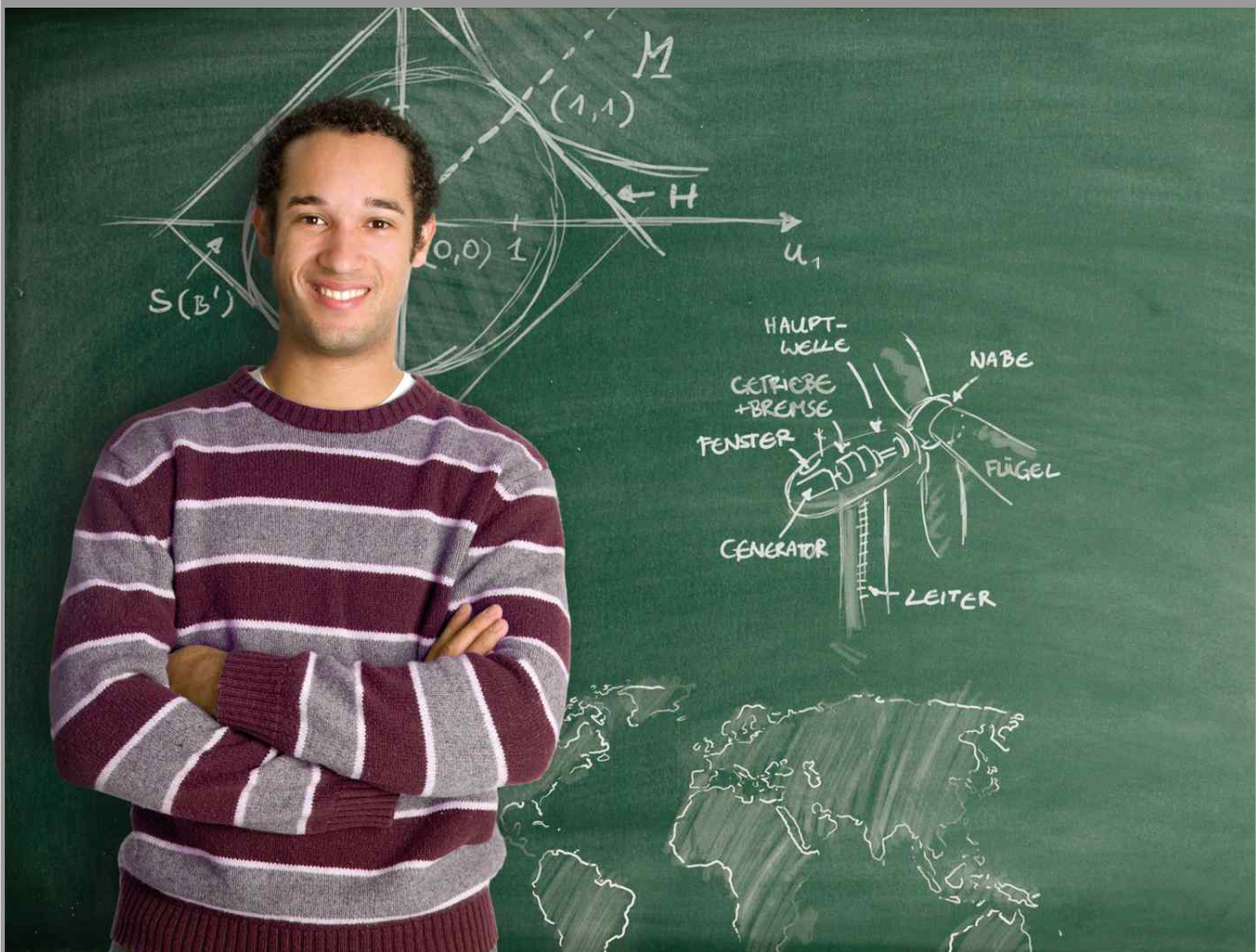# KIT

Karlsruher Institut für Technologie

# Module Handbook
# Economics Engineering (M.Sc.)

**SPO 2007/2015**
**Winter term 18/19**
**Date: 09/05/2018**

## KIT Department of Economics and Management

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# Part I
# About this handbook

## 1 Notes and rules

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

- the structure of the modules

- the extent (in CP),

- the dependencies of the modules,

- the learning outcomes,

- the assessment and examinations.

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

### 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.

### 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.

### 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 exammamination. 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/exams/index.php:

- Register/unregister for examinations

- Check for examination results

- Create transcript of records

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

## Types of exams

Following **SPO 2015** 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. According to **SPO 2007/2009** exams are split into written exams, oral exams and non exam assessments. Non exam assessments are graded or not.

## 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.

## 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.

## Further information

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

# 2   Online Version

A new webbased version of the module handbook is now available. This online handbook offers more comfort in browsing modules and courses and allows a smart switching between the english and german version. Try it out!

- Industrial Engineering and Management (B.Sc.): http://www.wiwi.kit.edu/english/mhbWiingBsc_en.php

- Industrial Engineering and Management (M.Sc.): http://www.wiwi.kit.edu/english/mhbWiingMsc_en.php

- Economics Engineering (B.Sc.): http://www.wiwi.kit.edu/english/mhbTVWLBsc_eng.php

- Economics Engineering (M.Sc.): http://www.wiwi.kit.edu/english/mhbTVWLMsc_en.php

- Information Engineering and Management (B.Sc.): http://www.wiwi.kit.edu/english/mhbInwiBsc_en.php

- Information Engineering and Management (M.Sc.): http://www.wiwi.kit.edu/english/mhbInwiMsc_en.php

- Economathematics (M.Sc.): http://www.wiwi.kit.edu/english/mhbWimaMsc_en.php
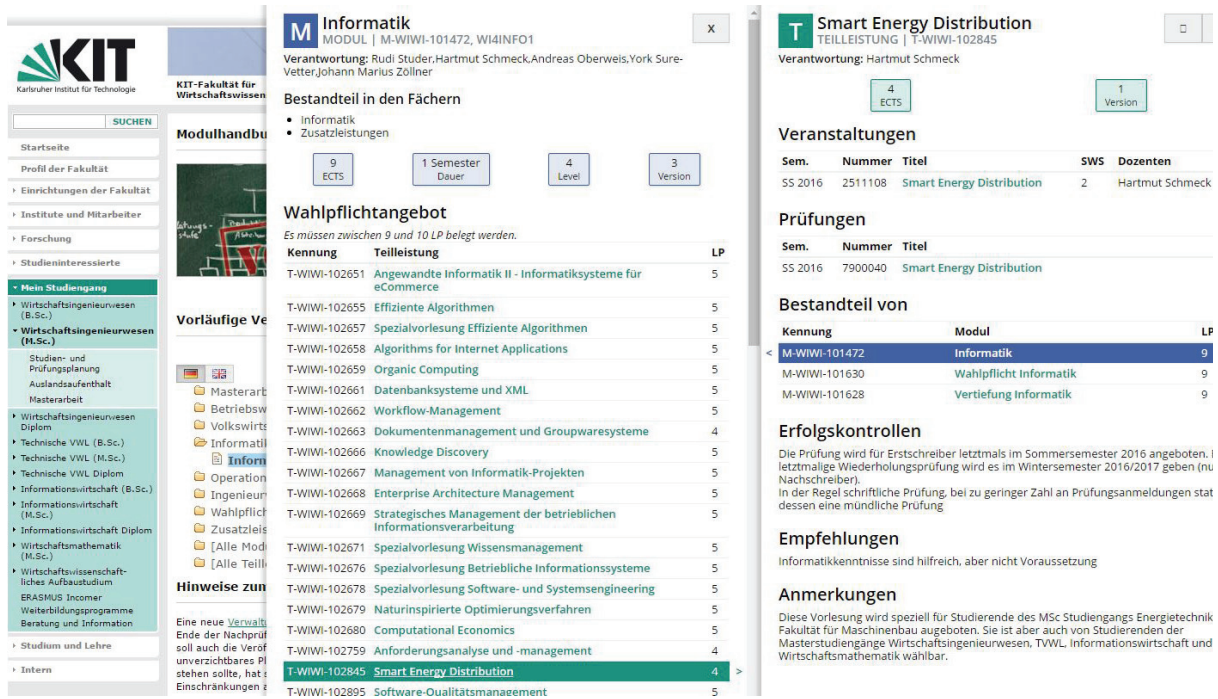
Figure 1: Screenshot of the webbased module handbook

# 3   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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Email: modul@wiwi.kit.edu

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## Part II

# The Master's degree program in Economics Engineering

## 1 Qualification objectives

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

They have generalized or specialized expertise in the different disciplines.

