflage, 2002)

## T  8.49 Course: Derivatives [T-WIWI-102643]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Marliese Uhrig-Homburg |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101402 - eFinance |
| | M-WIWI-101423 - Topics in Finance II |
| | M-WIWI-101465 - Topics in Finance I |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2530550 | Derivatives | 2 SWS | Lecture / 🗣 | Thimme, Uhrig-Homburg |
| ST 2022 | 2530551 | Übung zu Derivate | 1 SWS | Practice / 🗣 | Thimme, Eska, Uhrig-Homburg |
| **Exams** | | | | | |
| ST 2022 | 7900111 | Derivatives | | | Uhrig-Homburg |
| WT 22/23 | 7900051 | Derivatives | | | Uhrig-Homburg |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**

Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

**Prerequisites**
None

**Recommendation**
None

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

### V  Derivatives
2530550, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

**Literature**

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

**Weiterführende Literatur:**

Cox/Rubinstein (1985): Option Markets, Prentice Hall

| T | **8.50 Course: Design, Construction and Sustainability Assessment of Buildings I [T-WIWI-102742]** |
|---|---|

**Responsible:**    Prof. Dr.-Ing. Thomas Lützkendorf
**Organisation:**    KIT Department of Economics and Management
**Part of:**    M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 4,5 | Grade to a third | Each winter term | 1 |

| Exams | | | |
|-------|---|---|---|
| ST 2022 | 7900267 | Design, Construction and Sustainability Assessment of Buildings I | Lützkendorf |

**Competence Certificate**

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

A combination with the module *Real Estate Management* and with engineering science modules in the area of building physics and structural design is recommended.

| **T** | **8.51 Course: Design, Construction and Sustainability Assessment of Buildings II [T-WIWI-102743]** |
|---|---|

**Responsible:**    Prof. Dr.-Ing. Thomas Lützkendorf
**Organisation:**    KIT Department of Economics and Management
**Part of:**    M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

| **Type** Written examination | **Credits** 4,5 | **Grading scale** Grade to a third | **Recurrence** Each summer term | **Version** 1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2585403 | Übung zu Bauökologie II | 1 SWS | Practice / 🧩 | Rochlitzer |
| ST 2022 | 2585404 | Sustainability Assessment of Buildings | 2 SWS | Lecture / 🧩 | Lützkendorf, Rochlitzer |
| **Exams** | | | | | |
| ST 2022 | 7900345 | Design, Construction and Sustainability Assessment of Buildings II | | | Lützkendorf |
| ST 2022 | 7900350 | Design, Construction and Sustainability Assessment of Buildings II | | | Lützkendorf |

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🌐 On-Site, ✗ Cancelled

**Competence Certificate**
Depending on further pandemic developments, the exam will be offered either as a 60-minute upload exam (Open Book Exam @ Home), or as a 60-minute exam (written exam according to SPO § 4 Abs. 2, Pkt. 1).

**Prerequisites**
None

**Recommendation**
A combination with the module *Real Estate Management* and with engineering science modules from the areas building physics and structural designis recommended.

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

| **V** | **Sustainability Assessment of Buildings** 2585404, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)** **Blended (On-Site/Online)** |
|---|---|---|

**Content**
The course identifies problems concerning the economical and environmental assessment of buildings along their lifecycle and discusses suitable procedures and tools supporting the decision making process. For example, the course addresses topics like operating costs, heat cost allocation, comparisons of heating costs, applied economical assessment methods, life cycle assessment as well as related design and assessment tools (e.g. element catalogues, databases, emblems, tools) and assessment procedures (e.g. carbon footprint, MIPS, KEA), which are currently available.

**Recommendations:**

A combination with the module *Real Estate Management* [WW3BWLOOW2] and with engineering science modules from the areas building physics and structural designis recommended.

The student

- has an in-depth knowledge of the classification of environmental design and construction of buildings within the overall context of sustainability
- has a critical understanding of the main theories and methods of assessing the environmental performance of buildings
- is able to use methods and tools to evaluate the environmental performance in design and decision processes or to interpret existing results

The total workload for this course is approximately 135.0 hours. For further information see German version.

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Re-examinations are offered at every ordinary examination date.

**Literature**
**Weiterführende Literatur:**

- Schmidt-Bleek: "Das MIPS-Konzept". Droemer 1998
- Wackernagel et.al: "Unser ökologischer Fußabdruck". Birkhäuser 1997
- Braunschweig: "Methode der ökologischen Knappheit". BUWAL 1997
- Hohmeyer et al.: "Social Costs and Sustainability". Springer 1997
- Hofstetter: "Perspectives in Life Cycle Impact Assessment". Kluwer Academic Publishers 1998

## T  8.52 Course: Development Methods of Technical Systems [T-MACH-111283]

**Responsible:**     Dipl.-Ing. Thomas Maier
                     Prof. Dr.-Ing. Jivka Ovtcharova
**Organisation:**    KIT Department of Mechanical Engineering

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

| Type Examination of another type | Credits 4 | Grading scale Grade to a third | Recurrence Each term | Expansion 1 terms | Version 1 |
|---|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2121002 | Development methods of technical systems | 4 SWS | Project (P / 🎤 | Ovtcharova, Maier |
| WT 22/23 | 2121002 | Development methods of technical systems | 4 SWS | Project (P / 🎤 | Ovtcharova, Maier |
| **Exams** | | | | | |
| ST 2022 | 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, SS 2022, 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, 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.

**T**  **8.53 Course: Development of hybrid drivetrains [T-MACH-110817]**

| | |
|---|---|
| **Responsible:** | Prof. Dr. Thomas Koch |
| **Organisation:** | KIT Department of Mechanical Engineering |
| **Part of:** | M-MACH-101303 - Combustion Engines II |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2134155 | Development of Hybrid Powertrains | 2 SWS | Lecture / 🗣 | Koch, Doppelbauer |
| **Exams** | | | | | |
| ST 2022 | 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 2022, 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 8.54 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 | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each winter term | 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** | Lecture (V) |
|---|---|---|
| | 2500035, WS 22/23, 2 SWS, Language: English, Open in study portal | 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** | Practice (Ü) |
|---|---|---|
| | 2500036, WS 22/23, 1 SWS, Language: English, Open in study portal | On-Site |

### Content
Exercise Session for the course "Digital Markets and Market Design

### Organizational issues
Jede zweite Woche eine Übung

## T  8.55 Course: Digital Services: Foundations [T-WIWI-111307]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Gerhard Satzger |
| | Prof. Dr. Christof Weinhardt |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101434 - eBusiness and Service Management |
| | M-WIWI-102752 - Fundamentals of Digital Service Systems |
| | M-WIWI-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 2022 | 2595466 | Digital Services: Foundations | 2 SWS | Lecture / 🗣 | Satzger, Weinhardt |
| ST 2022 | 2595467 | Exercise Digital Services: Foundations | 1 SWS | Practice / 🗣 | Kühl, Schöffer, Badewitz |
| **Exams** | | | | | |
| ST 2022 | 7900307 | Digital Services | | | Satzger |
| WT 22/23 | 7900002 | Digital Services: Foundations | | | 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-109938 "Digital Services".

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

### V  Digital Services: Foundations
2595466, SS 2022, 2 SWS, Language: English, Open in study portal

**Lecture (V)**
**On-Site**

**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  8.56 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** | | | | | |
| ST 2022 | 76-T-MACH-110176 | Digitalization from Production to the Customer in the Optical Industry | | | Wawerla |
| 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    8.57 Course: Economics and Behavior [T-WIWI-102892]

**Responsible:** Prof. Dr. Nora Szech
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 4,5 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|--------|--------|--------------------------------|-------|------------|------------------|
| WT 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 |

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   8.58 Course: Economics I: Microeconomics [T-WIWI-102708]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Clemens Puppe |
| | Prof. Dr. Johannes Philipp Reiß |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101726 - Preliminary Exam |
| | M-WIWI-105204 - Economics |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 5 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2610012 | Economics I: Microeconomics | 3 SWS | Lecture / ⚙ | Reiß, Potarca |

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

### Competence Certificate

The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.

The main exam takes place subsequent to the lectur. The re-examination is offered at the same examination period. As a rule, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

### Prerequisites
None

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

### V   Economics I: Microeconomics
2610012, WS 22/23, 3 SWS, Language: German, Open in study portal

**Lecture (V)**
**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  8.59 Course: Economics II: Macroeconomics [T-WIWI-102709]

**Responsible:**     Prof. Dr. Berthold Wigger
**Organisation:**    KIT Department of Economics and Management
**Part of:**         M-WIWI-105204 - Economics

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 5 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|--------|--------|--------------------------------------|-------|-----------|-----------------------------------|
| ST 2022 | 2600014 | Economics II: Macroeconomics | 4 SWS | Lecture | Wigger |
| ST 2022 | 2660015 | Economics II : Macroeconomics, Tutorial | 2 SWS | Tutorial ( | Schmelzer, Setio, Herberholz |
| **Exams** | | | | | |
| ST 2022 | 790vwl2 | Economics II: Macroeconomics | | | Wigger |
| 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** | **Lecture (V)** |
|---|----------------------------------|------------------|
| | 2600014, SS 2022, 4 SWS, Language: German, Open in study portal | |

**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  8.60 Course: Economics III: Introduction in Econometrics [T-WIWI-102736]

**Responsible:** Prof. Dr. Melanie Schienle
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-101499 - Applied Microeconomics
M-WIWI-105203 - Introduction in Econometrics

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 5 | Grade to a third | Each summer term | 2 |

| Events | | | | | |
|--------|--------|-----------------------------------------|--------|-------------|---------------|
| ST 2022 | 2520016 | Economics III: Introduction to Econometrics | 2 SWS | Lecture / 🧩 | Krüger, Rüter |
| ST 2022 | 2520017 | Übungen zu VWL III | 2 SWS | Practice | Krüger, Rüter |
| **Exams** | | | | | |
| ST 2022 | 7900027 | Economics III: Introduction in Econometrics | | | Krüger |
| ST 2022 | 7900034 | Economics III: Introduction in Econometrics | | | Krüger |

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 2022, 2 SWS, Language: German, Open in study portal

**Lecture (V)**
**Blended (On-Site/Online)**

**Content**
**Learning objectives:**

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

**Content:**

- Simple and multiple linear regression (estimating parameters, confidence interval, testing, prognosis, testing assumptions)
- Model assessment

**Requirements:**

Knowledge of the lectures Statistics I + II is required.

**Workload:**

Total workload for 5 CP: approx. 150 hours

Attendance: 30 hours

Preparation and follow-up: 120 hours

**Literature**
Von Auer: Ökonometrie ISBN 3-540-00593-5

Goldberger: A course in Econometrics ISBN 0-674-17544-1

Gujarati. Basic Econometrics ISBN 0-07-113964-8

Schneeweiß: Ökonometrie ISBN 3-7908-0008-2

## T   8.61 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<br>Written examination | Credits<br>4,5 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2540454 | eFinance: Information Systems for Securities Trading | 2 SWS | Lecture / 🗣 | Weinhardt, Notheisen |
| WT 22/23 | 2540455 | Übungen zu eFinance: Information Systems for Securities Trading | 1 SWS | Practice / 🗣 | Jaquart |

Legend: 🗎 Online, ⚘ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

### Competence Certificate
Success is monitored by means of ongoing elaborations and presentations of tasks and an examination (60 minutes) at the end of the lecture period. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

### 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
2540454, WS 22/23, 2 SWS, Language: English, Open in study portal

**Lecture (V)**
**On-Site**

### Literature

- Picot, Arnold, Christine Bortenlänger, Heiner Röhrl (1996): "Börsen im Wandel". Knapp, Frankfurt
- Harris, Larry (2003): "Trading and Exchanges - Market Microstructure for Practitioners"". Oxford University Press, New York

### Weiterführende Literatur:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

## T   8.62 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 2022 | 2307391 | Electric Energy Systems | 2 SWS | Lecture / 🗣 | Leibfried |
| ST 2022 | 2307393 | Übungen zu 2307391 Elektroenergiesysteme | 1 SWS | Practice / 🗣 | Steinle |
| **Exams** | | | | | |
| ST 2022 | 7307391 | Electric Energy Systems | | | Leibfried |
| WT 22/23 | 7307391 | Electric Energy Systems | | | Leibfried |

Legend: 🗎 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Prerequisites**

| T | **8.63 Course: Employment Law [T-INFO-111436]** |

| **Responsible:** | Dr. Alexander Hoff |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101216 - Private Business Law |

| **Type** Written examination | **Credits** 3 | **Grading scale** Grade to a third | **Recurrence** Each summer term | **Version** 2 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24668 | Employment Law | 2 SWS | Lecture / 🗣 | Hoff |
| **Exams** | | | | | |
| ST 2022 | 7500082 | Employment Law | | | Dreier, Matz |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

| T | **8.64 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 Written examination | Credits 3,5 | Grading scale Grade to a third | Recurrence Each summer term | Version 3 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2581959 | Energy Policy | 2 SWS | Lecture / 🗣 | Wietschel |
| **Exams** | | | | | |
| ST 2022 | 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 2022, 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  8.65 Course: Engine Measurement Techniques [T-MACH-105169]

**Responsible:** Dr.-Ing. Sören Bernhardt
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101303 - Combustion Engines II

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 4 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2134137 | Engine measurement techniques | 2 SWS | Lecture / 🎤 | Bernhardt |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105169 | Engine Measurement Techniques | | | Koch |
| WT 22/23 | 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 2022, 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 | **8.66 Course: European and International Law [T-INFO-101312]** |
|---|---|

**Responsible:**    Ulf Brühann
**Organisation:**    KIT Department of Informatics
**Part of:**    M-INFO-101217 - Public Business Law

| **Type**<br>Written examination | **Credits**<br>3 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each summer term | **Version**<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24666 | Europäisches und Internationales Recht | 2 SWS | Lecture / 🎤 | Brühann |
| **Exams** | | | | | |
| ST 2022 | 7500084 | European and International Law | | | Dreier |

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

| T | **8.67 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** Oral examination | **Credits** 5 | **Grading scale** Grade to a third | **Version** 5 |
|---|---|---|---|

| Exams | | | |
|---|---|---|---|
| ST 2022 | 7800052 | Exam on Climatology as Minor Subject | Ginete Werner Pinto |
| ST 2022 | 7801203 | Climatology reexam | Ginete Werner Pinto |

## T  8.68 Course: Exercises in Civil Law [T-INFO-102013]

**Responsible:**   Prof. Dr. Thomas Dreier
                   Dr. Yvonne Matz
**Organisation:**  KIT Department of Informatics
      **Part of:**  M-INFO-101191 - Commercial Law

| **Type**<br>Examination of another type | **Credits**<br>9 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each term | **Version**<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24504 | Advanced Civil Law | 2 SWS | Lecture / 🎤 | Matz |
| ST 2022 | 24506 | Exercises in Civil Law | 2 SWS | Lecture / 🎤 | Dreier |
| ST 2022 | 24926 | Case Studies in Civil Law | 2 SWS | Practice / 🎤 | Herr |
| WT 22/23 | 24011 | Commercial and Corporate Law | 2 SWS | Lecture / 🎤 | Wiele |
| WT 22/23 | 24017 | Exercises in Civil Law | 2 SWS | Lecture / 🎤 | Dreier |
| **Exams** | | | | | |
| ST 2022 | 7500093 | Wirtschaftsprivatrecht | | | Dreier, Matz |
| WT 22/23 | 7500108 | Commercial Law | | | Dreier, Matz |

Legend: 📱 Online, ⚇ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

## T 8.69 Course: Experimental Physics [T-PHYS-100278]

**Responsible:** apl. Prof. Dr. Bernd Pilawa
Prof. Dr. Thomas Schimmel
**Organisation:** KIT Department of Physics
**Part of:** M-PHYS-100283 - Experimental Physics

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 14 | Grade to a third | Each term | 1 |

| Events | | | | | |
|--------|--------|-----------------|--------|-----------------|-----------------|
| ST 2022 | 4040021 | Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT, Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik | 4 SWS | Lecture / 🗣 | Pilawa |
| ST 2022 | 4040122 | Übungen zur Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT, Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik | 2 SWS | Practice / 🗣 | Pilawa, Wertz, NN |
| WT 22/23 | 4040011 | Experimentalphysik A für die Studiengänge Elektrotechnik, Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik | 4 SWS | Lecture / 🗣 | Schimmel |
| WT 22/23 | 4040112 | Übungen zur Experimentalphysik A für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Lehramt Chemie, NWT Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik | 2 SWS | Practice / 🗣 | Schimmel, Wertz |

| Exams | | | |
|---|---|---|---|
| ST 2022 | 7800001 | Experimental Physics | Schimmel |

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

**Competence Certificate**
Written exam (usually about 180 min)

**Prerequisites**
None

## T   8.70 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** | | | | | |
| ST 2022 | 00020 | 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 8.71 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** | | | | | |
| ST 2022 | 7900195 | Financial Accounting for Global Firms | | | Luedecke |
| WT 22/23 | 7900142 | Financial Accounting for Global Firms | | | Luedecke, Ruckes |

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  8.72 Course: Financial Data Science [T-WIWI-111238]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Maxim Ulrich |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-105610 - Financial Data Science |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Examination of another type | 9 | Grade to a third | see Annotations | 1 |

**Competence Certificate**

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

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

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

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

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

**Prerequisites**

None.

**Annotation**

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

## T  8.73 Course: Financial Econometrics [T-WIWI-103064]

**Responsible:** Prof. Dr. Melanie Schienle
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-101608 - Statistics and Econometrics
M-WIWI-105414 - Statistics and Econometrics II

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2520022 | Financial Econometrics | 2 SWS | Lecture / 🔀 | Schienle |
| WT 22/23 | 2520023 | Übungen zu Financial Econometrics | 2 SWS | Practice / 🔀 | Schienle, Görgen, Buse |
| **Exams** | | | | | |
| WT 22/23 | 7900123 | Financial Econometrics | | | Schienle |
| WT 22/23 | 7900126 | Financial Econometrics | | | Schienle |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 📍 On-Site, ✗ Cancelled

**Competence Certificate**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

**Annotation**
The next lecture will take place in the winter semester 2022/23.

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

### V  Financial Econometrics
2520022, WS 22/23, 2 SWS, Language: English, Open in study portal

**Lecture (V)**
**Blended (On-Site/Online)**

**Content**
**Learning objectives:**

The student

- shows a broad knowledge of fincancial econometric estimation and testing techniques
- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

**Content:**

ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

**Requirements:**

It is recommended to attend the course *Economics III: Introduction to Econometrics* [2520016] prior to this course.

**Workload:**

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

**Literature**

Taylor, S. J. (2005): "Asset Price Dynamics, Volatility, and Prediction", Princeton University Press.

Tsay, R. S. (2005): "Analysis of Financial Time Series: Financial Econometrics", Wiley, 2nd edition.

Cochrane, J. H. (2005): "Asset Pricing", revised edition, Princeton University Press.

Campbell, J. Y., A. W. Lo, and A. C. MacKinlay (1997): "The Econometrics of Financial Markets", Princeton University Press.

Hamilton, J. D. (1994): "Time Series Analysis", Princeton University Press.

Additional literature will be discussed in the lecture.

## T    8.74 Course: Financial Econometrics II [T-WIWI-110939]

| **Responsible:** | Prof. Dr. Melanie Schienle |
|---|---|
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-105414 - Statistics and Econometrics II |

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

**Competence Certificate**
Alternative exam assessment (Takehome Exam). Details will be announced at the beginning of the course.

**Prerequisites**
None

**Recommendation**
Knowledge of the contents covered by the course "Financial Econometrics"

**Annotation**
Course language is English
The next lecture will take place in the summer semester of 2023.

## T  8.75 Course: Financial Intermediation [T-WIWI-102623]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Martin Ruckes |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101423 - Topics in Finance II |
| | M-WIWI-101465 - Topics in Finance I |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2530232 | Financial Intermediation | 2 SWS | Lecture / 🖥 | Ruckes |
| WT 22/23 | 2530233 | Übung zu Finanzintermediation | 1 SWS | Practice / 🖥 | Ruckes, Benz |
| **Exams** | | | | | |
| ST 2022 | 7900078 | Financial Intermediation | | | Ruckes |
| WT 22/23 | 7900063 | Financial Intermediation | | | Ruckes |

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

### Competence Certificate

The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

### Prerequisites

None

### Recommendation

None

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

### V  Financial Intermediation
2530232, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

### Literature
**Weiterführende Literatur:**

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

| T | **8.76 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 2022 | 2530216 | Financial Management | 2 SWS | Lecture / 🎤 | Ruckes |
| ST 2022 | 2530217 | Übung zu Financial Management | 1 SWS | Practice / 🎤 | Ruckes, Wiegratz |
| **Exams** | | | | | |
| ST 2022 | 7900074 | Financial Management | | | Ruckes |
| WT 22/23 | 7900060 | Financial Management | | | Ruckes |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

**Competence Certificate**
The assessment consists of a written exam (60 min.) according to Section 4 (2), 1 of the examination regulation.
The exam takes place at every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
Knowledge of the content of the course Business Administration: Finance and Accounting [25026/25027] is recommended.

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

| V | **Financial Management** 2530216, SS 2022, 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   8.77 Course: Financing and Accounting [T-WIWI-111595]

| | |
|---|---|
| **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 2022 | 2500002 | Jahresabschluss und Bewertung | | Lecture | Ruckes, Luedecke |
| ST 2022 | 2500025 | Tutorien zu Finanzierung und Rechnungswesen | 2 SWS | Tutorial ( | Wouters, Ruckes, Strych, Assistenten |
| ST 2022 | 2610026 | Finance and Accounting | 2 SWS | Lecture / 🎤 | Ruckes, Wouters |
| **Exams** | | | | | |
| ST 2022 | 7900043 | Financing and Accounting | | | Ruckes, Wouters, Luedecke |
| WT 22/23 | 7900005 | 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   Finance and Accounting
2610026, SS 2022, 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   8.78 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 | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 5 | Grade to a third | Each summer term | 2 |

| Events | | | | | |
|--------|--------|------------------------------------------|--------|----------------|-----------------------------|
| ST 2022 | 2511010 | Foundations of Informatics I | 2 SWS | Lecture / 🗣 | Färber |
| ST 2022 | 2511011 | Exercises to Foundations of Informatics I | | Practice / 🗣 | Färber, Nguyen, Noullet, Popovic |
| **Exams** | | | | | |
| ST 2022 | 79AIFB_Info1_B5 | Foundations of Informatics I (Registration until 18 July 2022) | | | Färber |
| WT 22/23 | 79AIFB_Info1_A6 | Foundations of Informatics I | | | 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 2022, 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** | **Practice (Ü)** |
|---|---|---|
| | 2511011, SS 2022, SWS, Language: German, Open in study portal | **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 8.79 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** | | | | | |
| ST 2022 | 79AIFB_Info2_A5 | Foundations of Informatics II (Registration until 18 July 2022) | | | Käfer |
| WT 22/23 | 79AIFB_Info2_B7 | Foundations of Informatics II | | | 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 | **8.80 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 2022 | 2540560 | Foundations of Interactive Systems | 3 SWS | Lecture / 🧩 | Mädche, Toreini |
| **Exams** | | | | | |
| ST 2022 | 7900247 | Foundations of Interactive Systems | | | Mädche |
| WT 22/23 | 7900326 | 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**
2540560, SS 2022, 3 SWS, Language: English, Open in study portal | Lecture (V)
**Blended (On-Site/Online)** |
|---|---|---|

**Content**
**Lecture Description**

Computers have evolved from batch processors to highly interactive systems. This offers new possibilities besides challenges for the successful interaction design 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. Furthermore, it describes core development processes for interactive systems as well as provides insights on the use & contexts of interactive systems with a specific focus on selected application areas in organizations and society. With this lecture, students acquire foundational knowledge to successfully design 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. **For the SS2022**, the capstone project focuses on understanding user experience with AR-based shopping systems on mobile phones and provides a new design based on the capabilities of smart glasses.

**Learning Objectives**

The students

- have a basic understanding of key conceptual and theoretical foundations of interactive systems from a human and computer perspective
- are aware of important design principles for the design of important classes of interactive systems
- know design processes and techniques for developing interactive systems
- know how to apply the knowledge and skills gathered in the lecture for a real-world problem (as part of design-oriented capstone project)

**Prerequisites**

No specific prerequisites are required for the lecture

**Start Date:** 26.04.2022

**Literature**

Alan Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale. 2003. Human-Computer Interaction (3rd Edition). Prentice-Hall, Inc., USA.

Further literature will be made available in the lecture.

## T  8.81 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 | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each summer term | 4 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2511226 | Foundations of mobile Business | 2 SWS | Lecture / 🗣 | Schiefer, Frister |
| ST 2022 | 2511227 | Exercises Foundations of mobile Business | 1 SWS | Practice / 🗣 | Schiefer, Frister |
| **Exams** | | | | | |
| ST 2022 | 79AIFB_GMB_C5 | Foundations of mobile Business (Registration until 18 July 2022) | | | Oberweis |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**

The assessment of this course is a written (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 2022, 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).

**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** | **8.82 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]** |
| --- | --- |

**Responsible:**    Hon.-Prof. Dr. Bernhard Ulrich Kehrwald
             Dr.-Ing. Heiko Kubach

**Organisation:**    KIT Department of Mechanical Engineering

**Part of:**    M-MACH-101303 - Combustion Engines II

| **Type** Oral examination | **Credits** 4 | **Grading scale** Grade to a third | **Recurrence** Each winter term | **Version** 1 |
| --- | --- | --- | --- | --- |

| **Events** | | | | | |
| --- | --- | --- | --- | --- | --- |
| WT 22/23 | 2133108 | Fuels and Lubricants for Combustion Engines | 2 SWS | Lecture / 🗣 | Kehrwald |
| **Exams** | | | | | |
| ST 2022 | 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    8.83 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Olaf Deutschmann |
| | Prof. Dr. Jan-Dierk Grunwaldt |
| | Dr.-Ing. Heiko Kubach |
| | Hon.-Prof. Dr. Egbert Lox |
| **Organisation:** | KIT Department of Mechanical Engineering |
| **Part of:** | M-MACH-101303 - Combustion Engines II |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 4 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2134138 | Fundamentals of catalytic exhaust gas aftertreatment | 2 SWS | Lecture / 🎤 | Lox, Grunwaldt, Deutschmann |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105044 | Fundamentals of Catalytic Exhaust Gas Aftertreatment | | | Lox |
| WT 22/23 | 76-T-MACH-105044 | Fundamentals of Catalytic Exhaust Gas Aftertreatment | | | Lox |

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

**Competence Certificate**
oral examination, Duration: 25 min., no auxiliary means

**Prerequisites**
none

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

### V    Fundamentals of catalytic exhaust gas aftertreatment
2134138, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
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  8.84 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 2022 | 2581950 | Fundamentals of Production Management | 2 SWS | Lecture / 🎤 | Schultmann |
| ST 2022 | 2581951 | Übungen Grundlagen der Produktionswirtschaft | 2 SWS | Practice / 🎤 | Steins, Steffl |
| **Exams** | | | | | |
| ST 2022 | 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 2022, 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    8.85 Course: Gear Cutting Technology [T-MACH-102148]

**Responsible:**   Dr.-Ing. Markus Klaiber
**Organisation:**  KIT Department of Mechanical Engineering

**Part of:**   M-MACH-101284 - Specialization in Production Engineering

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Oral examination | 4 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|--------|--|--|--|--|--|
| WT 22/23 | 2149655 | Gear Technology | 2 SWS | Lecture / ⚙ | Klaiber |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-102148 | Gear Cutting Technology | | | Klaiber |
| 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　8.86 Course: General and Inorganic Chemistry [T-CHEMBIO-101866]

**Responsible:** Prof. Dr. Mario Ruben
**Organisation:** KIT Department of Chemistry and Biosciences
**Part of:** M-CHEMBIO-102335 - General and Inorganic Chemistry

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 7 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|--------|------|---------------------------------------------------------------------------|-------|-------------|--------|
| WT 22/23 | 5004 | Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens) | 3 SWS | Lecture / 🗣 | Ruben |
| WT 22/23 | 5005 | Seminar zur Vorlesung Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens) | 2 SWS | Seminar / 🗣 | Scheiba |

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

## T  8.87 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 | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Examination of another type | 8 | Grade to a third | Each winter term | 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 |

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

## T   8.88 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 2022 | 2550134 | Global Optimization I | 2 SWS | Lecture / 🗣 | Stein |
| **Exams** | | | | | |
| ST 2022 | 7900270_SS2022_HK | Global Optimization I | | | Stein |
| WT 22/23 | 7900004_WS2223_NK | Global Optimization I | | | Stein |

Legend: 🖥 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**

Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO). The successful completion of the exercises is required for admission to the written exam.

The exam is offered in the lecture of semester and the following semester.

The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
Part I and II of the lecture are held consecutively in the **same** semester.

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

| V | **Global Optimization I** | Lecture (V) |
|---|---|---|
| | 2550134, SS 2022, 2 SWS, Language: German, Open in study portal | **On-Site** |

**Content**

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of 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  8.89 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 2022 | 2550134 | Global Optimization I | 2 SWS | Lecture / 🕮 | Stein |
| ST 2022 | 2550135 | Exercise to Global Optimization I and II | 2 SWS | Practice / 🕮 | Stein, Beck |
| ST 2022 | 2550136 | Global Optimization II | 2 SWS | Lecture / 🕮 | Stein |
| **Exams** | | | | | |
| ST 2022 | 7900272_SS2022_HK | Global Optimization I and II | | | Stein |
| WT 22/23 | 7900006_WS2223_NK | Global Optimization I and II | | | Stein |

Legend: 🖥 Online, 🕸 Blended (On-Site/Online), 🕮 On-Site, ✗ Cancelled

**Competence Certificate**

The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
Part I and II of the lecture are held consecutively in the **same** semester.

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

| V | **Global Optimization I** | Lecture (V) |
|---|---|---|
| | 2550134, SS 2022, 2 SWS, Language: German, Open in study portal | On-Site |

**Content**

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of 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** <br> 2550136, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)** <br> **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** | **8.90 Course: Global Optimization II [T-WIWI-102727]** |
|---|---|

**Responsible:** Prof. Dr. Oliver Stein
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-101414 - Methodical Foundations of OR

| **Type** Written examination | **Credits** 4,5 | **Grading scale** Grade to a third | **Recurrence** Each summer term | **Version** 2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2550136 | Global Optimization II | 2 SWS | Lecture / 🗣 | Stein |
| **Exams** | | | | | |
| ST 2022 | 7900271_SS2022_HK | Global Optimization II | | | Stein |
| WT 22/23 | 7900005_WS2223_NK | Global Optimization II | | | Stein |

Legend: 📱 Online, 🖇 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

**Prerequisites**
None

**Annotation**
Part I and II of the lecture are held consecutively in the **same** semester.

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

| **V** | **Global Optimization II** 2550136, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V) On-Site** |
|---|---|---|

**Content**

In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

**Remark:**

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

**Learning objectives:**

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

**Literature**

O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

**Weiterführende Literatur:**

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

## T  8.91 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** | | | | | |
| ST 2022 | 76-T-MACH-110991 | Global Production | | | Lanza |
| WT 22/23 | 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 8.92 Course: Großdiesel- und -gasmotoren für Schiffsantriebe [T-MACH-110816]

**Responsible:**    Dr.-Ing. Heiko Kubach
**Organisation:**
   **Part of:**    M-MACH-101303 - Combustion Engines II

| Type | Credits | Grading scale | Recurrence | Expansion | Version |
|---|---|---|---|---|---|
| Oral examination | 4 | Grade to a third | Each summer term | 1 terms | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2134154 | Large Diesel and Gas Engines for Ship Propulsions | 2 SWS | Lecture / 🗣 | Weisser |
| **Exams** | | | | | |
| ST 2022 | 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 2022, 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  8.93 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** | | | | | |
| ST 2022 | 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   8.94 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 | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 4 | Grade to a third | Each winter term | 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** | | | | | |
| ST 2022 | 8230101667 | Hydraulic Engineering and Water Management | | | Rodrigues Pereira da Franca |

**Competence Certificate**
written exam with 60 minutes

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None

## T  8.95 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<br>Oral examination | Credits<br>4 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Expansion<br>1 terms | Version<br>1 |
| --- | --- | --- | --- | --- | --- |

| Events | | | | | |
| --- | --- | --- | --- | --- | --- |
| WT 22/23 | 2134155 | Hydrogen and reFuels - Energy Conversion in Combustion Engines | 2 SWS | Lecture / 🗣 | Koch |
| **Exams** | | | | | |
| ST 2022 | 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  8.96 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<br>Written examination | Credits<br>4 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 6200513 | Hydrology | 2 SWS | Lecture / 🔀 | Zehe, Wienhöfer |
| WT 22/23 | 6200514 | Tutorial Hydrology | 1 SWS | Practice / 🗣 | Zehe, Wienhöfer |
| **Exams** | | | | | |
| ST 2022 | 8230101693 | Hydrology | | | Wienhöfer, Zehe |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None

## T 8.97 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<br>Examination of another type | Credits<br>4 | Grading scale<br>Grade to a third | Recurrence<br>Each term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2123900 | I4.0 Systems platform | 4 SWS | Project (P / 🎤) | Ovtcharova, Maier |
| WT 22/23 | 2123900 | I4.0 Systems platform | 4 SWS | Project (P / 🎤) | Ovtcharova, Maier |
| **Exams** | | | | | |
| ST 2022 | 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, SS 2022, 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, 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

## T  8.98 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** | | | | | |
| ST 2022 | 76-T-MACH-105985 | Ignition systems | | | Toedter |
| WT 22/23 | 76-T-MACH-105985 | Ignition systems | | | Koch |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
oral exam, 20 min

**Prerequisites**
none

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

### V  Ignition systems
2133125, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

**Content**

- Ignition Process
- Spark Ignition
- Principle of Spark Ignition Systems
- Limits of Spark Ignition
- New Develpoments of Spark Ignition Systems
- New an Alternative Ignition Systems

## T  8.99 Course: Industrial Organization [T-WIWI-102844]

**Responsible:** Prof. Dr. Johannes Philipp Reiß

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

**Part of:** M-WIWI-101420 - Econometrics and Economics
M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

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

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2560238 | Industrial Organization | 2 SWS | Lecture / 🖥 | Reiß, Peters |
| ST 2022 | 2560239 | Übung zu Industrieökonomie | 1 SWS | Practice / 🖥 | Peters, Reiß |
| **Exams** | | | | | |
| ST 2022 | 7990002 | 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 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

### 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 8.100 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 Examination of another type | Credits 3 | Grading scale Grade to a third | Recurrence Each term | Version 2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2122014 | Information Engineering | 2 SWS | Seminar / ✧ | Ovtcharova, Mitarbeiter |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-102209 | Information Engineering | | | Ovtcharova |

Legend: 📱 Online, ✧ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

**Competence Certificate**
Alternative exam assessment (written composition and speech)

**Prerequisites**
None

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

### V Information Engineering
2122014, SS 2022, 2 SWS, Language: German/English, Open in study portal

**Seminar (S)
Blended (On-Site/Online)**

**Content**
Seminar papers on current research topics of the Institute for Information Management in Engineering. The respective topics are presented at the beginning of each semester.