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

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

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

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

## 2 SPO 2015

The Master's degree program in Economics Engineering (M.Sc.) has 4 terms and consists of 120 credits (CP) including Master's thesis. The Master's degree program further deepens or complements the scientific qualifications acquired in the Bachelor program. The students should be made capable of independently applying scientific knowledge and methods and evaluate their implications and scope concerning solutions of complex scientific and social problems.
Furthermore, the student has to attend two seminars with a minimum of six CP within the seminar module. In addition to the key skills gained in the seminars (3 CP), the student has to acquire additional key skills totalling at least 3 credits. Figure 2 shows the structure of the subjects and the credits allocated to the subjects. The student has to choose four elective modules of the mentioned disciplines. Thereby it is only possible to select a maximum of two modules from the same discipline and it is only allowed to choose either one module in law or in sociology.

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

| Term | Credits | Business Administration | Economics | Informatics | Operations Research | Electives 1 | Electives 2 | Master Thesis |
|------|---------|-------------------------|-----------|-------------|---------------------|-------------|-------------|---------------|
| 1 | 28,5 | **BUS** 9 CP | ECON 9 CP | **INFO** 9 CP | OR 9 CP | **Seminar Module** 9 CP | **Elect. Module 3** 9 CP | |
| 2 | 30 | | | | | **Elect. Module 1** 9 CP | | |
| 3 | 31,5 | | ECON 9 CP | | | **Elect. Module 2** 9 CP | **Elect. Module 4** 9 CP | |
| 4 | 30 | | | | | | | **Master Thesis** 30 CP |
| | 120 | | | | | | | |

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

# 3   SPO 2007

The structure of the Master's degree program in Economics Engineering SPO 2007 slightly differs from the structure following SPO 2015. Offered modules and courses are quite similar and equal the presentation in this module handbook. Nevertheless, there are still some specificities, summarized in the following illustration:

| **SPO 2007** | **SPO 2015** |
|--------------|--------------|
| **Terms** | |
| The structure of the Master's degree program in Economics Engineering is subdivided into a **compulsory program** and an **elective program**. | The structure of the Master's degree program in Economics Engineering is subdivided into the subjects Business Administration, Economics, Informatics, Operations Research, **Electives 1** and **Electives 2**. |
| The exams are split into written exams, oral exams and **non exam assessments**. | The 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. |

Figure 3: Differences between SPO 2007 and SPO 2015

Illustration 4 shows the structure of fields and modules and their correlated credit points following SPO 2007.
The Study- and Examination Regulation SPO 2007 is part of the appendix.

# 4   Key Skills

The master program Economics Engineering (M.Sc.) 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 program. As a result, interdisciplinary and connected thinking is encouraged in a natural way. Furthermore, the seminar courses in the master degree program contribute significantly to the development of key skills by practicing to elaborate and write scientifically sound papers and presentations about special topics. The *integrative* taught key skills, which are acquired throughout the entire program, can be classified into the following fields:

**Soft skills**
1. Team work, social communication and creativity techniques

| Economics Engineering (M.Sc.) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semester** | **Compulsory** | | | | | | **Elective** (4 out of 7) | | | | | |
| | EC | EC | BA | INFO | OR | Seminar + KS | STAT | EC | BA | INFO | OR | LAW o. SOCIO | ENG/NS |
| **1** | | | | | | | | | | | | | |
| **2** | | | | | | | | | | | | | |
| | 9 LP | 9 LP | 9 LP | 9 LP | 9 LP | 6 + 3 LP | 9 LP | 9 LP | 9 LP | 9 LP | 9 LP | 9 LP | 9 LP |
| **3** | | | | | | | | | | | | | |
| **4** | Master Thesis 30 LP | | | | | | | | | | | | |
| | **120 LP** (6 compulsory modules + 4 elective modules + Master thesis) | | | | | | | | | | | | |

Figure 4: Structure of the Master's degree program in Economics Engineering SPO 2007 (recommended)

2. Presentations and presentation techniques
3. Logical and systematical arguing and writing
4. Structured problem solving and communication

**Enabling skills**
1. Decision making in business context
2. Project management competences
3. Fundamentals of business science
4. English as a foreign language

**Orientational knowledge**
1. Acquisition of interdisciplinary knowledge
2. Institutional knowledge about economic and legal systems
3. Knowledge about international organisations
4. Media, technology and innovation

The integrative acquisition of key skills especially takes place in several obligatory courses during the master program, namely
1. Seminar module
2. Mentoring of the Master's thesis
3. Business science, economics and informatics modules

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

**Part III**
# Field structure

## 1   Master Thesis

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101659 | Module Masterarbeit (S. 166) | 30 | Martin Ruckes |

## 2   Economics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 88) | 9 | Berthold Wigger |
| M-WIWI-101497 | Agglomeration and Innovation (S. 92) | 9 | Ingrid Ott |
| M-WIWI-101453 | Applied Strategic Decisions (S. 95) | 9 | Johannes Philipp Reiß |
| M-WIWI-101504 | Collective Decision Making (S. 99) | 9 | Clemens Puppe |
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 112) | 9 | Kay Mitusch |
| M-WIWI-101468 | Environmental Economics (S. 127) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 128) | 9 | Johannes Philipp Reiß |
| M-WIWI-101496 | Growth and Agglomeration (S. 135) | 9 | Ingrid Ott |
| M-WIWI-101478 | Innovation and Growth (S. 146) | 9 | Ingrid Ott |
| M-WIWI-101514 | Innovation Economics (S. 148) | 9 | Ingrid Ott |
| M-WIWI-101500 | Microeconomic Theory (S. 165) | 9 | Clemens Puppe |
| M-WIWI-101406 | Network Economics (S. 169) | 9 | Kay Mitusch |
| M-WIWI-101485 | Transport Infrastructure Policy and Regional Development (S. 195) | 9 | Kay Mitusch |

## 3   Business Administration

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-103119 | Advanced Topics in Strategy and Management (S. 90) | 9 | Hagen Lindstädt |
| M-WIWI-101410 | Business & Service Engineering (S. 97) | 9 | Christof Weinhardt |
| M-WIWI-101510 | Cross-Functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 102) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 104) | 9 | Martin Klarmann |
| M-WIWI-104080 | Designing Interactive Information Systems (S. 105) | 9 | Alexander Mädche |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 107) | 9 | Wolf Fichtner,Stefan Nickel |
| M-WIWI-103261 | Disruptive FinTech Innovations  (S. 109) | 9 | Maxim Ulrich |
| M-WIWI-103720 | eEnergy: Markets, Services and Systems (S. 114) | 9 | Christof Weinhardt |
| M-WIWI-101409 | Electronic Markets (S. 117) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 121) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 123) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 125) | 9 | Orestis Terzidis |
| M-WIWI-101482 | Finance 1 (S. 130) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |

| | | | |
|---|---|---|---|
| M-WIWI-101483 | Finance 2 (S. 131) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101480 | Finance 3 (S. 133) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101471 | Industrial Production II (S. 136) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 138) | 9 | Frank Schultmann |
| M-WIWI-101411 | Information Engineering (S. 142) | 9 | Christof Weinhardt |
| M-WIWI-104068 | Information Systems in Organizations (S. 144) | 9 | Alexander Mädche |
| M-WIWI-101507 | Innovation Management (S. 150) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 152) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 154) | 9 | Ute Werner |
| M-WIWI-103247 | Intelligent Risk and Investment Advisory (S. 156) | 9 | Maxim Ulrich |
| M-WIWI-101498 | Management Accounting (S. 158) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 159) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 161) | 9 | Martin Klarmann |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 173) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 175) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 180) | 9 | Hansjörg Fromm,Christof Weinhardt |
| M-WIWI-101503 | Service Design Thinking (S. 182) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102754 | Service Economics and Management (S. 184) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 186) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 188) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 194) | 9 | Martin Klarmann |

# 4 Informatics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101472 | Informatics (S. 140) | 9 | Andreas Oberweis,Harald Sack,York Sure-Vetter,Johann Marius Zöllner |

# 5 Operations Research

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101473 | Mathematical Programming (S. 163) | 9 | Oliver Stein |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 171) | 9 | Stefan Nickel |
| M-WIWI-102805 | Service Operations (S. 190) | 9 | Stefan Nickel |
| M-WIWI-103289 | Stochastic Optimization (S. 192) | 9 | Steffen Rebennack |

# 6  Compulsory Elective Modules 1

## 6.1  Seminars

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-WIWI-101808 | Seminar Module (S. 177) | 9 | Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften |

## 6.2  Compulsory Modules

### 6.2.1  Economics

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 88) | 9 | Berthold Wigger |
| M-WIWI-101497 | Agglomeration and Innovation (S. 92) | 9 | Ingrid Ott |
| M-WIWI-101453 | Applied Strategic Decisions (S. 95) | 9 | Johannes Philipp Reiß |
| M-WIWI-101504 | Collective Decision Making (S. 99) | 9 | Clemens Puppe |
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 112) | 9 | Kay Mitusch |
| M-WIWI-101468 | Environmental Economics (S. 127) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 128) | 9 | Johannes Philipp Reiß |
| M-WIWI-101496 | Growth and Agglomeration (S. 135) | 9 | Ingrid Ott |
| M-WIWI-101478 | Innovation and Growth (S. 146) | 9 | Ingrid Ott |
| M-WIWI-101514 | Innovation Economics (S. 148) | 9 | Ingrid Ott |
| M-WIWI-101500 | Microeconomic Theory (S. 165) | 9 | Clemens Puppe |
| M-WIWI-101406 | Network Economics (S. 169) | 9 | Kay Mitusch |
| M-WIWI-101485 | Transport Infrastructure Policy and Regional Development (S. 195) | 9 | Kay Mitusch |

### 6.2.2  Business Administration

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-WIWI-103119 | Advanced Topics in Strategy and Management (S. 90) | 9 | Hagen Lindstädt |
| M-WIWI-101410 | Business & Service Engineering (S. 97) | 9 | Christof Weinhardt |
| M-WIWI-101510 | Cross-Functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 102) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 104) | 9 | Martin Klarmann |
| M-WIWI-104080 | Designing Interactive Information Systems (S. 105) | 9 | Alexander Mädche |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 107) | 9 | Wolf Fichtner,Stefan Nickel |
| M-WIWI-103261 | Disruptive FinTech Innovations  (S. 109) | 9 | Maxim Ulrich |
| M-WIWI-103720 | eEnergy: Markets, Services and Systems (S. 114) | 9 | Christof Weinhardt |
| M-WIWI-101409 | Electronic Markets (S. 117) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 121) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 123) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 125) | 9 | Orestis Terzidis |
| M-WIWI-101482 | Finance 1 (S. 130) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101483 | Finance 2 (S. 131) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |

| M-WIWI-101480 | Finance 3 (S. 133) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101471 | Industrial Production II (S. 136) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 138) | 9 | Frank Schultmann |
| M-WIWI-101411 | Information Engineering (S. 142) | 9 | Christof Weinhardt |
| M-WIWI-104068 | Information Systems in Organizations (S. 144) | 9 | Alexander Mädche |
| M-WIWI-101507 | Innovation Management (S. 150) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 152) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 154) | 9 | Ute Werner |
| M-WIWI-103247 | Intelligent Risk and Investment Advisory (S. 156) | 9 | Maxim Ulrich |
| M-WIWI-101498 | Management Accounting (S. 158) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 159) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 161) | 9 | Martin Klarmann |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 173) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 175) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 180) | 9 | Hansjörg Fromm,Christof Weinhardt |
| M-WIWI-101503 | Service Design Thinking (S. 182) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102754 | Service Economics and Management (S. 184) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 186) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 188) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 194) | 9 | Martin Klarmann |

### 6.2.3 Informatics

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-WIWI-101630 | Electives in Informatics (S. 115) | 9 | Andreas Oberweis,Harald Sack,Ali Sunyaev,York Sure-Vetter,Melanie Volkamer,Johann Marius Zöllner |
| M-WIWI-101628 | Emphasis in Informatics (S. 119) | 9 | Andreas Oberweis,Harald Sack,Ali Sunyaev,York Sure-Vetter,Melanie Volkamer,Johann Marius Zöllner |

### 6.2.4 Operations Research

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-WIWI-101473 | Mathematical Programming (S. 163) | 9 | Oliver Stein |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 171) | 9 | Stefan Nickel |
| M-WIWI-102805 | Service Operations (S. 190) | 9 | Stefan Nickel |
| M-WIWI-103289 | Stochastic Optimization (S. 192) | 9 | Steffen Rebennack |

### 6.2.5  Natural and Engineering Sciences

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-BGU-101064 | Fundamentals of Transportation (S. 30) | 9 | Peter Vortisch |
| M-BGU-101884 | Lean Management in Construction (S. 31) | 9 | Shervin Haghsheno |
| M-BGU-101110 | Process Engineering in Construction (S. 33) | 9 | Shervin Haghsheno |
| M-BGU-101888 | Project Management in Construction (S. 35) | 9 | Shervin Haghsheno |
| M-BGU-101065 | Transportation Modelling and Traffic Management (S. 37) | 9 | Peter Vortisch |
| M-CIWVT-101119 | Specialization in Food Process Engineering (S. 39) | 9 | Volker Gaukel |
| M-CIWVT-101121 | Water Chemistry and Water Technology I (S. 40) | 9 | Harald Horn |
| M-CIWVT-101122 | Water Chemistry and Water Technology II (S. 41) | 9 | Harald Horn |
| M-ETIT-101157 | Control Engineering II (S. 42) | 9 | Sören Hohmann |
| M-ETIT-101164 | Generation and transmission of renewable power (S. 43) | 9 | Bernd Hoferer,Thomas Leibfried |
| M-ETIT-101163 | High-Voltage Technology (S. 44) | 9 | Bernd Hoferer,Thomas Leibfried |
| M-MACH-101298 | Automated Manufacturing Systems (S. 50) | 9 | Jürgen Fleischer |
| M-MACH-101290 | BioMEMS (S. 52) | 9 | Jan Gerrit Korvink |
| M-MACH-101275 | Combustion Engines I (S. 54) | 9 | Thomas Koch,Heiko Kubach |
| M-MACH-101303 | Combustion Engines II (S. 55) | 9 | Heiko Kubach |
| M-MACH-101296 | Energy and Process Technology I (S. 57) | 9 | Heiner Wirbser |
| M-MACH-101297 | Energy and Process Technology II (S. 58) | 9 | Heiner Wirbser |
| M-MACH-101282 | Global Production and Logistics (S. 59) | 9 | Gisela Lanza |
| M-MACH-102626 | Integrated Product Development (S. 61) | 16 | Albert Albers |
| M-MACH-101272 | Integrated Production Planning (S. 62) | 9 | Gisela Lanza |
| M-MACH-101263 | Introduction to Logistics (S. 63) | 9 | Kai Furmans |
| M-MACH-101280 | Logistics in Value Chain Networks (S. 65) | 9 | Kai Furmans |
| M-MACH-101286 | Machine Tools and Industrial Handling (S. 67) | 9 | Jürgen Fleischer |
| M-MACH-101276 | Manufacturing Technology (S. 68) | 9 | Volker Schulze |
| M-MACH-101277 | Material Flow in Logistic Systems (S. 69) | 9 | Kai Furmans |
| M-MACH-101278 | Material Flow in Networked Logistic Systems (S. 70) | 9 | Kai Furmans |
| M-MACH-101291 | Microfabrication (S. 72) | 9 | Jan Gerrit Korvink |
| M-MACH-101292 | Microoptics (S. 74) | 9 | Jan Gerrit Korvink |
| M-MACH-101293 | Microsystem Technology (S. 76) | 9 | Jan Gerrit Korvink |
| M-MACH-101294 | Nanotechnology (S. 78) | 9 | Jan Gerrit Korvink |
| M-MACH-101295 | Optoelectronics and Optical Communication (S. 80) | 9 | Jan Gerrit Korvink |
| M-MACH-101284 | Specialization in Production Engineering (S. 81) | 9 | Volker Schulze |
| M-MACH-101279 | Technical Logistics (S. 82) | 9 | Kai Furmans |
| M-MACH-101283 | Virtual Engineering A (S. 84) | 9 | Jivka Ovtcharova |
| M-MACH-101281 | Virtual Engineering B (S. 86) | 9 | Jivka Ovtcharova |
| M-WIWI-101404 | Extracurricular Module in Engineering (S. 129) | 9 | Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften |
| M-WIWI-101642 | Natural Hazards and Risk Management 1 (S. 167) | 9 | Michael Kunz |
| M-WIWI-101644 | Natural Hazards and Risk Management 2 (S. 168) | 9 | Michael Kunz |