**Organizational issues**
Siehe ILIAS-Kurs

**Literature**
Themenspezifische Literatur

## T  8.101 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 | | | | | |
|--------|--|--|--|--|--|
| ST 2022 | 2121001 | Integrated Information Systems for engineers | 3 SWS | Lecture / Practice ( / 🗣 | Ovtcharova, Elstermann |
| WT 22/23 | 2121001 | Integrated Information Systems for engineers | 3 SWS | Lecture / Practice ( / 🗣 | Ovtcharova, Elstermann |
| **Exams** | | | | | |
| ST 2022 | 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, SS 2022, 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, 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

| T | **8.102 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<br>Written examination | Credits<br>9 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2150660 | Integrated Production Planning in the Age of Industry 4.0 | 6 SWS | Lecture / Practice ( / ⚙ | Lanza |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-109054 | Integrated Production Planning in the Age of Industry 4.0 | | | Lanza |
| WT 22/23 | 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**<br>2150660, SS 2022, 6 SWS, Language: German, Open in study portal | **Lecture / Practice (VÜ)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**

Integrated Production Planning in the age of Industry 4.0 will be taught in the context of this engineering science lecture. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the lecture:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (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  8.103 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 | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2150601 | Integrative Strategies in Production and Development of High Performance Cars | 2 SWS | Lecture / 🧩 | Schlichtenmayer |
| WT 22/23 | 2150601 | Integrative Strategies in Production and Development of High Performance Cars | 2 SWS | Lecture / 🧩 | Schlichtenmayer |

| Exams | | | | |
|---|---|---|---|---|
| ST 2022 | 76-T-MACH-105188 | Integrative Strategies in Production and Development of High Performance Cars | | Schlichtenmayer |
| WT 22/23 | 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, SS 2022, 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

**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**<br>2150601, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**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/).

# T  8.104 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 2022 | 2530570 | International Finance | 2 SWS | Lecture / 🗣 | Walter, Uhrig-Homburg |
| **Exams** | | | | | |
| ST 2022 | 7900097 | International Finance | | | Uhrig-Homburg |
| WT 22/23 | 7900052 | International Finance | | | Uhrig-Homburg |

Legend: 📱 Online, ❀ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

## Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

## Prerequisites
None

## Recommendation
None

## Annotation
The course is offered as a 14-day or block course.

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

| V | **International Finance** | Lecture (V) |
|---|---|---|
| | 2530570, SS 2022, 2 SWS, Language: German, Open in study portal | On-Site |

## Organizational issues
Die Veranstaltung wird als Blockveranstaltung angeboten, nach dem Kickoff am 27.04. nach Absprache.

## Literature
**Weiterführende Literatur:**

- Eiteman, D. et al., Multinational Business Finance, 13. Auflage, 2012.
- Solnik, B. und D. McLeavey, Global Investments, 6. Auflage, 2008.

# T    8.105 Course: Internet Law [T-INFO-101307]

**Responsible:**   Prof. Dr. Thomas Dreier
**Organisation:**   KIT Department of Informatics
**Part of:**   M-INFO-101215 - Intellectual Property Law

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 3 | Grade to a third | Each winter term | 2 |

| Events | | | | | |
|--------|--|--|--|--|--|
| WT 22/23 | 24354 | Internet Law | 2 SWS | Lecture / 🧩 | Dreier |
| **Exams** | | | | | |
| ST 2022 | 7500057 | Internet Law | | | Dreier, Matz |

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

| T | **8.106 Course: Internship [T-WIWI-102756]** |

| **Responsible:** | Studiendekan des KIT-Studienganges |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101610 - Internship |

| **Type**<br>Completed coursework | **Credits**<br>10 | **Grading scale**<br>pass/fail | **Version**<br>1 |

**Competence Certificate**
See module description

**Prerequisites**
See module description

**Recommendation**
See module description

**Annotation**
See module description

## T  8.107 Course: Introduction to Energy Economics [T-WIWI-102746]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Wolf Fichtner |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101464 - Energy Economics |

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

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2581010 | Introduction to Energy Economics | 2 SWS | Lecture / 🎙 | Fichtner |
| ST 2022 | 2581011 | Übungen zu Einführung in die Energiewirtschaft | 2 SWS | Practice / 🎙 | Lehmann, Sandmeier, Ardone, Fichtner |
| **Exams** | | | | | |
| ST 2022 | 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 2022, 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    8.108 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** | | | | | |
| ST 2022 | 8210_0100016 | Introduction to Engineering Geology | | | Blum |

**Prerequisites**

## T  8.109 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 2022 | 2520525 | Introduction to Game Theory | 2 SWS | Lecture / 🎤 | Rosar |
| ST 2022 | 2520526 | Übungen zu Einführung in die Spieltheorie | 1 SWS | Practice / 🎤 | Rosar |

| Exams | | | | |
|---|---|---|---|---|
| ST 2022 | 7900046 | 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

2520525, SS 2022, 2 SWS, Language: German, Open in study portal

**Lecture (V)
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. A short introduction to cooperative game theory is given if there is sufficient time.

The assessment consists of a written exam (60 minutes) according to Section 4(2),1 of the examination regulation.

The exam takes place in the recess period and can be resited at every ordinary examination date.

The module [M-WIWI-101398] *Introduction to Economics* must have been passed.

**Recommendations:**

Basic knowledge of mathematics and statistics is assumed.

The total workload for this course is approximately 135.0 hours. For further information see German version.

This course offers an introduction to the theoretical analysis of strategic interaction situations. At the end of the course, students shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings.

**Compulsory textbook:**

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

**Additional Literature:**

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

**Literature**
**Verpflichtende Literatur:**

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

**Ergänzende Literatur:**

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

## T  8.110 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-101681]

**Responsible:**    Dr.-Ing. Norbert Rösch
                Dr.-Ing. Sven Wursthorn
**Organisation:**    KIT Department of Civil Engineering, Geo and Environmental Sciences
**Part of:**    M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 3 | Grade to a third | Each winter term | 2 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 6071101 | Einführung in GIS für Studierende natur-, ingenieur- und geowissenschaftlicher Fachrichtungen, V/Ü | 4 SWS | Lecture / Practice ( / ⌘ | Wursthorn |
| **Exams** | | | | | |
| ST 2022 | 8280101681 | Introduction to GIS for Students of Natural, Engineering and Geo Sciences | | | Wursthorn |

Legend: ▪ Online, ⌘ Blended (On-Site/Online), ✦ On-Site, ✗ Cancelled

## T   8.111 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite [T-BGU-103541]

| | |
|---|---|
| **Responsible:** | Dr.-Ing. Norbert Rösch |
| | Dr.-Ing. Sven Wursthorn |
| **Organisation:** | KIT Department of Civil Engineering, Geo and Environmental Sciences |
| **Part of:** | M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis |

| Type | 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 |

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

## T  8.112 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 |

| Exams | | | |
|-------|---|---|---|
| ST 2022 | 7900076 | Introduction to Machine Learning | Geyer-Schulz |

**Competence Certificate**

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five-point-steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

## T 8.113 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<br>Written examination | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2141861 | Introduction to Microsystem Technology I | 2 SWS | Lecture / ⚙ | Korvink, Badilita |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105182 | Introduction to Microsystem Technology I | | | Korvink, Badilita |
| WT 22/23 | 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**<br>2141861, WS 22/23, 2 SWS, Language: English, Open in study portal | **Lecture (V)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Literature**
Mikrosystemtechnik für Ingenieure, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

## T  8.114 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 2022 | 2142874 | Introduction to Microsystem Technology II | 2 SWS | Lecture / 🎤 | Korvink, Badilita |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105183 | Introduction to Microsystem Technology II | | | Korvink, Badilita |
| WT 22/23 | 76-T-MACH-105183 | Introduction to Microsystem Technology II | | | Korvink, Badilita |

Legend: 📱 Online, ❖ Blended (On-Site/Online), 🎤 On-Site, ✘ Cancelled

**Competence Certificate**
written examination (60 min)

**Prerequisites**
none

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

### V  Introduction to Microsystem Technology II
2142874, SS 2022, 2 SWS, Language: English, Open in study portal

**Lecture (V)**
**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  8.115 Course: Introduction to Neural Networks and Genetic Algorithms [T-WIWI-111029]

**Responsible:** Prof. Dr. Andreas Geyer-Schulz
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-105482 - Machine Learning and Data Science

| Type Written examination | Credits 4,5 | Grading scale Grade to a third | Recurrence Each summer term | Expansion 1 terms | Version 1 |
|---|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2540541 | Introduction to Neural Networks and Genetic Algorithms | 2 SWS | Lecture | Geyer-Schulz |
| ST 2022 | 2540542 | Übung Introduction to Neural Networks and Genetic Algorithms | 1 SWS | Practice | Geyer-Schulz |
| **Exams** | | | | | |
| ST 2022 | 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
2540541, SS 2022, 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    8.116 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 | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2550040 | Introduction to Operations Research I | 2 SWS | Lecture / 🗣 | Stein |
| WT 22/23 | 2530044 | | | Tutorial ( / 🗣 | Dunke |
| WT 22/23 | 2550043 | Introduction to Operations Research II | 2+2 SWS | Lecture / 🗣 | Stein |
| **Exams** | | | | | |
| ST 2022 | 7900038 | Introduction to Operations Research I and II | | | Nickel |

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 I
2550040, SS 2022, 2 SWS, Language: German, Open in study portal

**Lecture (V)**
**On-Site**

### Content
Examples for typical OR problems.

Linear Programming: Basic notions, simplex method, duality, special versions of the simplex method (dual simplex method, three phase method), sensitivity analysis, parametric optimization, game theory.

Graphs and Networks: Basic notions of graph theory, shortest paths in networks, project scheduling, maximal and minimal cost flows in networks.

### Learning objectives:
The student

- names and describes basic notions of linear programming as well as graphs and networks,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

**Literature**

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

| V | **Introduction to Operations Research II** <br> 2550043, WS 22/23, 2+2 SWS, Language: German, Open in study portal | **Lecture (V)** <br> **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

## T  8.117 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** | | | | | |
| ST 2022 | 7900042 | Introduction to Programming with Java | | | Zöllner |
| WT 22/23 | 79AIFB_Prog1 | 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
2511000, WS 22/23, 3 SWS, Language: German, Open in study portal

**Lecture (V)**
**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 8.118 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** | | | | | |
| ST 2022 | 790fiwi | Introduction to Public Finance | | | Wigger |
| WT 22/23 | 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  8.119 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 2022 | 2550470 | Introduction to Stochastic Optimization | 2 SWS | Lecture / 🖥 | Rebennack |
| ST 2022 | 2550471 | Übung zur Einführung in die Stochastische Optimierung | 1 SWS | Practice / 🧩 | Rebennack, Sinske |
| ST 2022 | 2550474 | Rechnerübung zur Einführung in die Stochastische Optimierung | 2 SWS | Others (sons | Rebennack, Sinske |
| **Exams** | | | | | |
| ST 2022 | 7900311 | Introduction to Stochastic Optimization | | | Rebennack |

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

**Competence Certificate**

The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

**Prerequisites**

None.

## T  8.120 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 2022 | 2530575 | Investments | 2 SWS | Lecture / 🗣 | Uhrig-Homburg, Müller |
| ST 2022 | 2530576 | Übung zu Investments | 1 SWS | Practice / 🗣 | Uhrig-Homburg, Kargus |
| **Exams** | | | | | |
| ST 2022 | 7900109 | Investments | | | Uhrig-Homburg |
| WT 22/23 | 7900054 | Investments | | | Uhrig-Homburg |

Legend: 🗎 Online, ✺ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**

Depending on further pandemic developments, the examination will be offered 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 2022, 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  8.121 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**<br>Examination of another type | **Credits**<br>5 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each summer term | **Version**<br>2 |
| --- | --- | --- | --- | --- |

| Events | | | | | |
| --- | --- | --- | --- | --- | --- |
| ST 2022 | 2150550 | Laboratory Production Metrology | 3 SWS | Practical course / 👤 | Lanza, Stamer |
| **Exams** | | | | | |
| ST 2022 | 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**<br>2150550, SS 2022, 3 SWS, Language: German, Open in study portal | **Practical course (P)**<br>**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   8.122 Course: Laboratory Work in General and Inorganic Chemistry [T-CHEMBIO-108287]

**Organisation:**   KIT Department of Chemistry and Biosciences
**Part of:**   M-CHEMBIO-104026 - Laboratory Work in Inorganic Chemistry

| Type | Credits | Grading scale | Version |
|------|---------|---------------|---------|
| Examination of another type | 7 | Grade to a third | 1 |

| Exams | | | |
|-------|-------|--------------------------------------------------|-------|
| ST 2022 | 7100014 | Laboratory Work in General and Inorganic Chemistry | Anson |

**Prerequisites**

## T  8.123 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<br>Examination of another type | Credits<br>6 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Version<br>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**
none

**Annotation**
For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/lernfabrik.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

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

| V | **Learning Factory "Global Production"**<br>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 attendence: ~ 36 h
self-study: ~ 60 h

**Organizational issues**

Termine werden über die Institutshomepage bekanntgegeben.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Teilnehmer begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php)

Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.

Die Studierenden sollten Vorkenntnisse in mindestens einem der folgenden Bereiche haben:

- Integrierte Produktionsplanung
- Globale Produktion und Logistik
- Qualitätsmanagement

For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/studium-und-lehre.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

**Literature**
**Medien:**
E-Learning Plattform ilias, Powerpoint, Fotoprotokoll. Die Medien werden über ilias (https://ilias.studium.kit.edu/) bereitgestellt.
**Media:**
E-learning platform ilias, powerpoint, photo protocol. The media are provided through ilias (https://ilias.studium.kit.edu/).

## T  8.124 Course: Logistics and Supply Chain Management [T-MACH-110771]

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

**Part of:**     M-MACH-105298 - Logistics and Supply Chain Management

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 9 | Grade to a third | Each summer term | 3 |

| Events | | | | | |
|--------|--|--|--|--|--|
| ST 2022 | 2118078 | Logistics and Supply Chain Management | 4 SWS | Lecture / ⚘ | Furmans, Alicke |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-110771 | Logistics and Supply Chain Management | | | Furmans |

Legend: 🖥 Online, ⚘ Blended (On-Site/Online), ✦ On-Site, ✗ Cancelled

### Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

### Prerequisites
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 2022, 4 SWS, Language: English, Open in study portal

**Lecture (V)**
**Blended (On-Site/Online)**

### Content
In the lecture "Logistics and Supply Chain Management", comprehensive and well-founded fundamentals of crucial issues in logistics and supply chain management are presented. Furthermore, the interaction of different design elements of supply chains is emphasized. For this purpose, both qualitative and quantitative models are presented and applied. Additionally, methods for mapping and evaluating logistics systems and supply chains are described. The contents of the lecture are deepened in exercises and case studies and comprehension is partially reviewed in case studies. The contents will be illustrated, among other things, on the basis of supply chains in the automotive industry.

Among others, the following topics are covered:

- Inventory Management
- Forecasting
- Bullwhip Effect
- Supply Chain Segmentation and Collaboration
- Key Performance Indicators
- Supply Chain Risk Management
- Production Logistics
- Location Planning
- Route Planning

It is intended to provide an interactive format in which students can also contribute (and work alone or in groups). Since logistics and supply chain management (also in times during and after Corona) requires working in an international environment and therefore many terms are derived from English, the lecture will be held in English.

| T | **8.125 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 Written examination | Credits 3,5 | Grading scale Grade to a third | Recurrence Each summer term | Version 2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2581996 | Logistics and Supply Chain Management | 2 SWS | Lecture / 🗣 | Schultmann, Klein |
| ST 2022 | 2581997 | Übung zu Logistics and Supply Chain Management | 1 SWS | Practice / 🗣 | Lüttenberg, Eberhardt |
| **Exams** | | | | | |
| ST 2022 | 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** 2581996, SS 2022, 2 SWS, Language: English, Open in study portal | **Lecture (V) 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 | **8.126 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 Oral examination | Credits 9 | Grading scale Grade to a third | Recurrence Each winter term | Version 2 |
|---|---|---|---|---|

| **Events** | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2149910 | Machine Tools and High-Precision Manufacturing Systems | 6 SWS | Lecture / Practice ( / ⚉ | Fleischer |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-110963-WING | Machine Tools and High-Precision Manufacturing Systems | | | Fleischer |
| WT 22/23 | 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 8.127 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**<br>Written examination | **Credits**<br>4,5 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each winter term | **Version**<br>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** | | | | | |
| ST 2022 | 7900047 | Macroeconomic Theory | | | Brumm |
| 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**<br>2560404, WS 22/23, 2 SWS, Language: English, Open in study portal | **Lecture (V)**<br>**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  8.128 Course: Management Accounting 1 [T-WIWI-102800]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Marcus Wouters |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101498 - Management Accounting |

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

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2579900 | Management Accounting 1 | 2 SWS | Lecture / 🗣 | Wouters |
| ST 2022 | 2579901 | Tutorial Management Accounting 1 (Bachelor) | 2 SWS | Practice / 🗣 | Dickemann |
| ST 2022 | 2579902 | Tutorial Management Accounting 1 (Master) | 2 SWS | Practice / 🗣 | Dickemann |
| **Exams** | | | | | |
| ST 2022 | 79-2579900-B | Management Accounting 1 (Bachelor) | | | Wouters |
| ST 2022 | 79-2579900-M | Management Accounting 1 (Mastervorzug und Master) | | | Wouters |

Legend: 📱 Online, ❀ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

**Prerequisites**
None

**Annotation**
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

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

### V  Management Accounting 1
2579900, SS 2022, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

**Content**

The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

**Learning objectives:**

- Students have an understanding of theory and applications of management accounting topics.
- They can use financial information for various purposes in organizations.

**Examination:**

- The assessment consists of a written exam (120 minutes) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

**Workload:**

- The total workload for this course is approximately 135.0 hours. For further information see German version.

**Literature**

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

| V | **Tutorial Management Accounting 1 (Bachelor)** <br> 2579901, SS 2022, 2 SWS, Language: English, Open in study portal | **Practice (Ü)** <br> **On-Site** |
|---|---|---|

**Content**
see Module Handbook

| V | **Tutorial Management Accounting 1 (Master)** <br> 2579902, SS 2022, 2 SWS, Language: English, Open in study portal | **Practice (Ü)** <br> **On-Site** |
|---|---|---|

**Content**
see Module Handbook

## T   8.129 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<br>Written examination | Credits<br>4,5 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Version<br>2 |
|---|---|---|---|---|

### Events

| | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2579903 | Management Accounting 2 | 2 SWS | Lecture / 📱 | Wouters, Dickemann |
| WT 22/23 | 2579904 | Tutorial Management Accounting 2 (Bachelor) | 2 SWS | Practice / 👤 | Wouters |
| WT 22/23 | 2579905 | Tutorial Management Accounting 2 (Master) | 2 SWS | Practice / 👤 | Wouters |

### Exams

| | | | | |
|---|---|---|---|---|
| ST 2022 | 79-2579903-B | Management Accounting 2 (Bachelor) | | Wouters |
| ST 2022 | 79-2579903-M | Management Accounting 2 (Mastervorzug und Master) | | Wouters |

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

**Competence Certificate**
Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

**Prerequisites**
None

**Recommendation**
It is recommended to take part in the course "Management Accounting 1" before this course.

**Annotation**
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tutorial and examination.

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

| V | **Management Accounting 2**<br>2579903, WS 22/23, 2 SWS, Language: English, Open in study portal | Lecture (V)<br>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)** <br> 2579904, WS 22/23, 2 SWS, Language: English, Open in study portal | **Practice (Ü)** <br> **On-Site** |
|---|---|---|

**Content**
see ILIAS

| V | **Tutorial Management Accounting 2 (Master)** <br> 2579905, WS 22/23, 2 SWS, Language: English, Open in study portal | **Practice (Ü)** <br> **On-Site** |
|---|---|---|

**Content**
see ILIAS

## T  8.130 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** | | | | | |
| ST 2022 | 7900184 | Management and Marketing | | | Nieken, Terzidis, Klarmann |
| WT 22/23 | 7900012 | 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
2610026, WS 22/23, 2 SWS, Language: German, Open in study portal

**Lecture (V)**
**Blended (On-Site/Online)**

**Literature**
Ausführliche Literaturhinweise werden in den Materialen zur Vorlesung gegeben.

| T | **8.131 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 2022 | 2577900 | Management and Strategy | 2 SWS | Lecture / 🗣 | Lindstädt |
| **Exams** | | | | | |
| ST 2022 | 7900067 | Management and Strategy | | | Lindstädt |
| WT 22/23 | 7900199 | 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** <br> 2577900, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)** <br> **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 | **8.132 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**<br>Written examination | **Credits**<br>3,5 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each winter term | **Version**<br>4 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2577902 | Managing Organizations | 2 SWS | Lecture / 🗣 | Lindstädt |
| **Exams** | | | | | |
| ST 2022 | 7900066 | Managing Organizations | | | Lindstädt |
| WT 22/23 | 7900049 | 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**<br>2577902, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**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   8.133 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<br>Examination of another type | Credits<br>4,5 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2571152 | Managing the Marketing Mix | 2 SWS | Lecture / 🎤 | Klarmann |
| ST 2022 | 2571153 | Übung zu Marketing Mix (Bachelor) | 1 SWS | Practice / 🎤 | Cordts, Gerlach |
| **Exams** | | | | | |
| ST 2022 | 7900023 | Managing the Marketing Mix | | | Klarmann |
| ST 2022 | 7900205 | Managing the Marketing Mix | | | 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 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. The written exam will either take place in the lecture hall or online, depending on further pandemic developments. Further details will be announced during the lecture.

### Prerequisites

None

### Annotation

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**<br>2571152, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**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** | **8.134 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** Written examination | **Credits** 9 | **Grading scale** Grade to a third | **Recurrence** Each winter term | **Version** 3 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2149657 | Manufacturing Technology | 6 SWS | Lecture / Practice ( / 🧩 | Schulze |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-102105 | Manufacturing Technology | | | Schulze |
| WT 22/23 | 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   8.135 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**
2117051, WS 22/23, 15 SWS, Language: German, Open in study portal | **Others (sonst.)**
**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    8.136 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**<br>Written examination | **Credits**<br>5 | **Grading scale**<br>Grade to a third | **Version**<br>1 |
|---|---|---|---|

## T   8.137 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 |

## T   8.138 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**<br>Written examination | **Credits**<br>3,5 | **Grading scale**<br>Grade to a third | **Version**<br>1 |
|---|---|---|---|

| Exams | | | | |
|---|---|---|---|---|
| ST 2022 | 00022 | Mathematics II - Final Exam | | Nestmann, Winter, Last |
| ST 2022 | 00024 | Mathematics II - Final Exam | | Nestmann, Winter, Last |

## T    8.139 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 |
|---|---|---|---|

| Exams | | | |
|---|---|---|---|
| ST 2022 | 00021 | Mathematics II - Midterm Exam | Nestmann, Last, Winter |
| ST 2022 | 00023 | Mathematics II - Midterm Exam | Nestmann, Winter, Last |

## T  8.140 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 | Credits | Grading scale | Version |
|---|---|---|---|
| Written examination | 4 | Grade to a third | 1 |

## T  8.141 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**<br>Written examination | **Credits**<br>6 | **Grading scale**<br>Grade to a third | **Version**<br>2 |
|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2145178 | Mechanical Design I | 2 SWS | Lecture / 🗣 | 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**<br>2145178, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**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

## T    8.142 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** Completed coursework | **Credits** 1 | **Grading scale** pass/fail | **Recurrence** Each winter term | **Version** 1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2145185 | Tutorials Mechanical Design I | 1 SWS | Practice / 🗣 | Albers, Matthiesen, Mitarbeiter |

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   8.143 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 |

**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

## T  8.144 Course: Metal Forming [T-MACH-105177]

| | |
|---|---|
| **Responsible:** | Dr.-Ing. Thomas Herlan |
| **Organisation:** | KIT Department of Mechanical Engineering |
| **Part of:** | M-MACH-101284 - Specialization in Production Engineering |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 4 | Grade to a third | Each summer term | 2 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2150681 | Metal Forming | 2 SWS | Lecture / ⚙ | Herlan |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105177 | Metal Forming | | | Herlan |

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

**Competence Certificate**
Oral Exam (20 min)

**Prerequisites**
none

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

| V | **Metal Forming**<br>2150681, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**
At the beginning of the lecture the basics of metal forming are briefly introduced. The focus of the lecture is on massive forming (forging, extrusion, rolling) and sheet forming (car body forming, deep drawing, stretch drawing). This includes the systematic treatment of the appropriate metal forming Machines and the corresponding tool technology. Aspects of tribology, as well as basics in material science and aspects of production planning are also discussed briefly. The plastic theory is presented to the extent necessary in order to present the numerical simulation method and the FEM computation of forming processes or tool design. The lecture will be completed by product samples from the forming technology.

The topics are as follows:

- Introduction and basics
- Hot forming
- Metal forming machines
- Tools
- Metallographic fundamentals
- Plastic theory
- Tribology
- Sheet forming
- Extrusion
- Numerical simulation

**Learning Outcomes:**

The students ...

- are able to reflect the basics, forming processes, tools, Machines and equipment of metal forming in an integrated and systematic way.
- are capable to illustrate the differences between the forming processes, tools, machines and equipment with concrete examples and are qualified to analyze and assess them in terms of their suitability for the particular application.
- are also able to transfer and apply the acquired knowledge to other metal forming problems.

**Workload:**

regular attendance: 21 hours
self-study: 99 hours

**Organizational issues**
Vorlesungstermine freitags, wöchentlich.
Die konkreten Termine werden in der ersten Vorlesung bekannt gegeben und auf der Institutshomepage und ILIAS veröffentlicht.

**Literature**
**Medien**:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

**Media**:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

## T  8.145 Course: Microactuators [T-MACH-101910]

**Responsible:** Prof. Dr. Manfred Kohl
**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 2022 | 2142881 | Microactuators | 2 SWS | Lecture / 🧩 | Kohl |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-101910 | Microactuators | | | Kohl |

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

**Competence Certificate**
written exam, 60 min.

**Prerequisites**
none

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

### V  Microactuators
2142881, SS 2022, 2 SWS, Language: German, Open in study portal

**Lecture (V)**
**Blended (On-Site/Online)**

**Content**

- Basic knowledge in the material science of the actuation principles

- Layout and design optimization

- Fabrication technologies

- Selected developments

- Applications

The lecture includes amongst others the following topics:

- 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 8.146 Course: Microeconometrics [T-WIWI-112153]

| | |
|---|---|
| **Responsible:** | TT-Prof. Dr. Fabian Krüger |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-105414 - Statistics and Econometrics II |

| Type 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 |

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  8.147 Course: Mobility and Infrastructure [T-BGU-101791]

**Responsible:** Prof. Dr.-Ing. Ralf Roos
Prof. Dr.-Ing. Peter Vortisch
**Organisation:** KIT Department of Civil Engineering, Geo and Environmental Sciences
**Part of:** M-BGU-101067 - Mobility and Infrastructure

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 9 | Grade to a third | Each term | 2 |

| Events | | | | | |
|--------|--------|--------|--------|--------|--------|
| ST 2022 | 6200404 | Spatial Planning and Planning Law | 2 SWS | Lecture / ✪ | Wilske |
| ST 2022 | 6200405 | Exercises to Spatial Planning and Planning Law | 1 SWS | Practice / 🗣 | Wilske, Mitarbeiter/innen |
| ST 2022 | 6200406 | Transportation Systems | 2 SWS | Lecture / 🗣 | Vortisch |
| ST 2022 | 6200407 | Exercises to Transportation Systems | | Practice / ✪ | Vortisch, Mitarbeiter/innen |
| ST 2022 | 6200408 | Design Basics in Highway Engineering | 2 SWS | Lecture / 🗣 | Roos, Zimmermann |
| ST 2022 | 6200409 | Exercises to Design Basics in Highway Engineering | | Practice / 🗣 | Plachkova-Dzhurova, Zimmermann |
| **Exams** | | | | | |
| ST 2022 | 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 8.148 Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Stefan Nickel |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101413 - Applications of Operations Research |

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

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2550490 | Modellieren und OR-Software: Einführung | 3 SWS | Practical course / 🔀 | Nickel, Linner, Pomes |
| **Exams** | | | | | |
| ST 2022 | 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 2022, 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**

Bewerbung einreichen bis 31.03.2022:

http://go.wiwi.kit.edu/OR_Bewerbung

## T  8.149 Course: Nanotechnology with Clusterbeams [T-MACH-102080]

| | |
|---|---|
| **Responsible:** | Dr. Jürgen Gspann |
| **Organisation:** | KIT Department of Mechanical Engineering |

**Part of:**    M-MACH-101287 - Microsystem Technology

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

**Competence Certificate**
written examination
presence in more that 70% of the lectures
Duration: 1 h

aids: none

**Prerequisites**

## T  8.150 Course: Nonlinear Optimization I [T-WIWI-102724]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Oliver Stein |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101414 - Methodical Foundations of OR |
| | M-WIWI-103278 - Optimization under Uncertainty |

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2550111 | Nonlinear Optimization I | 2 SWS | Lecture / 🔊 | Stein |
| WT 22/23 | 2550112 | Exercises Nonlinear Optimization I + II | | Practice / 🔊 | Stein, Schwarze |
| **Exams** | | | | | |
| ST 2022 | 7900252_SS2022_NK | Nonlinear Optimization I | | | Stein |
| WT 22/23 | 7900001_WS2223_HK | Nonlinear Optimization I | | | Stein |

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

### Competence Certificate

The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam. The exam takes place in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

### Prerequisites

The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

### Annotation

Part I and II of the lecture are held consecutively in the *same* semester.

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

### V  Nonlinear Optimization I
2550111, WS 22/23, 2 SWS, Language: German, Open in study portal

**Lecture (V)**
**On-Site**

### Content

The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

**Remark:**

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

**Learning objectives:**

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

**Literature**
O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

**Weiterführende Literatur:**

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

## T  8.151 Course: Nonlinear Optimization I and II [T-WIWI-103637]

**Responsible:** Prof. Dr. Oliver Stein
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-101414 - Methodical Foundations of OR

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Written examination | 9 | Grade to a third | Each winter term | 6 |

| Events | | | | | |
|--------|--------|----------------------------------|--------|----------------|------------------|
| WT 22/23 | 2550111 | Nonlinear Optimization I | 2 SWS | Lecture / 🎤 | Stein |
| WT 22/23 | 2550112 | Exercises Nonlinear Optimization I + II | | Practice / 🎤 | Stein, Schwarze |
| WT 22/23 | 2550113 | Nonlinear Optimization II | 2 SWS | Lecture / 🎤 | Stein |
| **Exams** | | | | | |
| ST 2022 | 7900266_SS2022_NK | Nonlinear Optimization I and II | | | Stein |
| WT 22/23 | 7900003_WS2223_HK | Nonlinear Optimization I and II | | | Stein |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

### Competence Certificate

The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

### Prerequisites
None.

### Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

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

| V | **Nonlinear Optimization I** | **Lecture (V)** |
|---|------------------------------|-----------------|
|   | 2550111, WS 22/23, 2 SWS, Language: German, Open in study portal | **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** <br> 2550113, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)** <br> **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  8.152 Course: Nonlinear Optimization II [T-WIWI-102725]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Oliver Stein |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101414 - Methodical Foundations of OR |

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

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2550112 | Exercises Nonlinear Optimization I + II | | Practice / 🌳 | Stein, Schwarze |
| WT 22/23 | 2550113 | Nonlinear Optimization II | 2 SWS | Lecture / 🌳 | Stein |
| **Exams** | | | | | |
| ST 2022 | 7900258_SS2022_NK | Nonlinear Optimization II | | | Stein |
| WT 22/23 | 7900002_WS2223_HK | Nonlinear Optimization II | | | Stein |

Legend: 📱 Online, 🗗 Blended (On-Site/Online), 🌳 On-Site, ✗ Cancelled

### Competence Certificate

The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.