### 6.2.6  Statistics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101637 | Analytics and Statistics (S. 93) | 9 | Oliver Grothe |
| M-WIWI-101638 | Econometrics and Statistics I (S. 110) | 9 | Melanie Schienle |

| M-WIWI-101639 | Econometrics and Statistics II (S. 111) | 9 | Melanie Schienle |

# 7   Compulsory Elective Modules 2

## 7.1   Compulsory Elective Modules

### 7.1.1   Economics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 88) | 9 | Berthold Wigger |
| M-WIWI-101497 | Agglomeration and Innovation (S. 92) | 9 | Ingrid Ott |
| M-WIWI-101453 | Applied Strategic Decisions (S. 95) | 9 | Johannes Philipp Reiß |
| M-WIWI-101504 | Collective Decision Making (S. 99) | 9 | Clemens Puppe |
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 112) | 9 | Kay Mitusch |
| M-WIWI-101468 | Environmental Economics (S. 127) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 128) | 9 | Johannes Philipp Reiß |
| M-WIWI-101496 | Growth and Agglomeration (S. 135) | 9 | Ingrid Ott |
| M-WIWI-101478 | Innovation and Growth (S. 146) | 9 | Ingrid Ott |
| M-WIWI-101514 | Innovation Economics (S. 148) | 9 | Ingrid Ott |
| M-WIWI-101500 | Microeconomic Theory (S. 165) | 9 | Clemens Puppe |
| M-WIWI-101406 | Network Economics (S. 169) | 9 | Kay Mitusch |
| M-WIWI-101485 | Transport Infrastructure Policy and Regional Development (S. 195) | 9 | Kay Mitusch |

### 7.1.2   Business Administration

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-103119 | Advanced Topics in Strategy and Management (S. 90) | 9 | Hagen Lindstädt |
| M-WIWI-101410 | Business & Service Engineering (S. 97) | 9 | Christof Weinhardt |
| M-WIWI-101510 | Cross-Functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 102) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 104) | 9 | Martin Klarmann |
| M-WIWI-104080 | Designing Interactive Information Systems (S. 105) | 9 | Alexander Mädche |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 107) | 9 | Wolf Fichtner,Stefan Nickel |
| M-WIWI-103261 | Disruptive FinTech Innovations  (S. 109) | 9 | Maxim Ulrich |
| M-WIWI-103720 | eEnergy: Markets, Services and Systems (S. 114) | 9 | Christof Weinhardt |
| M-WIWI-101409 | Electronic Markets (S. 117) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 121) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 123) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 125) | 9 | Orestis Terzidis |
| M-WIWI-101482 | Finance 1 (S. 130) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101483 | Finance 2 (S. 131) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101480 | Finance 3 (S. 133) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101471 | Industrial Production II (S. 136) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 138) | 9 | Frank Schultmann |
| M-WIWI-101411 | Information Engineering (S. 142) | 9 | Christof Weinhardt |

| M-WIWI-104068 | Information Systems in Organizations (S. 144) | 9 | Alexander Mädche |
| M-WIWI-101507 | Innovation Management (S. 150) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 152) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 154) | 9 | Ute Werner |
| M-WIWI-103247 | Intelligent Risk and Investment Advisory (S. 156) | 9 | Maxim Ulrich |
| M-WIWI-101498 | Management Accounting (S. 158) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 159) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 161) | 9 | Martin Klarmann |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 173) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 175) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 180) | 9 | Hansjörg Fromm,Christof Weinhardt |
| M-WIWI-101503 | Service Design Thinking (S. 182) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102754 | Service Economics and Management (S. 184) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 186) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 188) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 194) | 9 | Martin Klarmann |

### 7.1.3  Informatics

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-WIWI-101630 | Electives in Informatics (S. 115) | 9 | Andreas Oberweis,Harald Sack,Ali Sunyaev,York Sure-Vetter,Melanie Volkamer,Johann Marius Zöllner |
| M-WIWI-101628 | Emphasis in Informatics (S. 119) | 9 | Andreas Oberweis,Harald Sack,Ali Sunyaev,York Sure-Vetter,Melanie Volkamer,Johann Marius Zöllner |

### 7.1.4  Operations Research

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-WIWI-101473 | Mathematical Programming (S. 163) | 9 | Oliver Stein |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 171) | 9 | Stefan Nickel |
| M-WIWI-102805 | Service Operations (S. 190) | 9 | Stefan Nickel |
| M-WIWI-103289 | Stochastic Optimization (S. 192) | 9 | Steffen Rebennack |

### 7.1.5  Natural and Engineering Sciences

| Identifier | Module | ECTS | Responsibility |
| --- | --- | --- | --- |
| M-BGU-101064 | Fundamentals of Transportation (S. 30) | 9 | Peter Vortisch |

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|---|---|---|---|
| M-BGU-101884 | Lean Management in Construction (S. 31) | 9 | Shervin Haghsheno |
| M-BGU-101110 | Process Engineering in Construction (S. 33) | 9 | Shervin Haghsheno |
| M-BGU-101888 | Project Management in Construction (S. 35) | 9 | Shervin Haghsheno |
| M-BGU-101065 | Transportation Modelling and Traffic Management (S. 37) | 9 | Peter Vortisch |
| M-CIWVT-101119 | Specialization in Food Process Engineering (S. 39) | 9 | Volker Gaukel |
| M-CIWVT-101121 | Water Chemistry and Water Technology I (S. 40) | 9 | Harald Horn |
| M-CIWVT-101122 | Water Chemistry and Water Technology II (S. 41) | 9 | Harald Horn |
| M-ETIT-101157 | Control Engineering II (S. 42) | 9 | Sören Hohmann |
| M-ETIT-101164 | Generation and transmission of renewable power (S. 43) | 9 | Bernd Hoferer,Thomas Leibfried |
| M-ETIT-101163 | High-Voltage Technology (S. 44) | 9 | Bernd Hoferer,Thomas Leibfried |
| M-MACH-101298 | Automated Manufacturing Systems (S. 50) | 9 | Jürgen Fleischer |
| M-MACH-101290 | BioMEMS (S. 52) | 9 | Jan Gerrit Korvink |
| M-MACH-101275 | Combustion Engines I (S. 54) | 9 | Thomas Koch,Heiko Kubach |
| M-MACH-101303 | Combustion Engines II (S. 55) | 9 | Heiko Kubach |
| M-MACH-101296 | Energy and Process Technology I (S. 57) | 9 | Heiner Wirbser |
| M-MACH-101297 | Energy and Process Technology II (S. 58) | 9 | Heiner Wirbser |
| M-MACH-101282 | Global Production and Logistics (S. 59) | 9 | Gisela Lanza |
| M-MACH-102626 | Integrated Product Development (S. 61) | 16 | Albert Albers |
| M-MACH-101272 | Integrated Production Planning (S. 62) | 9 | Gisela Lanza |
| M-MACH-101263 | Introduction to Logistics (S. 63) | 9 | Kai Furmans |
| M-MACH-101280 | Logistics in Value Chain Networks (S. 65) | 9 | Kai Furmans |
| M-MACH-101286 | Machine Tools and Industrial Handling (S. 67) | 9 | Jürgen Fleischer |
| M-MACH-101276 | Manufacturing Technology (S. 68) | 9 | Volker Schulze |
| M-MACH-101277 | Material Flow in Logistic Systems (S. 69) | 9 | Kai Furmans |
| M-MACH-101278 | Material Flow in Networked Logistic Systems (S. 70) | 9 | Kai Furmans |
| M-MACH-101291 | Microfabrication (S. 72) | 9 | Jan Gerrit Korvink |
| M-MACH-101292 | Microoptics (S. 74) | 9 | Jan Gerrit Korvink |
| M-MACH-101293 | Microsystem Technology (S. 76) | 9 | Jan Gerrit Korvink |
| M-MACH-101294 | Nanotechnology (S. 78) | 9 | Jan Gerrit Korvink |
| M-MACH-101295 | Optoelectronics and Optical Communication (S. 80) | 9 | Jan Gerrit Korvink |
| M-MACH-101284 | Specialization in Production Engineering (S. 81) | 9 | Volker Schulze |
| M-MACH-101279 | Technical Logistics (S. 82) | 9 | Kai Furmans |
| M-MACH-101283 | Virtual Engineering A (S. 84) | 9 | Jivka Ovtcharova |
| M-MACH-101281 | Virtual Engineering B (S. 86) | 9 | Jivka Ovtcharova |
| M-WIWI-101404 | Extracurricular Module in Engineering (S. 129) | 9 | Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften |
| M-WIWI-101642 | Natural Hazards and Risk Management 1 (S. 167) | 9 | Michael Kunz |
| M-WIWI-101644 | Natural Hazards and Risk Management 2 (S. 168) | 9 | Michael Kunz |