### Prerequisites
None.

### Annotation
Part I and II of the lecture are held consecutively in the same semester.

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

### V  Nonlinear Optimization II
2550113, WS 22/23, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

### Content

The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

**Remark:**

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

**Learning objectives:**

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

**Literature**

O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

**Weiterführende Literatur:**

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

## T    8.153 Course: Novel Actuators and Sensors [T-MACH-102152]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Manfred Kohl |
| | Dr. Martin Sommer |
| **Organisation:** | KIT Department of Mechanical Engineering |
| | |
| **Part of:** | M-MACH-101287 - Microsystem Technology |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4 | Grade to a third | Each winter term | 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**<br>2141865, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)**<br>**Blended (On-Site/Online)** |

**Literature**

- Vorlesungsskript "Neue Aktoren" und Folienskript "Sensoren"

- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007

- "Sensors Update", Edited by H.Baltes, W. Göpel, J. Hesse, VCH, 1996, ISBN: 3-527-29432-5

- "Multivariate Datenanalyse – Methodik und Anwendungen in der Chemie", R. Henrion, G. Henrion, Springer 1994, ISBN 3-540-58188-X

## T  8.154 Course: Optimization under Uncertainty [T-WIWI-106545]

**Responsible:**   Prof. Dr. Steffen Rebennack
**Organisation:**  KIT Department of Economics and Management
**Part of:**       M-WIWI-101413 - Applications of Operations Research
                   M-WIWI-103278 - Optimization under Uncertainty

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

| Events | | | | | |
|--------|--|--|--|--|--|
| WT 22/23 | 2550464 | Optimization Under Uncertainty | 2 SWS | Lecture / 🖥 | Rebennack |
| WT 22/23 | 2550465 | Übungen zu Optimierungsansätze unter Unsicherheit | 1 SWS | Practice / 👊 | Rebennack, Füllner |
| WT 22/23 | 2550466 | | 2 SWS | Others (sons | Rebennack, Füllner |

Legend: 🖥 Online, 🌐 Blended (On-Site/Online), 👊 On-Site, ✗ Cancelled

**Competence Certificate**
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

**Prerequisites**
None.

| T | **8.155 Course: Optoelectronic Components [T-ETIT-101907]** |

**Responsible:** Prof. Dr. Wolfgang Freude
**Organisation:** KIT Department of Electrical Engineering and Information Technology
**Part of:** M-MACH-101287 - Microsystem Technology

| **Type** Oral examination | **Credits** 4 | **Grading scale** Grade to a third | **Recurrence** Each summer term | **Version** 1 |

| Events | | | | | |
|--------|--------|--------------------------------------|--------|-------------------|--------|
| ST 2022 | 2309486 | Optoelectronic Components | 2 SWS | Lecture / 🎤 | Freude |
| ST 2022 | 2309487 | Optoelectronic Components (Tutorial) | 1 SWS | Practice / 🎤 | Freude |
| **Exams** | | | | | |
| ST 2022 | 7309486 | Optoelectronic Components | | | Freude |

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

**Prerequisites**

## T   8.156 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 2022 | 2573001 | Personnel Policies and Labor Market Institutions | 2 SWS | Lecture / 🗣 | Nieken |
| ST 2022 | 2573002 | Übungen zu Personalpolitik und Arbeitsmarktinstitutionen | 1 SWS | Practice / 🗣 | Nieken, Mitarbeiter |
| **Exams** | | | | | |
| ST 2022 | 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** | Lecture (V) |
|---|---|---|
| | 2573001, SS 2022, 2 SWS, Language: German, Open in study portal | 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    8.157 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    8.158 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 8.159 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   8.160 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   8.160 Course: PH APL-ING-TL04 ub [T-WIWI-106294]

## T 8.161 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 | 8.162 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  8.163 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    8.164 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 Written examination | Credits 6 | Grading scale Grade to a third | Recurrence Each summer term | Version 1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2142890 | Physics for Engineers | 4 SWS | Lecture / Practice ( / 🎤 | Weygand, Dienwiebel, Nesterov-Müller, Gumbsch |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-100530 | Physics for Engineers | | | Gumbsch, Weygand, Nesterov-Müller, Dienwiebel |

Legend: 📱 Online, 🏫 Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

**Competence Certificate**
written exam 90 min

**Prerequisites**
none

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

| V | **Physics for Engineers** 2142890, SS 2022, 4 SWS, Language: German, Open in study portal | **Lecture / Practice (VÜ) On-Site** |
|---|---|---|

**Content**

1) Foundations of solid state physics

- Wave particle dualism
- Tunnelling
- Schrödinger equation
- H-atom

2) Electrical conductivity of solids

- solid state: periodic potentials
- Pauli Principle
- band structure
- metals, semiconductors and isolators
- p-n junction / diode

3) Optics

- quantum mechanical principles of the laser
- linear optics
- non-linear optics

Exercises are used for complementing and deepening the contents of the lecture as well as for answering more extensive questions raised by the students and for testing progress in learning of the topics.

The student

- has the basic understanding of the physical foundations to explain the relationship between the quantum mechanical principles and the optical as well as electrical properties of materials
- can describe the fundamental experiments, which allow the illustration of these principles

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises)
self-study: 105 hours

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

**Organizational issues**
Kontakt: daniel.weygand@kit.edu

**Literature**

- Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
- Haken und Wolf: Atom- und Quantenphysik. Einführung in die experimentellen und theoretischen Grundlagen, 7. Aufl., Springer, 2000
- Harris, Moderne Physik, Pearson Verlag, 2013

## T  8.165 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 | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Examination of another type | 4,5 | Grade to a third | Each winter term | 3 |

### Events

| | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2540468 | Platform Economy | 2 SWS | Lecture / 🗣 | Weinhardt |
| WT 22/23 | 2540469 | Übung zu Platform Economy | 1 SWS | Practice / 🗣 | Knierim |

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)
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- 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  8.166 Course: PLM-CAD Workshop [T-MACH-102153]

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

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

| Type Examination of another type | Credits 4 | Grading scale Grade to a third | Recurrence Each term | Version 3 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2121357 | PLM-CAD Workshop | 4 SWS | Project (P / 🎤 | Ovtcharova, Mitarbeiter |
| WT 22/23 | 2121357 | PLM-CAD Workshop | 4 SWS | Project (P / 🎤 | Ovtcharova, Mitarbeiter |
| **Exams** | | | | | |
| ST 2022 | 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, SS 2022, 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

### 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

## T  8.167 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 Written examination | Credits 6 | Grading scale Grade to a third | Recurrence Each winter term | Version 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** | | | | | |
| ST 2022 | 7307371 | Power Network | | | Leibfried |
| WT 22/23 | 7307371 | Power Network | | | Leibfried |

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

## T  8.168 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 |

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  8.169 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  8.170 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   8.171 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<br>Examination of another type | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2143875 | Introduction to Microsystem Technology - Practical Course | 2 SWS | Practical course / 🎤 | Last |
| ST 2022 | 2143877 | Introduction to Microsystem Technology - Practical Course | 2 SWS | Practical course / 🎤 | Last |
| 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 |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-102164 | Practical Training in Basics of Microsystem Technology | | | Last |
| WT 22/23 | 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, SS 2022, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

**Content**
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
3. Mikro optics: "LIGA-micro spectrometer"
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
9. Atomic force microscopy
Each student takes part in only five experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

**Organizational issues**
Das Praktikum findet in den Laboren des IMT am CN statt. Treffpunkt: Bau 307, Raum 322.

Teilnahmeanfragen an Frau Nowotny, marie.nowotny@kit.edu

**Literature**
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

| **V** | **Introduction to Microsystem Technology - Practical Course**<br>2143877, SS 2022, 2 SWS, Language: German, Open in study portal | **Practical course (P)**<br>**On-Site** |

**Content**
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
3. Mikro optics: "LIGA-micro spectrometer"
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
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Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

| **V** | **Introduction to Microsystem Technology - Practical Course**<br>2143875, WS 22/23, 2 SWS, Language: German, Open in study portal | **Practical course (P)**<br>**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**<br>2143877, WS 22/23, 2 SWS, Language: German, Open in study portal | **Practical course (P)**<br>**On-Site** |

**Literature**
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

## T  8.172 Course: Problem Solving, Communication and Leadership [T-WIWI-102871]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Hagen Lindstädt |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101425 - Strategy and Organization |
| | M-WIWI-101513 - Human Resources and Organizations |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 2 | Grade to a third | Each summer term | 2 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2577910 | Problem solving, communication and leadership | 1 SWS | Lecture / 🗣 | Lindstädt |
| **Exams** | | | | | |
| ST 2022 | 7900068 | Problem Solving, Communication and Leadership | | | Lindstädt |
| WT 22/23 | 7900070 | 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 2022, 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 | **8.173 Course: Procedures of Remote Sensing [T-BGU-103542]** |

**Responsible:**     Dr.-Ing. Uwe Weidner
**Organisation:**    KIT Department of Civil Engineering, Geo and Environmental Sciences
**Part of:**         M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

| **Type** Oral examination | **Credits** 3 | **Grading scale** Grade to a third | **Version** 2 |
|---|---|---|---|

## T   8.174 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 | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Completed coursework | 1 | pass/fail | Each summer term | 1 |

| Events | | | | | |
|--------|--------|----------------------------------------|--------|------------|---------|
| ST 2022 | 6020244 | Procedures of Remote Sensing, Excercise | 1 SWS | Practice / 🗣 | Weidner |
| **Exams** | | | | | |
| ST 2022 | 8284101638 | Procedures of Remote Sensing, Prerequisite | | | Weidner |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None

## T  8.175 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** | Lecture (V) |
|---|---|---|
| | 2149670, WS 22/23, 2 SWS, Language: German, Open in study portal | 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   8.176 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**<br>Written examination | **Credits**<br>4 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each winter term | **Version**<br>2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2121350 | Product Lifecycle Management | 2 SWS | Lecture / 🗣 | Ovtcharova, Elstermann |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-105147 | Product Lifecycle Management | | | Ovtcharova, Elstermann |
| WT 22/23 | 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 8.177 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 2022 | 2123364 | Product, Process and Resource Integration in the Automotive Industry | 2 SWS | Lecture / Practice ( / 🗣 | Mbang |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-102155 | Product, Process and Resource Integration in the Automotive Industry | | | 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 2022, 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 | 8.178 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** | | | | | |
| ST 2022 | 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  8.179 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 2022 | 2150605 | Production Technology for E-Mobility | 2 SWS | Lecture / ♻ | Fleischer |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-110984 | Production Technology for E-Mobility | | | Fleischer |
| WT 22/23 | 76-T-MACH-110984 | Production Technology for E-Mobility | | | Fleischer |

Legend: 📱 Online, ♻ Blended (On-Site/Online), 🌑 On-Site, ✗ Cancelled

**Competence Certificate**
Written Exam (60 min)

**Prerequisites**
none

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

## V  Production Technology for E-Mobility
2150605, SS 2022, 2 SWS, Language: German, Open in study portal

**Lecture (V)**
**Blended (On-Site/Online)**

**Content**
In the lecture Production Engineering for Electromobility the students should be enabled to design, select and develop production processes for the production of the components of an electric drive train (electric motor, battery cells, fuel cells) by using research-oriented teaching.

**Learning Outcomes:**

The students are able to:

- describe the structure and function of a fuel cell, an electric traction drive and a batterysystem.
- reproduce the process chains for the production of the components fuel cell, battery and electric traction drive.
- apply methodical tools to solve problems along the process chain.
- derive the challenges in the production of electric drives for electric mobility.
- describe the factors influencing the individual process steps on each other using the process chain of Li-ion battery cells.
- enumerate or describe the necessary process parameters to counteract the influencing factors of the process steps in Li-ion battery cell production.
- apply methodical tools to solve problems along the process chain for the production of Li-ion battery cells.
- derive the challenge of mounting and dismounting battery modules.
- derive the challenges in the production of fuel cells for use in mobility.

**Workload:**

regular attendance: 42 hours
self-study: 78 hours

**Literature**
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

<div style="background-color:#b8dcd4">

**T**    **8.180 Course: Production, Logistics and Information Systems [T-WIWI-111602]**

</div>

| | |
|---|---|
| **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** Written examination | **Credits** 5 | **Grading scale** Grade to a third | **Recurrence** Each winter term | **Version** 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 ( | Strych |
| **Exams** | | | | | |
| WT 22/23 | 7900154 | Production, Logistics and Information Systems | | | Schultmann, Nickel, Weinhardt, Mädche, Geyer-Schulz, Fichtner |

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:*

<div style="background-color:#e5f0d8">

**V**    2600004, WS 22/23, 2 SWS, Open in study portal                                          **Lecture (V)**

</div>

**Literature**
Coenenberg, Haller und Schultze (2014): Jahresabschluss und Jahresabschlussanalyse, 23. Auflage. Stuttgart: Schäffer-Poeschel.
Hawawini and Viallet (2011): Finance for Executives: Managing for Value Creation. South-Western Cencage Learning.

## T   8.181 Course: Project in Applied Remote Sensing [T-BGU-101814]

**Responsible:** Prof. Dr.-Ing. Stefan Hinz
Dr.-Ing. Uwe Weidner

**Organisation:** KIT Department of Civil Engineering, Geo and Environmental Sciences

**Part of:** M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

| Type | Credits | Grading scale | Version |
|------|---------|---------------|---------|
| Completed coursework | 1 | pass/fail | 1 |

| Events | | | | | |
|--------|--------|-----------------------------------------|--------|-------------|-------------------------|
| ST 2022 | 6020245 | Projektübung angewandte Fernerkundung | 2 SWS | Practice / 🗣 | Assistenten, Hinz, Weidner |
| **Exams** | | | | | |
| ST 2022 | 8284101814 | Project in Applied Remote Sensing | | | Weidner |

Legend: 🗖 Online, ⚄ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

## T  8.182 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  8.183 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 | | | |
|---|---|---|---|
| ST 2022 | 8230101675 | Project Management (graded) | Haghsheno, Schneider |
| 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**    **8.184 Course: Public Law I & II [T-INFO-110300]**

| | |
|---|---|
| **Responsible:** | Prof. Dr. Thomas Dreier |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101192 - Constitutional and Administrative Law |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 6 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24520 | Öffentliches Recht II - Öffentliches Wirtschaftsrecht | 2 SWS | Lecture / 🗣 | Werner-Kappler |
| WT 22/23 | 24016 | Öffentliches Recht I - Grundlagen | 2 SWS | Lecture / ⚬ | Werner-Kappler |
| **Exams** | | | | | |
| ST 2022 | 7500298 | Public Law I & II | | | Dreier |

Legend: 🗎 Online, ⚬ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

## T  8.185 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<br>Written examination | Credits<br>4,5 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2560120 | Public Revenues | 2 SWS | Lecture / 🗣 | Wigger |
| ST 2022 | 2560121 | Übung zu Öffentliche Einnahmen | 1 SWS | Practice / 🗣 | Wigger |
| **Exams** | | | | | |
| ST 2022 | 790oeff | Public Revenues | | | Wigger |
| WT 22/23 | 790oeff | Public Revenues | | | Wigger |

Legend: 🗎 Online, ⚅ Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

### Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

### Prerequisites
None

### Recommendation
Basic knowledge of Public Finance is required.

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

### V  Public Revenues
2560120, SS 2022, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

### Content
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

### Learning goals:
See German version.

### Workload:
The total workload for this course is approximately 135.0 hours. For further information see German version.

### Literature
**Literatur:**

- Homburg, S.(2000): *Allgemeine Steuerlehre*, Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4. Aufl., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* und *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2. Aufl., Springer

## T  8.186 Course: Public Sector Finance [T-WIWI-109590]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Berthold Wigger |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101403 - Public Finance |

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

| Exams | | | | |
|---|---|---|---|---|
| ST 2022 | 790oefi | Public Sector Finance | | Wigger |

**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**
T-WIWI-107763 "Municipal Finance" must not be selected.

**Annotation**
Previous title until winter semester 2018/19 "Municipal Finance".

| T | **8.187 Course: Quality Management [T-MACH-102107]** |

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

**Part of:**   M-MACH-101284 - Specialization in Production Engineering

| **Type** Written examination | **Credits** 4 | **Grading scale** Grade to a third | **Recurrence** Each winter term | **Version** 2 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2149667 | Quality Management | 2 SWS | Lecture / ⚙ | Lanza |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-102107 | Quality Management | | | Lanza |
| WT 22/23 | 76-T-MACH-102107 | Quality Management | | | Lanza |

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

**Competence Certificate**
Written Exam (60 min)

**Prerequisites**
none

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

| V | **Quality Management** 2149667, WS 22/23, 2 SWS, Language: German, Open in study portal | **Lecture (V)** **Blended (On-Site/Online)** |

**Content**
Based on the quality philosophies Total Quality Management (TQM) and Six Sigma, the lecture deals with the requirements of modern quality management. Within this context, the process concept of a modern enterprise and the process-specific fields of application of quality assurance methods are presented. The lecture covers the current state of the art in preventive and non-preventive quality management methods in addition to manufacturing metrology, statistical methods and service related quality management. The content is completed with the presentation of certification possibilities and legal quality aspects.

Main topics of the lecture:

- The term "Quality"
- Total Quality Management (TQM) and Six Sigma
- Universal methods and tools
- QM during early product stages – product denition
- QM during product development and in procurement
- QM in production – manufacturing metrology
- QM in production – statistical methods
- QM in service
- Quality management systems
- Legal aspects of QM

**Learning Outcomes:**

The students …

- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

**Workload:**

regular attendance: 21 hours
self-study: 99 hours

**Organizational issues**
Start: 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    8.188 Course: Real Estate Management I [T-WIWI-102744]

**Responsible:**     Prof. Dr.-Ing. Thomas Lützkendorf
**Organisation:**    KIT Department of Economics and Management
**Part of:**         M-WIWI-101466 - Real Estate Management

| Type Written examination | Credits 4,5 | Grading scale Grade to a third | Recurrence Each winter term | Version 1 |
|---|---|---|---|---|

**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Annotation**
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

## T 8.189 Course: Real Estate Management II [T-WIWI-102745]

| | |
|---|---|
| **Responsible:** | Prof. Dr.-Ing. Thomas Lützkendorf |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101466 - Real Estate Management |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2585400 | Real Estate Management II | 2 SWS | Lecture / 🧩 | Lützkendorf, Worschech |
| ST 2022 | 2585401 | Übung zu Real Estate Management II | 2 SWS | Practice / 🧩 | Worschech |
| **Exams** | | | | | |
| ST 2022 | 7900333 | Real Estate Management II | | | Lützkendorf |
| ST 2022 | 7900353 | Real Estate Management II | | | Lützkendorf |

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

**Competence Certificate**
Depending on further pandemic developments, the exam will be offered either as a 60-minute upload exam (Open Book Exam @ Home), or as a 60-minute exam (written exam according to SPO § 4 Abs. 2, Pkt. 1).

**Prerequisites**
None

**Recommendation**
A combination with the module *Design Construction and Assessment of Green Buildings I* is recommended.

Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

**Annotation**
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

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

| V | **Real Estate Management II** 2585400, SS 2022, 2 SWS, Language: German, Open in study portal | **Lecture (V)** **Blended (On-Site/Online)** |
|---|---|---|

**Content**

The course Real Estate Management II gives special attention to topics in connection to the management of large real estate portfolios. This especially includes property valuation, market and object rating, maintenance and modernization, as well as real estate portfolio and risk management. The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems.

The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

The student

- has an in-depth knowledge on the economic classification and significance of the real estate industry
- has a critical understanding of essential theories, methods and instruments of the real estate industry
- is able to analyze and evaluate activity areas and functions in real estate companies as well as to prepare or to take decisions

**Recommendations:**

A combination with the module *Design Construction and Assessment of Green Buildings I* [WW3BWLOOW1] is recommended.

Furthermore it is recommed to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

The total workload for this course is approximately 135.0 hours. For further information see German version.

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Reexaminations are offered at every ordinary examination date.

**Literature**
**Weiterführende Literatur:**

- Gondring (Hrsg.): "Immobilienwirtschaft: Handbuch für Studium und Praxis". ISBN 3-8006-2989-5. Vahlen 2004
- Kühne-Büning (Hrsg.): "Grundlagen der Wohnungs- und Immobilienwirtschaft". ISBN 3-8314-0706-1. Knapp & Hammonia-Verlag 2005
- Schulte (Hrsg.): "Immobilienökonomie Bd. I". ISBN 3-486-25430-8. Oldenbourg 2000

## T    8.190 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 2022 | 6020241 | Remote Sensing Systems | 1 SWS | Lecture / 🗣 | Hinz, Cermak |
| ST 2022 | 6020242 | Systems of Remote Sensing, Excercise | 1 SWS | Practice / 🗣 | Andersen, Weidner |
| ST 2022 | 6020243 | Procedures of Remote Sensing | 2 SWS | Lecture / 🗣 | Weidner |
| ST 2022 | 6020244 | Procedures of Remote Sensing, Excercise | 1 SWS | Practice / 🗣 | Weidner |
| **Exams** | | | | | |
| ST 2022 | 8284101636 | Remote Sensing, exam | | | Weidner, Hinz |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Recommendation**
None

| T | **8.191 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<br>Written examination | Credits<br>3,5 | Grading scale<br>Grade to a third | Recurrence<br>Each winter term | Version<br>5 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2581012 | Renewable Energy – Resources, Technologies and Economics | 2 SWS | Lecture / 🗣 | Jochem |
| **Exams** | | | | | |
| ST 2022 | 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**<br>2581012, WS 22/23, 2 SWS, Language: English, Open in study portal | Lecture (V)<br>On-Site |

**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    8.192 Course: Selected Legal Issues of Internet Law [T-INFO-108462]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Thomas Dreier |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101215 - Intellectual Property Law |

| Type<br>Examination of another type | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24821 | Selected legal issues of Internet law | 2 SWS | Colloquium (K / 🗣 | Dreier |
| **Exams** | | | | | |
| ST 2022 | 7500099 | Selected Legal Issues of Internet Law | | | Dreier, Matz |

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

## T  8.193 Course: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

| | |
|---|---|
| **Responsible:** | Dr. Mathias Heckele |
| | Dr.-Ing. Timo Mappes |
| **Organisation:** | KIT Department of Mechanical Engineering |

**Part of:**    M-MACH-101287 - Microsystem Technology

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Oral examination | 3 | Grade to a third | Each term | 1 |

**Competence Certificate**
Oral examination

**Prerequisites**

## T  8.194 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 | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Examination of another type | 4 | Grade to a third | Each summer term | 2 |

**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**

## T  8.195 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<br>Examination of another type | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2151643 | Seminar Data Mining in Production | 2 SWS | Seminar / 🧩 | Lanza |
| WT 22/23 | 2151643 | Seminar Data Mining in Production | 2 SWS | Seminar / 🧩 | Lanza |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-108737 | Seminar Data-Mining in Production | | | Lanza |
| WT 22/23 | 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**<br>2151643, SS 2022, 2 SWS, Language: German, Open in study portal | Seminar (S)<br>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**<br>2151643, WS 22/23, 2 SWS, Language: German, Open in study portal | **Seminar (S)**<br>**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.

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- 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 | **8.196 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 | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2500033 | Machine Learning for Business Applications | 2 SWS | Seminar / 📱 | Ulrich |
| ST 2022 | 2500125 | Current Topics in Digital Transformation Seminar | 3 SWS | Seminar / ❀ | Mädche |
| ST 2022 | 2530293 | Seminar in Finance (Bachelor, Prof. Ruckes) | 2 SWS | Seminar / 🎙 | Ruckes, Luedecke, Hoang, Benz, Wiegratz, Silbereis |
| ST 2022 | 2530374 | Machine Learning for Business Applications | 2 SWS | Seminar | Ulrich |
| ST 2022 | 2540472 | Digital Citizen Science | 2 SWS | Seminar | Weinhardt, Knierim, Mädche |
| ST 2022 | 2540473 | Business Data Analytics | 2 SWS | Seminar | Badewitz, Weinhardt |
| ST 2022 | 2540477 | Digital Experience & Participation | 2 SWS | Seminar | Peukert, Fegert |
| ST 2022 | 2540478 | Smart Grid Economics & Energy Markets | 2 SWS | Seminar | Staudt, Henni, Semmelmann, Qu, Bluhm, Golla |
| ST 2022 | 2540524 | Bachelor Seminar in Data Science and Machine Learning | 2 SWS | Seminar | Geyer-Schulz, Schweizer |
| ST 2022 | 2540553 | User-Adaptive Systems Seminar | 2 SWS | Seminar / ❀ | Mädche, Beigl |
| ST 2022 | 2540557 | Information Systems and Service Design Seminar | 3 SWS | Seminar / ❀ | Mädche |
| ST 2022 | 2545010 | Entrepreneurship Basics (Track 1) | 2 SWS | Seminar / 🎙 | Terzidis, Hirte |
| ST 2022 | 2545011 | Entrepreneurship Basics (Track 2) | 2 SWS | Seminar / 🎙 | Böhrer, Terzidis |
| ST 2022 | 2573010 | Seminar Human Resources and Organizations (Bachelor) | 2 SWS | Seminar / 🎙 | Nieken, Mitarbeiter |
| ST 2022 | 2573011 | Seminar Human Resource Management (Bachelor) | 2 SWS | Seminar / 🎙 | Nieken, Mitarbeiter |
| ST 2022 | 2579909 | Seminar Management Accounting | 2 SWS | Seminar / 🎙 | Wouters, Jaedeke |
| ST 2022 | 2579919 | Seminar in Management Accounting - Special Topics | 2 SWS | Seminar / 🎙 | Ebinger |
| ST 2022 | 2581030 | Seminar Energiewirtschaft IV | 2 SWS | Seminar / 🎙 | Dehler-Holland, Fichtner |
| ST 2022 | 2581977 | Seminar Produktionswirtschaft und Logistik II | 2 SWS | Seminar / 🎙 | Volk, Schultmann |
| ST 2022 | 2581980 | Seminar Energiewirtschaft II | 2 SWS | Seminar / 🎙 | Kraft, Fichtner |
| ST 2022 | 2581990 | | 2 SWS | Seminar / 🎙 | Schultmann |
| WT 22/23 | 2500019 | Digital Citizen Science | 2 SWS | Seminar / ❀ | Mädche, Nieken |
| WT 22/23 | 2500045 | Digital Democracy - Challenges and Opportunities of the Digital Society | 2 SWS | Seminar / 📱 | Fegert |
| WT 22/23 | 2500125 | Current Topics in Digital Transformation Seminar | 3 SWS | Seminar / ❀ | Mädche |
| WT 22/23 | 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 | Data Science in Service Management | 2 SWS | Seminar / 🗨 | Badewitz, Grote, Jaquart |
|---|---|---|---|---|---|
| WT 22/23 | 2540475 | Digital Platforms, Markets & Work | 2 SWS | Seminar / 🗨 | Knierim, del Puppo, Bartholomeyczik |
| WT 22/23 | 2540477 | Digital Experience and Participation | 2 SWS | Seminar / 🗨 | Peukert, Fegert, Greif-Winzrieth, Stein, Bezzaoui |
| WT 22/23 | 2540478 | Smart Grids and Energy Markets | 2 SWS | Seminar / 🗨 | Golla, Henni, Bluhm, Semmelmann |
| WT 22/23 | 2540557 | Information Systems and Design (ISSD) Seminar | 2 SWS | Seminar / 🕸 | Mädche |
| WT 22/23 | 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 |
| WT 22/23 | 2581030 | Seminar in Energy Economics | 2 SWS | Seminar / 🗨 | Dehler-Holland, Fichtner |
| WT 22/23 | 2581976 | Seminar in Production and Operations Management I | 2 SWS | Seminar / 🗨 | Schultmann, Rudi |
| WT 22/23 | 2581980 | Seminar in Energy Economics | 2 SWS | Seminar / 🗨 | Fichtner, Kraft, Zimmermann |
| WT 22/23 | 2581981 | Seminar in Energy Economics | 2 SWS | Seminar / 🗨 | Ardone, Finck, Fichtner, Slednev |
| WT 22/23 | 2581990 | | 2 SWS | Seminar | Schultmann |
| **Exams** | | | | | |
| ST 2022 | 7900003 | Seminar in Finance (Bachelor, Prof. Ruckes) | | | Ruckes |
| ST 2022 | 7900013 | Bachelor Seminar in Data Science and Machine Learning | | | Geyer-Schulz |
| ST 2022 | 7900056 | Entrepreneurship Basics (Track 1) | | | Terzidis |
| ST 2022 | 7900057 | Entrepreneurship Basics (Track 2) | | | Terzidis |
| ST 2022 | 7900093 | Seminar in Business Administration A | | | Weinhardt |
| ST 2022 | 7900100 | Seminar Human Resource Management (Bachelor) | | | Nieken |
| ST 2022 | 7900104 | Analyse bestehender Gebäudeökobilanzen bezüglich der Einschätzung des TGA-Anteils an der Gebäudeumwelterheblichkeit | | | Lützkendorf |
| ST 2022 | 7900126 | Bewertung der Rücknahme- und Recyclingprozesse von Photovoltaikanlagen | | | Lützkendorf |
| ST 2022 | 7900154 | Vergleichende qualitative Inhaltsanalyse von Werbeaussagen und Produktbeschreibungen für Wärmepumpen | | | Lützkendorf |
| ST 2022 | 7900163 | Erstellen einer Übersicht zu soziokulturellen Anforderungen an die technische Ausrüstung von Bauwerken für den Anwendungsfall „Wohngebäude" | | | Lützkendorf |
| ST 2022 | 7900165 | Variantenvergleich von Legionellen-Schutzeinrichtungen für Ein- und Zweifamilienhäuser | | | Lützkendorf |
| ST 2022 | 7900166 | Home Office Design Seminar: Digital Citizen Science | | | Mädche |
| ST 2022 | 7900180 | Seminar in Business Administration | | | Weinhardt |
| ST 2022 | 7900188 | Seminar in Business Administration (Bachelor) - Data Science for Human-Centric AI-Based Service Design | | | Satzger |
| ST 2022 | 7900190 | Current Topics in Digital Transformation Seminar | | | Mädche |
| ST 2022 | 7900214 | Seminar Business Data Analytics | | | Weinhardt |
| ST 2022 | 7900230 | Seminar Human Resources and Organizations (Bachelor) | | | Nieken |
| ST 2022 | 7900256 | Seminar Digital Platforms, Markets & Work | | | Weinhardt |

| ST 2022 | 7900261 | Information Systems and Design (ISSD) Seminar | Mädche |
|---------|---------|----------------------------------------------|--------|
| ST 2022 | 7900265 | User-adaptive Systems Seminar | Mädche |
| ST 2022 | 7900291 | Integration von Nachhaltigkeitsaspekten in die Immobilienwertermittlung | Lützkendorf |
| ST 2022 | 7900296 | Machine Learning for Business Applications | Ulrich |
| ST 2022 | 7900372 | Seminar Digital Citizen Science | Weinhardt |
| ST 2022 | 79-2579909-B | Seminar Management Accounting (Bachelor) | Wouters |
| ST 2022 | 79-2579919-B | Seminar Management Accounting - Special Topics (Bachelor) | Wouters |
| ST 2022 | 79-2579929-B | Seminar Management Accounting - Sustainability Topics (Bachelor) | Wouters |
| ST 2022 | 792581030 | Seminar in Business Administration (Bachelor) | Fichtner |
| ST 2022 | 792581031 | Seminar in Business Administration B (Master) | Plötz |
| ST 2022 | 7981976 | Seminar in Production and Operations Management I | Schultmann |
| ST 2022 | 7981977 | Seminar in Production and Operations Management II | Schultmann |
| ST 2022 | 7981978 | Seminar in Production and Operations Management III: Current Topics in Risk and Crisis Management | Schultmann |
| ST 2022 | 7981979 | Seminar Energy Economics I | Fichtner |
| ST 2022 | 7981980 | Seminar Energy Economics II | Fichtner |
| ST 2022 | 7981981 | Seminar Energy Economics III | Fichtner |
| WT 22/23 | 7900069 | Current Topics in Digital Transformation Seminar | Mädche |
| WT 22/23 | 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 | 7900175 | Seminar in Finance: Green Finance - What Does Sustainability Cost? | Uhrig-Homburg |

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 | **Machine Learning for Business Applications**  2500033, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**  **Online** |
|---|---|---|

**Content**

Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to various business applications.

**Organizational issues**

Blockseminar tba

| V | **Machine Learning for Business Applications**<br>2530374, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)** |
|---|---|---|

**Content**

The digitalization is not only changing today's society but also companies' business models, in particular of the financial industry. In general, the large variety of digitalized processes and connected devices (Industry 4.0) generates a huge amount of data which can be used to extract valuable (investment) insights. For this task data science skills are essential.

In this seminar we will use modern data science techniques to analyze all kinds of financial and economic data, ranging from big data intra-day option prices to alternative datasets, like textual statements. For this empirical analysis we will use the state of the art Python programming language.

In a bi-weekly schedule you and your supervisor will first learn and discuss important data science concepts and then apply it in a practical FinTech-type analysis using real-world data. As a prerequisite students should already have basic finance knowledge.

**Organizational issues**

Location: Räume des Lehrstuhls, Blücherstraße 17, E-008

| V | **User-Adaptive Systems Seminar**<br>2540553, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**

User-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a user-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). It is offered as part of the DFG-funded graduate school "KD2School: Designing Adaptive Systems for Economic Decisions" (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-adaptive system prototype

**Prerequisites**

Strong analytical abilities and profound software development skills are required.

**Organizational issues**

Termine werden bekannt gegeben

**Literature**

Required literature will be made available in the seminar.

| V | **Information Systems and Service Design Seminar**<br>2540557, SS 2022, 3 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group ISSD (Prof. Mädche). The research group "Information Systems & Service Design" (ISSD) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

**Learning Objectives**

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

**Prerequisites**

No specific prerequisites are required for the seminar.

**Literature**

Further literature will be made available in the seminar.

**Organizational issues**
Termine werden bekannt gegeben

| V | **Entrepreneurship Basics (Track 1)**<br>2545010, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**On-Site** |
|---|---|---|

**Content**
**Content**

This seminar shows what is important for entrepreneurs and 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.

**Learning Objectives**

After completing this course, the course participants will be able to

- Describe why personal and team corevalues are important for team formation and how they can affect start-up projects.
- Reflect on and name top 3 personal and team core values.
- Reflect on and name top 3 personal and team core competences
- Develop a sound value proposition for a target customer
- Recognize Business Opportunities applying the Business Model Canvas
- Create sustainable Business Ideas
- Pitch their Business Ideas to potential investors

**Registration**:

Registration is via the Wiwi portal.

**Organizational issues**
Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

| V | **Entrepreneurship Basics (Track 2)**<br>2545011, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**On-Site** |
|---|---|---|

**Content**
**Content**

This seminar shows what is important for entrepreneurs and 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.