### 7.1.6   Statistics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101637 | Analytics and Statistics (S. 93) | 9 | Oliver Grothe |
| M-WIWI-101638 | Econometrics and Statistics I (S. 110) | 9 | Melanie Schienle |
| M-WIWI-101639 | Econometrics and Statistics II (S. 111) | 9 | Melanie Schienle |

### 7.1.7   Law

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-INFO-101242 | Governance, Risk & Compliance (S. 46) | 9 | Thomas Dreier |
| M-INFO-101215 | Intellectual Property Law (S. 47) | 9 | Thomas Dreier |
| M-INFO-101216 | Private Business Law (S. 48) | 9 | Thomas Dreier |
| M-INFO-101217 | Public Business Law (S. 49) | 9 | Matthias Bäcker |

### 7.1.8   Sociology

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-GEISTSOZ-101169 | Sociology (S. 45) | 9 | Gerd Nollmann |

# 8   Additional Examinations

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-BGU-101064 | Fundamentals of Transportation (S. 30) | 9 | Peter Vortisch |
| M-BGU-101884 | Lean Management in Construction (S. 31) | 9 | Shervin Haghsheno |
| M-BGU-101110 | Process Engineering in Construction (S. 33) | 9 | Shervin Haghsheno |
| M-BGU-101888 | Project Management in Construction (S. 35) | 9 | Shervin Haghsheno |
| M-BGU-101065 | Transportation Modelling and Traffic Management (S. 37) | 9 | Peter Vortisch |
| M-CIWVT-101120 | Principles of Food Process Engineering (S. 38) | 9 | Volker Gaukel |
| M-CIWVT-101119 | Specialization in Food Process Engineering (S. 39) | 9 | Volker Gaukel |
| M-CIWVT-101121 | Water Chemistry and Water Technology I (S. 40) | 9 | Harald Horn |
| M-CIWVT-101122 | Water Chemistry and Water Technology II (S. 41) | 9 | Harald Horn |
| M-ETIT-101157 | Control Engineering II (S. 42) | 9 | Sören Hohmann |
| M-ETIT-101164 | Generation and transmission of renewable power (S. 43) | 9 | Bernd Hoferer,Thomas Leibfried |
| M-ETIT-101163 | High-Voltage Technology (S. 44) | 9 | Bernd Hoferer,Thomas Leibfried |
| M-GEISTSOZ-101169 | Sociology (S. 45) | 9 | Gerd Nollmann |
| M-MACH-101298 | Automated Manufacturing Systems (S. 50) | 9 | Jürgen Fleischer |
| M-MACH-101290 | BioMEMS (S. 52) | 9 | Jan Gerrit Korvink |
| M-MACH-101275 | Combustion Engines I (S. 54) | 9 | Thomas Koch,Heiko Kubach |
| M-MACH-101303 | Combustion Engines II (S. 55) | 9 | Heiko Kubach |
| M-MACH-101296 | Energy and Process Technology I (S. 57) | 9 | Heiner Wirbser |
| M-MACH-101297 | Energy and Process Technology II (S. 58) | 9 | Heiner Wirbser |
| M-MACH-101272 | Integrated Production Planning (S. 62) | 9 | Gisela Lanza |
| M-MACH-101263 | Introduction to Logistics (S. 63) | 9 | Kai Furmans |
| M-MACH-101280 | Logistics in Value Chain Networks (S. 65) | 9 | Kai Furmans |
| M-MACH-101286 | Machine Tools and Industrial Handling (S. 67) | 9 | Jürgen Fleischer |
| M-MACH-101276 | Manufacturing Technology (S. 68) | 9 | Volker Schulze |
| M-MACH-101277 | Material Flow in Logistic Systems (S. 69) | 9 | Kai Furmans |

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| M-MACH-101278 | Material Flow in Networked Logistic Systems (S. 70) | 9 | Kai Furmans |
| M-MACH-101291 | Microfabrication (S. 72) | 9 | Jan Gerrit Korvink |
| M-MACH-101292 | Microoptics (S. 74) | 9 | Jan Gerrit Korvink |
| M-MACH-101293 | Microsystem Technology (S. 76) | 9 | Jan Gerrit Korvink |
| M-MACH-101294 | Nanotechnology (S. 78) | 9 | Jan Gerrit Korvink |
| M-MACH-101295 | Optoelectronics and Optical Communication (S. 80) | 9 | Jan Gerrit Korvink |
| M-MACH-101284 | Specialization in Production Engineering (S. 81) | 9 | Volker Schulze |
| M-MACH-101279 | Technical Logistics (S. 82) | 9 | Kai Furmans |
| M-MACH-101283 | Virtual Engineering A (S. 84) | 9 | Jivka Ovtcharova |
| M-MACH-101281 | Virtual Engineering B (S. 86) | 9 | Jivka Ovtcharova |
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 88) | 9 | Berthold Wigger |
| M-WIWI-103119 | Advanced Topics in Strategy and Management (S. 90) | 9 | Hagen Lindstädt |
| M-WIWI-101497 | Agglomeration and Innovation (S. 92) | 9 | Ingrid Ott |
| M-WIWI-101637 | Analytics and Statistics (S. 93) | 9 | Oliver Grothe |
| M-WIWI-101453 | Applied Strategic Decisions (S. 95) | 9 | Johannes Philipp Reiß |
| M-WIWI-101410 | Business & Service Engineering (S. 97) | 9 | Christof Weinhardt |
| M-WIWI-101504 | Collective Decision Making (S. 99) | 9 | Clemens Puppe |
| M-WIWI-101510 | Cross-Functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 102) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 104) | 9 | Martin Klarmann |
| M-WIWI-104080 | Designing Interactive Information Systems (S. 105) | 9 | Alexander Mädche |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 107) | 9 | Wolf Fichtner,Stefan Nickel |
| M-WIWI-103261 | Disruptive FinTech Innovations (S. 109) | 9 | Maxim Ulrich |
| M-WIWI-101638 | Econometrics and Statistics I (S. 110) | 9 | Melanie Schienle |
| M-WIWI-101639 | Econometrics and Statistics II (S. 111) | 9 | Melanie Schienle |
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 112) | 9 | Kay Mitusch |
| M-WIWI-103720 | eEnergy: Markets, Services and Systems (S. 114) | 9 | Christof Weinhardt |
| M-WIWI-101630 | Electives in Informatics (S. 115) | 9 | Andreas Oberweis,Harald Sack,Ali Sunyaev,York Sure-Vetter,Melanie Volkamer,Johann Marius Zöllner |
| M-WIWI-101409 | Electronic Markets (S. 117) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101628 | Emphasis in Informatics (S. 119) | 9 | Andreas Oberweis,Harald Sack,Ali Sunyaev,York Sure-Vetter,Melanie Volkamer,Johann Marius Zöllner |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 121) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 123) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 125) | 9 | Orestis Terzidis |
| M-WIWI-101468 | Environmental Economics (S. 127) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 128) | 9 | Johannes Philipp Reiß |
| M-WIWI-101482 | Finance 1 (S. 130) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101483 | Finance 2 (S. 131) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101480 | Finance 3 (S. 133) | 9 | Martin Ruckes,Marliese Uhrig-Homburg |
| M-WIWI-101496 | Growth and Agglomeration (S. 135) | 9 | Ingrid Ott |
| M-WIWI-101471 | Industrial Production II (S. 136) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 138) | 9 | Frank Schultmann |
| M-WIWI-101472 | Informatics (S. 140) | 9 | Andreas Oberweis,Harald Sack,York Sure-Vetter,Johann Marius Zöllner |
| M-WIWI-101411 | Information Engineering (S. 142) | 9 | Christof Weinhardt |
| M-WIWI-104068 | Information Systems in Organizations (S. 144) | 9 | Alexander Mädche |
| M-WIWI-101478 | Innovation and Growth (S. 146) | 9 | Ingrid Ott |