**Learning Objectives**

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.

**Registration**

Registration is via the Wiwi portal.

**Organizational issues**

Please note that this seminar will be held in presence at the current planning stage. Further information will be announced via ILIAS.

| V | **Seminar Human Resources and Organizations (Bachelor)**<br>2573010, SS 2022, 2 SWS, Language: German, Open in study portal | **Seminar (S)**<br>**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)**<br>2573011, SS 2022, 2 SWS, Language: German, Open in study portal | **Seminar (S)**<br>**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**<br>2579909, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**On-Site** |
|---|---|---|

**Content**

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

**Learning objectives:**

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

**Workload:**

- The total workload for this course is approximately 90 hours. For further information see German version.

**Examination:**

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

**Note:**

- Maximum of 16 students.

**Organizational issues**
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

**Literature**
Will be announced in the course.

| V | **Seminar in Management Accounting - Special Topics**<br>2579919, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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.

| V | **Digital Citizen Science**<br>2500019, WS 22/23, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**
Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Scheibehenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

| V | **Data Science in Service Management**<br>2540473, WS 22/23, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)**<br>**On-Site** |
|---|---|---|

**Content**
wird auf deutsch und englisch gehalten

**Organizational issues**
Blockveranstaltung, siehe WWW

| V | **Entrepreneurship Basics (Track 1)**<br>2545010, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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)**<br>2545011, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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)<br>2573010, WS 22/23, 2 SWS, Language: German, Open in study portal | Seminar (S)<br>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)<br>2573011, WS 22/23, 2 SWS, Language: German, Open in study portal | Seminar (S)<br>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<br>2579919, WS 22/23, 2 SWS, Language: English, Open in study portal | Seminar (S)<br>On-Site |
|---|---|---|

**Content**

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

**Learning objectives:**

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

**Examination:**

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

**Required prior Courses:**

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

**Workload:**

- The total workload for this course is approximately 90 hours. For further information see German version.

**Note:**

- Maximum of 16 students.

**Organizational issues**

Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

**Literature**

Will be announced in the course.

| T | **8.197 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<br>Examination of another type | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each term | Version<br>1 |
|---|---|---|---|---|

| **Events** | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2500013 | Predictive Data Analytics - An Introduction to Machine Learning | | Seminar / ⚙ | Lerch, Koster |
| ST 2022 | 2520367 | Strategische Entscheidungen | 2 SWS | Seminar / ⚙ | Ehrhart |
| ST 2022 | 2560241 | Digital IT Solutions and Services transforming the Field of Public Transportation | 2 SWS | Seminar | Janoshalmi |
| ST 2022 | 2560259 | Organisation and Management of Development Projects | 2 SWS | Seminar / ⚙ | Sieber |
| ST 2022 | 2560553 | Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Bachelor) | 2 SWS | Seminar / ⚙ | Szech, Zhao |
| ST 2022 | 2560554 | Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Master) | 2 SWS | Seminar / ⚙ | Szech, Rau |
| 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 | Overcoming the Corona Crisis - Morals & Social Behavior (Bachelor) | 2 SWS | Seminar / ⚙ | Szech, Zhao |
| WT 22/23 | 2560142 | Moral Wiggle Room and Info Avoidance - Topics in Political Economy (Master) | 2 SWS | Seminar / ⚙ | Szech, Rosar, Rau |
| WT 22/23 | 2560400 | Seminar in Macroeconomics I | 2 SWS | Seminar / ⚙ | Brumm, Krause, Pegorari, Hußmann |
| WT 22/23 | 2560401 | Seminar in Macroeconomics II | 2 SWS | Seminar / ⚙ | Brumm, Krause, Pegorari, Hußmann |
| WT 22/23 | 2561208 | Selected aspects of European transport planning and -modelling | 2 SWS | Seminar | Szimba |
| **Exams** | | | | | |
| ST 2022 | 7900009 | Demographic Change and Pension Reforms | | | Brumm |
| ST 2022 | 7900033 | Predictive Data Analytics | | | Lerch |
| ST 2022 | 7900051 | Seminar in Economic Policy | | | Ott |
| ST 2022 | 7900060 | Bounded Rationality - Theory and Experiments (Bachelor) | | | Szech |
| ST 2022 | 7900070 | Seminar: Behavioral Game Theory | | | Puppe |
| ST 2022 | 7900130 | Shaping AI and Digitization (Bachelor) | | | Szech |
| ST 2022 | 7900162 | The Macroeconomics of Sanctions | | | Brumm |
| ST 2022 | 7900164 | Seminar in Economics (Bachelor) | | | Mitusch |
| ST 2022 | 7900282 | Digital IT-Solutions and Services Transforming the Field of Public Transportation | | | Mitusch |
| ST 2022 | 7900293 | Seminar Strategic Decision (Bachelor) | | | Ehrhart |
| ST 2022 | 79sefi1 | Seminar Public Finance (Bachelor) | | | Wigger |
| WT 22/23 | 7900076 | Economic Choices Over the Life Cycle | | | Brumm |
| WT 22/23 | 7900254 | Topics in Econometrics. Seminar in Economics (Bachelor) | | | Schienle |

Legend: 📱 Online, ✥ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

**Competence Certificate**
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**
None.

**Recommendation**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

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

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

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

| V | **Predictive Data Analytics - An Introduction to Machine Learning**<br>2500013, SS 2022, SWS, Language: English, Open in study portal | **Seminar (S)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**
Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

**Organizational issues**
The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

| V | **Shaping AI and Digitization for Society - Seminar Morals and Social Behavior (Bachelor)**<br>2560553, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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 20 (online)

Seminar Presentations June 3 (Präsenz or online)

| V | **Bounded Rationality - Theory and Experiments, Seminar on Topics in Political Economy (Master)**<br>2560554, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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 (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

**Organizational issues**
Blockveranstaltung:

Introductory Meeting: April 19, 16.00 (online)

Seminar Presentations (end of May) (online or Präsenz)

| V | **Topics in Econometrics**<br>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)**<br>2560140, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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 | **Overcoming the Corona Crisis - Morals & Social Behavior (Bachelor)**<br>2560141, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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 | **Moral Wiggle Room and Info Avoidance - Topics in Political Economy (Master)**<br>2560142, WS 22/23, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

**Organizational issues**
Application is possible via https://portal.wiwi.kit.edu/Seminare

## T  8.198 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 |

| Exams | | | |
|---|---|---|---|
| ST 2022 | 7311633 | Seminar Creating a Patent Specification | Stork |
| ST 2022 | 76-T-MACH-102135 | Conveying Technology and Logistics | Furmans |
| ST 2022 | 76-T-MACH-2115009 | Seminar for Rail System Technology | Gratzfeld, Geimer |

**Competence Certificate**
See German version.

**Prerequisites**
See module description.

**Recommendation**
None

## T  8.199 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<br>Examination of another type | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each term | Version<br>1 |
|---|---|---|---|---|

| **Events** | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2513308 | Seminar Knowledge Discovery and Data Mining (Bachelor) | 3 SWS | Seminar / 📱 | Färber, Noullet, Saier, Popovic |
| ST 2022 | 2513310 | Seminar Data Science & Real-time Big Data Analytics (Bachelor) | 2 SWS | Seminar / 📱 | Färber, Käfer, Kulbach, Thoma |
| ST 2022 | 2513402 | Seminar Emerging Trends in Internet Technologies (Bachelor) | 2 SWS | Seminar / 📱 | Sunyaev, Thiebes, Lins |
| ST 2022 | 2513404 | Seminar Emerging Trends in Digital Health (Bachelor) | 2 SWS | Seminar / 📱 | Lins, Sunyaev, Thiebes |
| ST 2022 | 2513500 | Cognitive Automobiles and Robots | 2 SWS | Seminar / 📱 | Zöllner |
| ST 2022 | 2540553 | User-Adaptive Systems Seminar | 2 SWS | Seminar / 🔀 | Mädche, Beigl |
| 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 |
| **Exams** | | | | | |
| ST 2022 | 7900090 | Seminar Data Science & Real-time Big Data Analytics (Bachelor) | | | Sure-Vetter |
| ST 2022 | 7900094 | Seminar Knowledge Discovery and Data Mining (Bachelor) | | | Sure-Vetter |
| ST 2022 | 7900136 | Seminar Emerging Trends in Digital Health (Bachelor) | | | Sunyaev |
| ST 2022 | 7900187 | Seminar Emerging Trends in Internet Technologies (Bachelor) | | | Sunyaev |
| ST 2022 | 7900265 | User-adaptive Systems Seminar | | | Mädche |
| 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 |

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 Knowledge Discovery and Data Mining (Bachelor)**<br>2513308, SS 2022, 3 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**Online** |
|---|---|---|

**Content**
In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science
The exact dates and information for registration will be announced at the event page.

**Organizational issues**
Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu/.

Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

**Literature**
Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

| V | **Seminar Data Science & Real-time Big Data Analytics (Bachelor)**<br>2513310, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**Online** |
|---|---|---|

**Content**

In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

**Organizational issues**

Further information as well as the registration form can be found under the following link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

| **V** | **Cognitive Automobiles and Robots**<br>2513500, SS 2022, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)**<br>**Online** |
|---|---|---|

**Content**

The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

**Learning objectives:**

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

**Recommendations:**

Attendance of the lecture machine learning

**Workload:**

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

**Organizational issues**

Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

| **V** | **User-Adaptive Systems Seminar**<br>2540553, SS 2022, 2 SWS, Language: English, Open in study portal | **Seminar (S)**<br>**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 | **Seminar Programming 3 (Bachelor)**<br>2513200, WS 22/23, 2 SWS, Open in study portal | Seminar (S)<br>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)**<br>2513312, WS 22/23, 3 SWS, Language: German/English, Open in study portal | Seminar (S)<br>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)**<br>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)**<br>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.

## T  8.200 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 |

8.200 Course: Seminar in Mathematics (Bachelor) [T-MATH-102265]

## T  8.201 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** | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2550132 | Seminar on Mathematical Optimization (MA) | 2 SWS | Seminar / 🎤 | Stein, Beck, Schwarze |
| ST 2022 | 2550472 | Seminar on Power Systems Optimization (Bachelor) | 2 SWS | Seminar / 🧩 | Rebennack, Warwicker |
| ST 2022 | 2550491 | Seminar: Modern OR and Innovative Logistics | 2 SWS | Seminar / 🧩 | Nickel, Mitarbeiter |
| WT 22/23 | 2550131 | Seminar on Methodical Foundations of Operations Research (B) | 2 SWS | Seminar / 🎤 | Stein, Beck, Schwarze |
| WT 22/23 | 2550472 | Seminar on Power Systems Optimization (Bachelor) | 2 SWS | Seminar / 🧩 | Rebennack, Warwicker |
| WT 22/23 | 2550491 | Seminar: Modern OR and Innovative Logistics | 2 SWS | Seminar / 🧩 | Nickel, Mitarbeiter |
| **Exams** | | | | | |
| ST 2022 | 7900018_SS2022 | Seminar in Operations Research A (Master) | | | Stein |
| ST 2022 | 7900244 | Seminar: Modern OR and Innovative Logistics | | | Nickel |
| ST 2022 | 7900347 | Seminar on Power Systems Optimization (Bachelor) | | | Rebennack |
| WT 22/23 | 7900011_WS2223 | Seminar in Operations Research B (Bachelor) | | | Stein |

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

### Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

### Prerequisites
None.

### Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

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

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

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

| **V** | **Seminar: Modern OR and Innovative Logistics**<br>2550491, SS 2022, 2 SWS, Language: German, Open in study portal | **Seminar (S)**<br>**Blended (On-Site/Online)** |

**Content**

The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

**Exam:**

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

**Requirements:**

If possible, at least one module of the institute should be taken before attending the seminar.

**Objectives:**

The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

**Organizational issues**

wird auf der Homepage dol.ior.kit.edu bzw. auf dem WiWi-Portal bekannt gegeben

**Literature**

Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

| **V** | **Seminar on Methodical Foundations of Operations Research (B)**<br>2550131, WS 22/23, 2 SWS, Language: German, Open in study portal | **Seminar (S)**<br>**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**<br>2550491, WS 22/23, 2 SWS, Language: German, Open in study portal | **Seminar (S)**<br>**Blended (On-Site/Online)** |
|---|---|---|

**Content**

The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

**Organizational issues**

wird auf der Homepage bekannt gegeben

**Literature**

Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

## T    8.202 Course: Seminar in Statistics (Bachelor) [T-WIWI-103489]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Oliver Grothe |
| | Prof. Dr. Melanie Schienle |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101816 - Seminar Module |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Examination of another type | 3 | Grade to a third | Each term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2500013 | Predictive Data Analytics - An Introduction to Machine Learning | | Seminar / ❖ | Lerch, Koster |
| ST 2022 | 2521310 | Advanced Topics in Econometrics | 2 SWS | Seminar | Schienle, Krüger, Görgen, Koster, Buse, Rüter |
| ST 2022 | 2550560 | Spezielle Themen der Datenanalyse und Statistik | 2 SWS | Seminar / ● | Grothe, Kaplan, Kächele |
| WT 22/23 | 2500042 | Interpretable Statistical and Machine Learning Models | 2 SWS | Seminar / ❖ | Lerch |
| WT 22/23 | 2521310 | Topics in Econometrics | 2 SWS | Seminar | Schienle, Rüter, Görgen |
| **Exams** | | | | | |
| ST 2022 | 7900033 | Predictive Data Analytics | | | Lerch |
| ST 2022 | 7900150 | Advanced Topics in Econometrics, Seminar in Statistics A (Master) | | | Schienle, Krüger |
| ST 2022 | 7900250 | Data Mining and Applications (Projectseminar) | | | Nakhaeizadeh |
| WT 22/23 | 7900254 | Topics in Econometrics. Seminar in Economics (Bachelor) | | | Schienle |

Legend: 📱 Online, ❖ Blended (On-Site/Online), ● On-Site, ✗ Cancelled

**Competence Certificate**
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**
None.

**Recommendation**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

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

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

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

| V | **Predictive Data Analytics - An Introduction to Machine Learning** | **Seminar (S)** |
|---|---|---|
| | 2500013, SS 2022, SWS, Language: English, Open in study portal | **Blended (On-Site/Online)** |

**Content**

Modern methods from artificial intelligence and machine learning, in particular deep learning methods based on multi-layered artificial neural networks, provide unprecedented tools for data analysis and prediction. Over the past years, they have transformed many scientific fields and have become ubiquitous in real-world applications from speech recognition to self-driving cars.

This seminar will provide a broad introduction to machine learning from statistical foundations to applications in the sciences, economics and engineering. The focus will be on modern machine learning methods for predictive data analytics such as random forests, gradient boosting machines and neural networks, their trans-disciplinary application to supervised learning tasks, and approaches to gain insight into the 'black box' of machine learning models. Lectures on the theoretical background will be accompanied by hands-on programming exercises in Python that will cover practical aspects of implementing machine learning methods for analyzing scientific and real-world datasets.