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|---|---|---|---|
| M-WIWI-101514 | Innovation Economics (S. 148) | 9 | Ingrid Ott |
| M-WIWI-101507 | Innovation Management (S. 150) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 152) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 154) | 9 | Ute Werner |
| M-WIWI-103247 | Intelligent Risk and Investment Advisory (S. 156) | 9 | Maxim Ulrich |
| M-WIWI-101498 | Management Accounting (S. 158) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 159) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 161) | 9 | Martin Klarmann |
| M-WIWI-101473 | Mathematical Programming (S. 163) | 9 | Oliver Stein |
| M-WIWI-101500 | Microeconomic Theory (S. 165) | 9 | Clemens Puppe |
| M-WIWI-101642 | Natural Hazards and Risk Management 1 (S. 167) | 9 | Michael Kunz |
| M-WIWI-101644 | Natural Hazards and Risk Management 2 (S. 168) | 9 | Michael Kunz |
| M-WIWI-101406 | Network Economics (S. 169) | 9 | Kay Mitusch |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 171) | 9 | Stefan Nickel |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 173) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 175) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 180) | 9 | Hansjörg Fromm,Christof Weinhardt |
| M-WIWI-101503 | Service Design Thinking (S. 182) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102754 | Service Economics and Management (S. 184) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 186) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 188) | 9 | Gerhard Satzger,Christof Weinhardt |
| M-WIWI-102805 | Service Operations (S. 190) | 9 | Stefan Nickel |
| M-WIWI-103289 | Stochastic Optimization (S. 192) | 9 | Steffen Rebennack |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 194) | 9 | Martin Klarmann |
| M-WIWI-101485 | Transport Infrastructure Policy and Regional Development (S. 195) | 9 | Kay Mitusch |

# Part IV
# Modules

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

**Responsibility:**     Peter Vortisch

**Organisation:**       KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
**Curricular An-**      Compulsory Elective
**chorage:**

**Contained in:**       Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
                        Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
                        Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|------------|----------|----------|-------|---------|
| 9 | Each summer term | 2 terms | German/English | 4 | 3 |

### Pflichtleistung
Non-Compulsory Block; You must choose between 1 und 2 courses and between 3 and 6 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-BGU-106609 | Characteristics of Transportation Systems (S. 253) | 3 | Peter Vortisch |
| T-BGU-106610 | Transportation Systems (S. 655) | 3 | Peter Vortisch |

### Wahlpflicht
Non-Compulsory Block; You must choose between 1 und 2 courses and between 3 and 6 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-BGU-106611 | Freight Transport (S. 346) | 3 | Bastian Chlond |
| T-BGU-106301 | Long-Distance and Air Traffic (S. 417) | 3 | Bastian Chlond |
| T-BGU-101005 | Tendering, Planning and Financing in Public Transport (S. 645) | 3 | Peter Vortisch |
| T-BGU-100014 | Seminar in Transportation (S. 591) | 3 | Bastian Chlond, Peter Vortisch |
| T-WIWI-103174 | Seminar Mobility Services (Master) (S. 592) | 3 | Gerhard Satzger, Carola Stryja |
| T-BGU-103425 | Mobility Services and new Forms of Mobility (S. 448) | 3 | Martin Kagerbauer |
| T-BGU-103426 | Strategic Transport Planning (S. 626) | 3 | Volker Waßmuth |
| T-BGU-106608 | Information Management for public Mobility Services (S. 374) | 3 | Peter Vortisch |

## Conditions
None

## Qualification Objectives
See German version.

## Recommendations
None

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

| | |
|---|---|
| **Responsibility:** | Shervin Haghsheno |
| **Organisation:** | KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Each winter term | 2 terms | German | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-108000 | Lean Construction (S. 408) | 4,5 | Shervin Haghsheno |
| T-BGU-101007 | project paper Lean Construction (S. 530) | 1,5 | Shervin Haghsheno |

**Wahlpflicht**
Non-Compulsory Block; You must choose between 1 und 2 courses and between 3 and 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-103430 | Turnkey Construction I - Processes and Methods (S. 657) | 1,5 | Shervin Haghsheno |
| T-BGU-103431 | Turnkey Construction II - Trades and Technology (S. 658) | 3 | Shervin Haghsheno |
| T-BGU-103427 | Site Management (S. 607) | 1,5 | Shervin Haghsheno |
| T-BGU-103429 | Building Laws (S. 234) | 3 | Shervin Haghsheno |
| T-BGU-103432 | Project Management in Construction and Real Estate Industry I (S. 528) | 3 | Shervin Haghsheno |
| T-BGU-103433 | Project Management in Construction and Real Estate Industry II (S. 529) | 3 | Shervin Haghsheno |

**Learning Control / Examinations**

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.

The exam must be repeated at the latest 2 semesters after the first try. The exam will be based on the content of the latest lecture.

The exam of of the course Lean Construction consists of a preparatory and oral assessment. The preparatory assessment is a group work and consists of an assignment with presentation. The preparatory assessment is precondition to attend the oral examination (30 min) of the course Lean Construction. The grade of the exam Lean Construction is defined by weighted average of grades for oral examination (75 %) and preparatory assignment (25 %).

Examination of courses Projektmanagement in der Bau- und Immobilienwirtschaft I, Projektmanagement in der Bau- und Immobilienwirtschaft II, and Baurecht are carried out written. Combinations of courses Schlüsselfertiges Bauen I, Schlüsselfertiges Bauen II, Bauleitung, and Nachtragsmanagementare examined orally.

**Module Grade**

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

**Conditions**

The course Lean Construction is compulsory and must be examined.

**Qualification Objectives**

see German version

**Content**

see German version

**Recommendations**

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

**Remarks**

**Literature**

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

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

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

**Workload**

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

## M  Module: Process Engineering in Construction  [M-BGU-101110]

**Responsibility:**  Shervin Haghsheno

**Organisation:**  KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

**Curricular Anchorage:**  Compulsory Elective

**Contained in:**  Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|------------|----------|----------|-------|---------|
| 9 | Each winter term | 2 terms | German | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-BGU-101844 | Process Engineering (S. 522) | 3 | Harald Schneider |

**Wahlpflicht**

Non-Compulsory Block; You must choose between 2 und 3 courses and between 6 and 7,5 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-BGU-101845 | Construction Equipment (S. 265) | 3 | Sascha Gentes |
| T-BGU-101832 | Operation Methods for Foundation and Marine Construction (S. 471) | 1,5 | Harald Schneider |
| T-BGU-101801 | Operation Methods for Earthmoving (S. 470) | 1,5 | Heinrich Schlick |
| T-BGU-101846 | Tunnel Construction and Blasting Engineering (S. 656) | 3 | Shervin Haghsheno |
| T-BGU-101847 | Project Studies (S. 531) | 3 | Sascha Gentes |
| T-BGU-101850 | Disassembly Process Engineering (S. 297) | 3 | Sascha Gentes |

**Learning Control / Examinations**

- 'Teilleistung' T-BGU-101844 with written examination according to § 4 Par. 2 No. 1
according to selected course:
- 'Teilleistung' T-BGU-101845 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-101832 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101801 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101846 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101847 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101850 with oral examination according to § 4 Par. 2 No. 2
details about the learning controls see at the respective 'Teilleistung'

**Module Grade**

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

**Conditions**

The course Verfahrenstechnik [6241704] is compulsory and must be examined.

**Qualification Objectives**

Students understand different processes and the related construction equipment, it's technology, capabilities and constraints. Students can define process solutions consisting of machinery and devices. They can evaluate existing processes through knowledge about process performance and operating conditions, and the can identify potential for improvement.

**Content**

Within the frame of this module, various construction und conditioning processes will be presented as well as performance

calculations conducted. Students learn about the construction machinery and devices of these processes. Transmission, generation, conversion and controlling of power are explained with the help of various practical examples. Moreover, the module includes possibilities for an on-site familiarization.

**Recommendations**

**Remarks**

None

**Workload**

see German version

## M  Module: Project Management in Construction  [M-BGU-101888]

**Responsibility:** Shervin Haghsheno

**Organisation:** KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

**Curricular An-chorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|------------|----------|----------|---------|
| 9 | Each winter term | 2 terms | German | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-BGU-103432 | Project Management in Construction and Real Estate Industry I (S. 528) | 3 | Shervin Haghsheno |
| T-BGU-103431 | Turnkey Construction II - Trades and Technology (S. 658) | 3 | Shervin Haghsheno |

**Wahlpflicht**

Non-Compulsory Block; You must choose between 1 und 2 courses and between 3 and 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-BGU-103427 | Site Management (S. 607) | 1,5 | Shervin Haghsheno |
| T-BGU-103430 | Turnkey Construction I - Processes and Methods (S. 657) | 1,5 | Shervin Haghsheno |
| T-BGU-103428 | Supplementary Claim Management (S. 629) | 1,5 | Shervin Haghsheno |
| T-BGU-103429 | Building Laws (S. 234) | 3 | Shervin Haghsheno |
| T-BGU-103433 | Project Management in Construction and Real Estate Industry II (S. 529) | 3 | Shervin Haghsheno |

**Learning Control / Examinations**
- 'Teilleistung' T-BGU-103432 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-103431 with oral examination according to § 4 Par. 2 No. 2
according to selected course:
- 'Teilleistung' T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103430 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103428 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103429 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103433 with oral examination according to § 4 Par. 2 No. 2
details about the learning controls see at the respective 'Teilleistung'

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

**Conditions**
The courses Projektmanagement in der Bau- und Immobilienwirtschaft I and Schlüsselfertiges Bauen II are compulsory and must be examined.