**Organizational issues**

The seminar consists of three parts:

1. A 3-day block course of lectures and hands-on programming exercises will take place on April 11-13, 2022, either online or in person at Campus South, depending on the Covid-19 situation and regulations. Participation is mandatory. Some familiarity with basic concepts of probability theory and statistics is expected, as well as basic programming skills in Python. For the programming exercises, participants are expected to bring their own laptop with Python and relevant libraries installed.
2. Afterwards, all students will conduct a project for which they will choose a dataset from a list of scientific and real-world datasets and apply what they have learned in the course. Exemplary tasks include predictions of AirBnB prices, wine ratings, salaries, air quality, electricity prices or wildfires. The (potentially preliminary) results will be presented in a meeting during the semester (0.5 days, date to be determined, either online or in person), in a presentation of max. 15 minutes. Participation is mandatory.
3. A final report on the project of 10-20 pages and the code has to be submitted by September 30, 2022. The final grade will be based on the active participation in the seminar (10%), the presentation (30%) and the final report (60%).

| V | **Advanced Topics in Econometrics** <br> 2521310, SS 2022, 2 SWS, Language: German/English, Open in study portal | **Seminar (S)** |
|---|---|---|

**Organizational issues**

Blockveranstaltung, Termine werden bekannt gegeben

| V | **Topics in Econometrics** <br> 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

# T  8.203 Course: Seminar Production Technology [T-MACH-109062]

**Responsible:**    Prof. Dr.-Ing. Jürgen Fleischer
                    Prof. Dr.-Ing. Gisela Lanza
                    Prof. Dr.-Ing. Volker Schulze

**Organisation:**   KIT Department of Mechanical Engineering

**Part of:**        M-WIWI-101816 - Seminar Module

| Type | Credits | Grading scale | Recurrence | Version |
|------|---------|---------------|------------|---------|
| Examination of another type | 3 | Grade to a third | Each term | 1 |

| Events | | | | | |
|--------|--------|---------------------------------|--------|--------------|-------------------------------|
| ST 2022 | 2149665 | Seminar Production Technology | 1 SWS | Seminar / ⚙ | Fleischer, Lanza, Schulze, Zanger |
| **Exams** | | | | | |
| ST 2022 | 76-T-MACH-109062 | Seminar Production Technology | | | Fleischer, Lanza, Schulze |
| WT 22/23 | 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** | **Seminar (S)** |
|---|---|---|
| | 2149665, SS 2022, 1 SWS, Language: German, Open in study portal | **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  8.204 Course: Seminar: Commercial and Corporate Law in the IT Industry [T-INFO-111405]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Thomas Dreier |
| | Dr. Georg Nolte |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101216 - Private Business Law |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Examination of another type | 3 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 2400165 | Seminar Commercial and Corporate Law in Information Technology | 2 SWS | Seminar / ▤ | Nolte |
| **Exams** | | | | | |
| WT 22/23 | 7500182 | Seminar: Legal Studies II | | | Dreier, Boehm, Raabe |

Legend: ▤ Online, ⬙ Blended (On-Site/Online), ◗ On-Site, ✗ Cancelled

| T | **8.205 Course: Seminar: IT- Security Law [T-INFO-111404]** |

| **Responsible:** | Martin Schallbruch |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101217 - Public Business Law |

| **Type**<br>Examination of another type | **Credits**<br>3 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each winter term | **Version**<br>1 |
|---|---|---|---|---|

| **Events** | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 24389 | Seminar "IT-Sicherheitsrecht" | 2 SWS | Seminar | Schallbruch |
| **Exams** | | | | | |
| WT 22/23 | 7500182 | Seminar: Legal Studies II | | | Dreier, Boehm, Raabe |

| T | **8.206 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<br>Examination of another type | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each term | Version<br>1 |
|---|---|---|---|---|

| **Events** | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2400005 | Governance, Risk & Compliance | 2 SWS | Seminar / 🗣 | Herzig |
| ST 2022 | 2400061 | Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung | 2 SWS | Seminar / 🗣 | Bless, Boehm, Hartenstein, Mädche, Zitterbart, Volkamer |
| ST 2022 | 2400078 | Die Bedeutung von ISMS im Datensicherheitsrecht | 2 SWS | Seminar / 🗣 | Raabe |
| ST 2022 | 2400168 | „Vom Original zur Kopie und vom Analogen zum Digitalen" | 2 SWS | Seminar / 🗣 | Dreier, Jehle |
| ST 2022 | 2400240 | Grundlagen Ethik und IT | 2 SWS | Seminar / 🗣 | Dreier |
| ST 2022 | 24820 | Current Issues in Patent Law | 2 SWS | Seminar / ⚙ | Melullis |
| WT 22/23 | 2400060 | Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection | 2 SWS | Seminar / 🗣 | Reussner, Raabe, Werner, Müller-Quade |
| WT 22/23 | 2400142 | Seminar Urheberrecht | 2 SWS | Seminar / 🗣 | Dreier |
| WT 22/23 | 2513214 | Seminar Information security and Data protection (Bachelor) | 2 SWS | Seminar / ⚙ | Oberweis, Volkamer, Boehm, Alpers, Düzgün, Schiefer, Veit, Ballreich, Gottschalk |
| **Exams** | | | | | |
| ST 2022 | 7500106 | Title not available | | | Bless, Hartenstein, Mädche, Zitterbart, Boehm, Sunyaev |
| ST 2022 | 7500140 | Seminar: Legal Studies I | | | Dreier, Boehm, Melullis, Matz |
| WT 22/23 | 7500182 | Seminar: Legal Studies II | | | Dreier, Boehm, Raabe |
| WT 22/23 | 7500232 | Seminar Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection | | | Reussner |

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

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

| V | **Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung**<br>2400061, SS 2022, 2 SWS, Open in study portal | Seminar (S)<br>On-Site |
|---|---|---|

**Content**

- Registration via https://portal.wiwi.kit.edu/ys/5877

**Organizational issues**
nach Vereinbarung

## T  8.207 Course: Seminar: Patent Law [T-INFO-111403]

**Responsible:** Markus Dammler
**Organisation:** KIT Department of Informatics
**Part of:** M-INFO-101215 - Intellectual Property Law

| Type Examination of another type | Credits 3 | Grading scale Grade to a third | Recurrence Each winter term | Version 1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 24186 | Seminar Patent Law | 2 SWS | Seminar / 🧩 | Dammler |
| **Exams** | | | | | |
| WT 22/23 | 7500182 | Seminar: Legal Studies II | | | Dreier, Boehm, Raabe |

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🎙 On-Site, ✗ Cancelled

## T 8.208 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 | | | | | |
|--------|--------|----------------------------------------------------------------------------|--------|--------------|----------|
| ST 2022 | 5011003 | "Just do as you are told!" How to achieve behavior change? | 2 SWS | Seminar / 🧩 | Mäs |
| ST 2022 | 5011008 | Decomposition and Regression Analysis | 2 SWS | Seminar / 📱 | Nollmann |
| ST 2022 | 5011013 | Pandemic and Infodemic | 2 SWS | Seminar / 🧩 | Mäs |
| ST 2022 | 5011019 | An introduction to "botany". What is known about the effects of social bots on political opinions? | 2 SWS | Seminar / 🌐 | Mäs |
| WT 22/23 | 5011011 | Patterns of ideological polarization in opinion surveys | 2 SWS | Seminar / 🧩 | Mäs |
| WT 22/23 | 5011014 | Sociology of Technology | | Seminar / 🌐 | Lösch |
| **Exams** | | | | | |
| ST 2022 | 7400379 | Social Science A | | | Nollmann |
| ST 2022 | 7400454 | 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 | **"Just do as you are told!" How to achieve behavior change?** | **Seminar (S)** |
|---|---|---|
| | 5011003, SS 2022, 2 SWS, Language: German, Open in study portal | **Blended (On-Site/Online)** |

**Content**

The Covid-Pandemic shows how challenging it is to change the behavior of individuals. How to increase the share of individuals wearing masks, and getting vaccinated? Likewise, it is difficult to convince individuals to reduce their carbon footprint by flying less and by consuming less meat. This seminar is concerned with alternative methods of behavior change, covering both theoretical models and empirical research. Central approaches are incentive programs, nudging, and social institutions.

| V | **Pandemic and Infodemic** | **Seminar (S)** |
|---|---|---|
| | 5011013, SS 2022, 2 SWS, Language: German, Open in study portal | **Blended (On-Site/Online)** |

**Content**

Understanding and managing a pandemic is highly complex, since there is a complicated interplay between the dynamics of the pandemic and the behavior of individuals. On the one hand, individuals can wear masks, get vaccinated, limit their mobility, and socially distance; reducing the chances that they catch the virus and effectively reducing the spreading of the virus. On the other hand, individuals adjust these forms of behavior also to the dynamics of the pandemic: When they perceive increased risk of infection, individuals protect themselves, and they fail to protect when they perceive risks to be low. However, during the Covid pandemic, many western countries experience huge disagreement about the risks and appropriate behavioral responses. A worryingly high number of individuals is influenced by fake news and conspiracy theories and, as a consequence, fail to protect themselves. Understanding how such opinion and behavior dynamics affect the pandemic and vice versa is an open research question and will be the focus of this interdisciplinary seminar.

This seminar is coorganized by researchers from TU Berlin, the Karlsruhe Institute of Technology, Lübeck University, and the MPI-DS & University Göttingen, and brings together expertise from physics, sociology, mobility research, and computer science. Participants are introduced to models of diseases spreading, mobility, and opinion dynamics. Next, it is discussed how the interplay of disease spreading and individuals´ behavior can be studied, what dynamics arise from it, and how insights about the pandemic should be communicated by decision makers and the media to the public. In the interactive part of the seminar, participants choose a topic of the course and work in small groups on a joint research project. Seminar participants will have diverse backgrounds (social science, engineering, computer science, physics, science communication), which will be considered in the evaluation of their project report, presentation or term paper. It will be highly appreciated if diverse project teams are formed where students contribute the perspective from their specific background.

Course coordinators:

Dr. Viola Priesemann, Max Planck Institute for Dynamics and Self-Organization (MPI-DS) & University Göttingen

Dr. phil. André Calero Valdez, Lübeck University

Prof. Dr. Michael Mäs, Karlsruhe Institute of Technology

Prof. Dr. Kai Nagel, Technische Universität Berlin

**Organizational issues**

Das Seminar wird gemeinsam von Forschenden der TU Berlin, des Karlsruher Instituts für Technologie, der Universität Lübeck und des MPI-DS & Universität Göttingen organisiert und bringt Forschende aus Physik, Soziologie, Mobilitätsforschung und Informatik zusammen.

Die gemeinsamen Veranstaltungen werden daher auf Englisch stattfinden. Lokale Treffen am KIT und Prüfungsleistungen sind aber auf Deutsch.

Koordinatoren:

Dr. Viola Priesemann, Max Planck Institute for Dynamics and Self-Organization (MPI-DS) & University Göttingen

Dr. phil. André Calero Valdez, Lübeck University

Prof. Dr. Michael Mäs, Karlsruhe Institute of Technology

Prof. Dr. Kai Nagel, Technische Universität Berlin

| **V** | **An introduction to "botany". What is known about the effects of social bots on political opinions?** <br> 5011019, SS 2022, 2 SWS, Language: German, Open in study portal | **Seminar (S)** <br> **On-Site** |
| --- | --- | --- |

**Content**

It has been warned that so-called „social bots" have contributed to the spreading of fake news and the rise of opinion polarization. There is even evidence for large-scale attempts to alter democratic elections with the help of bots. This seminar is concerned with these warnings. Starting from a literature overview, we develop formal models of opinion dynamics. We implement bots in these models and derive insights about the conditions under which bots are indeed dangerous.

## T  8.209 Course: Social Science B (WiWi) [T-GEISTSOZ-109049]

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

| Type Examination of another type | Credits 3 | Grading scale Grade to a third | Recurrence Each winter term | Version 1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| WT 22/23 | 5011011 | Patterns of ideological polarization in opinion surveys | 2 SWS | Seminar / 🧩 | Mäs |
| WT 22/23 | 5011014 | Sociology of Technology | | Seminar / 🗣 | Lösch |
| **Exams** | | | | | |
| ST 2022 | 7400455 | Social Science B (WiWi) | | | Nollmann |

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

## T  8.210 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**<br>Examination of another type | **Credits**<br>4,5 | **Grading scale**<br>Grade to a third | **Recurrence**<br>Each term | **Version**<br>2 |
|---|---|---|---|---|

| Exams | | | |
|---|---|---|---|
| ST 2022 | 7900224 | Special Topics in Information Systems | Weinhardt |
| ST 2022 | 7900286 | Sustainability through Digitalization: Development of a Low-cost Do-it-Yourself Smart Meter Infrastructure together with an Energy App | Weinhardt |

**Competence Certificate**

The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.

Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

**Prerequisites**

see below

**Recommendation**

None

**Annotation**

All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in "Information Systems" so far. With this course students majoring in "Industrial Engineering and Management" and "Economics Engineering" also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

## T    8.211 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

| | |
|---|---|
| **Responsible:** | apl. Prof. Dr. Wolf-Dieter Heller |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101420 - Econometrics and Economics |
| | M-WIWI-101608 - Statistics and Econometrics |
| | M-WIWI-105414 - Statistics and Econometrics II |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 4,5 | Grade to a third | Each winter term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| WT 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 8.212 Course: Statistics I [T-WIWI-102737]

| | |
|---|---|
| **Responsible:** | Prof. Dr. Oliver Grothe |
| | Prof. Dr. Melanie Schienle |
| **Organisation:** | KIT Department of Economics and Management |
| **Part of:** | M-WIWI-101432 - Introduction to Statistics |
| | M-WIWI-101726 - Preliminary Exam |

| Type | Credits | Grading scale | Recurrence | Version |
|---|---|---|---|---|
| Written examination | 5 | Grade to a third | Each summer term | 1 |

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 2600008 | Statistics I | 4 SWS | Lecture / 🎤 | Grothe |
| **Exams** | | | | | |
| ST 2022 | 7900035 | Statistics I | | | Grothe, Lerch |
| ST 2022 | 7900036 | Statistics I | | | Grothe, 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 2022, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

**Content**

**Learning objectives:**

The Student understands and applies

- the basic concepts of statistical data exploration,
- the basic definitions and theorems of probability theory.

**Content:**

A. Descriptive Statistics: univariate und bivariate analysis

B. Probability Theory: probability space, conditional and product probabilities

C. Random variables: location and shape parameters, dependency measures, concrete distribution models

**Workload:**

Total workload for 5 CP: approx. 150 hours

Attendance: 60 hours

Preparation and follow-up: 90 hours

**Literature**
Skriptum: Kurzfassung Statistik I

**Weiterführende Literatur:**

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

## T  8.213 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 |
| WT 22/23 | 2610021 | | 2 SWS | Tutorial ( | Grothe, Lerch, Ritschel |
| WT 22/23 | 2610022 | PC-Praktikum zu Statistik II | 2 SWS | | Grothe, Lerch, Görgen |
| **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)
Online

### Content
**Learning objectives:**

The student

- understands and applies the basic definitions and theorems of probability theory,
- transfers these theoretical foundations to problems in parametrical mathematical statistics.

**Content:**

D. Sampling and Estimation Theory: Sampling distributions, estimators, point and interval estimation
E. Test Theory: General Principles of Hypothesis Testing, Concrete 1- and 2-Sampling Tests
F. Regression analysis: Simple and multiple linear regression, statistical inference

**Requirements:**

It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2600020].

**Workload:**

Total workload: 150 hours (5.0 Credits).

Attendance: 30 hours

Preparation and follow-up: 90 hours

**Literature**

Skriptum: Kurzfassung Statistik II

**Weiterführende Literatur:**

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

## T  8.214 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 | | | | |
|---|---|---|---|---|
| ST 2022 | 7900268 | Strategic Finance and Technoloy Change | | Ruckes |

**Competence Certificate**

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

**Prerequisites**

None

**Recommendation**

Attending the lecture "Financial Management" is strongly recommended.

**T** **8.215 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  8.216 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   8.217 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 2022 | 6020242 | Systems of Remote Sensing, Excercise | 1 SWS | Practice / 🗣 | Andersen, Weidner |
| **Exams** | | | | | |
| ST 2022 | 8284101637 | Systems of Remote Sensing, Prerequisite | | | |

Legend: 📱 Online, ✨ Blended (On-Site/Online), 🗣 On-Site, ✖ Cancelled

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None

## T   8.218 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 2022 | 2550486 | Tactical and operational SCM | 3 SWS | Lecture / ⚛ | Nickel |
|---|---|---|---|---|---|
| ST 2022 | 2550487 | Übungen zu Taktisches und operatives SCM | 1,5 SWS | Practice / ⚛ | Pomes, Linner |

**Exams**

| ST 2022 | 00008 | 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
2550486, SS 2022, 3 SWS, Language: German, Open in study portal

**Lecture (V)**
**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.

**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  8.219 Course: Tax Law [T-INFO-111437]

| | |
|---|---|
| **Responsible:** | Detlef Dietrich |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101216 - Private Business Law |

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

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24646 | Tax Law | 2 SWS | Lecture / 🎤 | Dietrich |
| **Exams** | | | | | |
| ST 2022 | 7500120 | Tax Law | | | Dreier, Matz |

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

## T  8.220 Course: Telecommunications Law [T-INFO-101309]

**Organisation:**  KIT Department of Informatics
**Part of:**  M-INFO-101217 - Public Business Law

| Type<br>Written examination | Credits<br>3 | Grading scale<br>Grade to a third | Recurrence<br>Each summer term | Version<br>1 |
|---|---|---|---|---|

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24632 | Telekommunikationsrecht | 2 SWS | Lecture / 🗣 | Döveling |
| **Exams** | | | | | |
| ST 2022 | 7500085 | Telecommunications Law | | | Dreier |

Legend: 📱 Online, ⚙ Blended (On-Site/Online), 🗣 On-Site, ✖ Cancelled

## T  8.221 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 2022 | 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 2022, 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 | 8.222 Course: Trademark and Unfair Competition Law [T-INFO-101313] |
|---|---|

**Responsible:** Dr. Yvonne Matz
**Organisation:** KIT Department of Informatics
**Part of:** M-INFO-101215 - Intellectual Property Law

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

| Events | | | | | |
|---|---|---|---|---|---|
| ST 2022 | 24609 | Trademark and Unfair Competition Law | 2 SWS | Lecture / 🎤 | Matz |
| WT 22/23 | 24136 | Trademark and Unfair Competition Law | 2 SWS | Lecture / 🎤 | Matz |
| **Exams** | | | | | |
| ST 2022 | 7500051 | Trademark and Unfair Competition Law | | | Dreier, Matz |

Legend: 📱 Online, ⬦ Blended (On-Site/Online), 🎤 On-Site, ✗ Cancelled

## T  8.223 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** | | | | | |
| ST 2022 | 76-T-MACH-110981 | Tutorial Global Production | | | Lanza |
| WT 22/23 | 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**<br>2149611, WS 22/23, 1 SWS, Language: German, Open in study portal | **Practice (Ü)**<br>**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  8.224 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** | | | | | |
| ST 2022 | 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   8.225 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 |

| Exams | | | |
|-------|-------|-------------------|-------|
| ST 2022 | 7900191 | Welfare Economics | Puppe |

**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.