**Qualification Objectives**
see German version

**Content**

see German version

**Recommendations**

**Remarks**

**Literature**

DIETHELM, G.: Projektmanagement, Band 1: Grundlagen, Verlag Neue Wirtschafts-Briefe, Herne, 2000

DIETHELM, G.: Projektmanagement, Band 2: Sonderfragen, Verlag Neue Wirtschafts-Briefe, Herne, 2001

ESCHENBRUCH, K.: Recht der Projektsteuerung, Werner Verlag, München, 2003

HAHN, R.: Projektmanagement für Ingenieure, Wiley-VCH Verlag, Weinheim, 2002

KERZNER, H.: Project Management - A Systems Approach to Planning, Scheduling and Controlling, Wiley & Sons, 2006

KOCHENDÖRFER, B., LIEBCHEN, J.: Bau-Projekt-Management, Verlag B. G. Teubner, Stuttgart, 2001

Project Management Institute: A Guide to the Project Management Body of Knowledge: PMBOK Guide, 2008

ROSENAU, M:, W.: Succesful Project Management, Van Norstrand Reinhold, New York, 1992

VOLKMANN, W.: Projektabwicklung, Verlag für Wirtschaft und Verwaltung Hubert Wingen, Essen, 2002

ELWERT, Ulrich, Flassak, Alexander: Nachtragsmanagement in der Baupraxis - Grundlagen, Beispiele, Anwendung, Vieweg, 2., erw. und aktualisierte Aufl., Wiesbaden, 2008.

WÜRFELE, Falk [Hrsg.]: Nachtragsmanagement - Leistungsbeschreibung, Leistungsabweichung, Bauzeitverzögerung, Werner, Neuwied, 2006.

SCHERER, Holger: Integriertes Nachtragsmanagement - Verfahrenshandbuch für die Dokumentation von Behinderungen, Störungen und Nachtragssachverhalten auf der Grundlage der VOB, Zeittechnik-Verlag, Neu-Isenburg, 2001.

HELLER, Jörg: Sicherung der Nachtragsvergütung nach VOB und BGB, Zeittechnik-Verlag, Neu-Isenburg, 2000

**Workload**

see German version

## M  Module: Transportation Modelling and Traffic Management  [M-BGU-101065]

| | |
|---|---|
| **Responsibility:** | Peter Vortisch |
| **Organisation:** | KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German/English | 4 | 3 |

### Pflichtleistung
Non-Compulsory Block; You must choose between 2 und 3 courses and between 6 and 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-101797 | Methods and Models in Transportation Planning (S. 442) | 3 | Peter Vortisch |
| T-BGU-101798 | Traffic Engineering (S. 649) | 3 | Peter Vortisch |
| T-BGU-101799 | Traffic Management and Transport Telematics (S. 651) | 3 | Peter Vortisch |
| T-BGU-101800 | Traffic Flow Simulation (S. 650) | 3 | Peter Vortisch |

### Wahlpflicht
Non-Compulsory Block; You must choose at most 1 courses and between 0 and 3 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-100010 | Transportation Data Analysis (S. 654) | 3 | Martin Kagerbauer |
| T-BGU-106611 | Freight Transport (S. 346) | 3 | Bastian Chlond |
| T-BGU-106301 | Long-Distance and Air Traffic (S. 417) | 3 | Bastian Chlond |
| T-BGU-101005 | Tendering, Planning and Financing in Public Transport (S. 645) | 3 | Peter Vortisch |
| T-BGU-100014 | Seminar in Transportation (S. 591) | 3 | Bastian Chlond, Peter Vortisch |
| T-WIWI-103174 | Seminar Mobility Services (Master) (S. 592) | 3 | Gerhard Satzger, Carola Stryja |
| T-BGU-103425 | Mobility Services and new Forms of Mobility (S. 448) | 3 | Martin Kagerbauer |
| T-BGU-103426 | Strategic Transport Planning (S. 626) | 3 | Volker Waßmuth |
| T-BGU-106608 | Information Management for public Mobility Services (S. 374) | 3 | Peter Vortisch |

### Conditions
None

### Qualification Objectives
See German version.

### Recommendations
None

## M   Module: Principles of Food Process Engineering   [M-CIWVT-101120]

| | |
|---|---|
| **Responsibility:** | Volker Gaukel |
| **Organisation:** | KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-CIWVT-101874 | Principles of Food Process Engineering (S. 518) | 9 | Volker Gaukel |

### Conditions
none

### Qualification Objectives
See German version.

## M Module: Specialization in Food Process Engineering  [M-CIWVT-101119]

| | |
|---|---|
| **Responsibility:** | Volker Gaukel |
| **Organisation:** | KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-CIWVT-101875 | Specialization in Food Process Engineering (S. 620) | 9 | Volker Gaukel |

**Conditions**

The module "Principles of Food Process Engineering" must be passed.

**Qualification Objectives**

See German version.

**Content**

See courses.

## M  Module: Water Chemistry and Water Technology I  [M-CIWVT-101121]

| | |
|---|---|
| **Responsibility:** | Harald Horn |
| **Organisation:** | KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each winter term | 1 term | German/English | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-CIWVT-101900 | Water Chemistry and Water Technology I (S. 666) | 6 | Harald Horn |
| T-CIWVT-103351 | Laboratory Work Water Chemistry (S. 404) | 4 | Gudrun Abbt-Braun, Harald Horn |

### Conditions
none

### Qualification Objectives
The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water.

### Content
This module gives the basis to understand the most important methods of raw water treatment.

Therefore types and sum of water constituents and their interaction with each other and with water molecules are introduced. The effects of the different treatment and purification methods are shown

## M  Module: Water Chemistry and Water Technology II  [M-CIWVT-101122]

**Responsibility:** Harald Horn

**Organisation:** KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-CIWVT-101901 | Water Chemistry and Water Technology II (S. 667) | 9 | Harald Horn |

**Conditions**

The Module "Water Chemistry and Water Technology I" must be passed.

**Qualification Objectives**

The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water.
- knows about the different types of water treatment and water purification methods to convert, reduce or concentrate water constituents,

**Content**

The effects of the different treatment and purification methods are shown and it is explained how they can convert, reduce or concentrate water constituents.

## M | Module: Control Engineering II  [M-ETIT-101157]

| | |
|---|---|
| **Responsibility:** | Sören Hohmann |
| **Organisation:** | KIT-Fakultät für Elektrotechnik und Informationstechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Level | Version |
|---|---|---|
| 9 | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-100981 | Automation of Discrete Event and Hybrid Systems (S. 222) | 3 | Sören Hohmann |
| T-ETIT-100666 | Control of Linear Multivariable Systems (S. 266) | 6 | Sören Hohmann |

# M Module: Generation and transmission of renewable power  [M-ETIT-101164]

| | |
|---|---|
| **Responsibility:** | Bernd Hoferer, Thomas Leibfried |
| **Organisation:** | KIT-Fakultät für Elektrotechnik und Informationstechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Wahlpflichtblock**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-100830 | Power Network (S. 504) | 6 | Thomas Leibfried |
| T-ETIT-101941 | Power Transmission and Power Network Control (S. 505) | 5 | Thomas Leibfried |
| T-ETIT-100724 | Photovoltaic System Design (S. 491) | 3 | N.N. |
| T-ETIT-101915 | High-Voltage Test Technique (S. 366) | 4 | Rainer Badent |

## Conditions
None

## Qualification Objectives
The student

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

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

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

| | |
|---|---|
| **Responsibility:** | Bernd Hoferer, Thomas Leibfried |
| **Organisation:** | KIT-Fakultät für Elektrotechnik und Informationstechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Duration | Level | Version |
|:---:|:---:|:---:|:---:|
| 9 | 2 terms | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-101913 | High-Voltage Technology I (S. 364) | 4,5 | Rainer Badent |
| T-ETIT-101914 | High-Voltage Technology II (S. 365) | 4,5 | Rainer Badent |

**Qualification Objectives**

The student

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

**Content**

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

# M Module: Sociology [M-GEISTSOZ-101169]

| **Responsibility:** | Gerd Nollmann |
|---|---|
| **Organisation:** | KIT-Fakultät für Geistes- und Sozialwissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 2 / Compulsory Elective Modules / Sociology Additional Examinations |

| | ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|---|
| | 9 | Each term | 2 terms | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-GEISTSOZ-104565 | Computer Aided Data Analysis (S. 263) | 0 | Gerd Nollmann |
| T-GEISTSOZ-109052 | Application of Social Science Methods (WiWi) (S. 213) | 9 | Gerd Nollmann |

## Conditions
Students must pass three excersise sheets within the seminar "Computer based data analysis".

## Qualification Objectives
The student

- Gains theoretical and methodical knowledge of social processes and structures,
- learns a script based data analysis tool (R, Stata, Python),
- gathers his/her data within an own framework and/or analyzes complex data,
- is able to present his/her work results in a precise and clear way.

## Content
The Sociology module offers students the opportunity to learn a data analysis tool (R, Stata, Python) within the framework of a two-semester course and to independently transfer this tool to a content-related question. Both the tool and the contents are determined by the lecturers. The contents can refer to the analysis of large population surveys (SOEP, Microcensus, ALLBUS), to own experiments, to own field studies or to Big Data analyses.

## Remarks
Basic knowledge in multivariate regression and inference statistics is required.

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

| | |
|---|---|
| **Responsibility:** | Thomas Dreier |
| **Organisation:** | KIT-Fakultät für Informatik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 2 / Compulsory Elective Modules / Law |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Governance, Risk & Compliance**

Non-Compulsory Block; You must choose at least 1 courses and at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-INFO-101303 | Data Protection Law (S. 282) | 3 | Nikolaus Marsch |
| T-INFO-101315 | Tax Law I (S. 637) | 3 | Thomas Dreier |
| T-INFO-101316 | Law of Contracts (S. 407) | 3 | Thomas Dreier |
| T-INFO-101288 | Corporate Compliance (S. 270) | 3 | Thomas Dreier |
| T-INFO-101997 | Seminar: Legal Studies I (S. 594) | 3 | Thomas Dreier |
| T-INFO-108405 | Data Protection by Design (S. 281) | 3 | Oliver Raabe |

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

| | |
|---|---|
| **Responsibility:** | Thomas Dreier |
| **Organisation:** | KIT-Fakultät für Informatik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 2 / Compulsory Elective Modules / Law |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Recht des Geistigen Eigentums**

Non-Compulsory Block; You must choose at least 1 courses and at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-INFO-102036 | Computer Contract Law (S. 264) | 3 | Thomas Dreier |
| T-INFO-101308 | Copyright (S. 269) | 3 | Thomas Dreier |
| T-INFO-101310 | Patent Law (S. 481) | 3 | Thomas Dreier |
| T-INFO-101313 | Trademark and Unfair Competition Law (S. 648) | 3 | Yvonne Matz |
| T-INFO-101307 | Internet Law (S. 394) | 3 | Thomas Dreier |
| T-INFO-108462 | Selected legal issues of Internet law (S. 555) | 3 | Thomas Dreier |

**Conditions**

None

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

| | |
|---|---|
| **Responsibility:** | Thomas Dreier |
| **Organisation:** | KIT-Fakultät für Informatik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 2 / Compulsory Elective Modules / Law |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Recht der Wirtschaftsunternehmen**

Non-Compulsory Block; You must choose at least 1 courses and at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-INFO-101329 | Employment Law I (S. 309) | 3 | Thomas Dreier |
| T-INFO-101330 | Employment Law II (S. 310) | 3 | Thomas Dreier |
| T-INFO-101316 | Law of Contracts (S. 407) | 3 | Thomas Dreier |
| T-INFO-101314 | Tax Law II (S. 638) | 3 | Detlef Dietrich, Thomas Dreier |
| T-INFO-101315 | Tax Law I (S. 637) | 3 | Thomas Dreier |

### Conditions
None

### Qualification Objectives
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 Module: Public Business Law [M-INFO-101217]

| | |
|---|---|
| **Responsibility:** | Matthias Bäcker |
| **Organisation:** | KIT-Fakultät für Informatik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 2 / Compulsory Elective Modules / Law |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 2 |

### Öffentliches Wirtschaftsrecht

Non-Compulsory Block; You must choose at least 1 courses and at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-INFO-101309 | Telecommunications Law (S. 644) | 3 | Nikolaus Marsch |
| T-INFO-101303 | Data Protection Law (S. 282) | 3 | Nikolaus Marsch |
| T-INFO-101311 | Public Media Law (S. 533) | 3 | Thomas Dreier |
| T-INFO-101312 | European and International Law (S. 334) | 3 | Ulf Brühann |
| T-INFO-101348 | Environmental Law (S. 333) | 3 | Matthias Bäcker |

**Learning Control / Examinations**

see course description.

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

**Responsibility:**      Jürgen Fleischer

**Organisation:**        KIT-Fakultät für Maschinenbau

**Curricular An-**       Compulsory Elective
**chorage:**

**Contained in:**        Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
                         Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
                         Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each summer term | 1 term | German | 4 | 1 |

**Compulsory**

| Identifier | Course | | ECTS | Responsibility |
|------------|--------|--|------|----------------|
| T-MACH-102162 | Automated Manufacturing Systems (S. 220) | | 9 | Jürgen Fleischer |

**Learning Control / Examinations**
written exam (120 minutes)

**Conditions**
none

**Qualification Objectives**
The students

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

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

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

In the second part of the lecture, the basics are illustrated using implemented manufacturing processes for the production of automotive components (chassis and drive technology).The analysis of automated manufacturing systems for manufacturing of defined components is also included. In the field of vehicle power train both, the automated manufacturing process for the production of the conventional internal-combustion engine and the automated manufacturing process for

the production of the prospective electric power train (electric motor and battery) are considered. In the field of car body, the focus is on the analysis of the process chain for the automated manufacturing of conventional sheet metal body parts, as well as for automated manufacturing of body components made out of fiber-reinforced plastics. Within tutorials, the contents from the lecture are advanced and applied to specific problems and tasks.

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

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

| | |
|---|---|
| **Responsibility:** | Jan Gerrit Korvink |
| **Organisation:** | Institut für Mikrostrukturtechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences<br>Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences<br>Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 1 term | German | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-100966 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (S. 226) | 3 | Andreas Guber |

**BioMEMS**
Non-Compulsory Block; You must choose at least 6 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 511) | 3 | Arndt Last |
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 556) | 3 | Timo Mappes |
| T-MACH-100967 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 227) | 3 | Andreas Guber |
| T-MACH-100968 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 229) | 3 | Andreas Guber |
| T-MACH-101910 | Microactuators (S. 444) | 3 | Manfred Kohl |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists (S. 230) | 3 | Hendrik Hölscher |
| T-MACH-102176 | Current Topics on BioMEMS (S. 278) | 4 | Andreas Guber |

**Learning Control / Examinations**
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.

**Conditions**
none

**Qualification Objectives**
The student

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

**Content**
Operations through small orifices, a pill which will take pictures on its way through your body or lab results right at

the point of care - the need for easier and faster ways to help people is an important factor in research. The module BioMEMS (Bio(medical)-Micro-Electro-Mechanical-Systems) describes the application of microtechnology in the field of Life-Science, medical applications and Biotechnology and will teach you the necessary skills to understand and develop biological and medical devices.

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

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

**Workload**
270 hours

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

**Responsibility:** Thomas Koch, Heiko Kubach

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular An-** Compulsory Elective
**chorage:**

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each winter term | 1 term | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-102194 | Combustion Engines I (S. 254) | 5 | Thomas Koch, Heiko Kubach |
| T-MACH-105564 | Energy Conversion and Increased Efficiency in Internal Combustion Engines (S. 314) | 4 | Thomas Koch, Heiko Kubach |

**Learning Control / Examinations**
The module examination contains of two oral examinations. The module score results from the two scores weighted according to the ECTS.

**Conditions**
None

**Qualification Objectives**
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**
Introduction, History, Concepts
Working Principle and Termodynamics
Characteristic Parameters
Air Path
Fuel Path
Energy Conversion
Fuels
Emissions
Exhaust Gas Aftertreatment
Reaction kinetics
Gas exchange
Ignition
Flow field of gasoline engines
Working process
Pressure trace analysis
Thermodynamic analysis of the high pressure process
Exergy analysis and waste heat recuperation
Aspects of sustainability

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

| | |
|---|---|
| **Responsibility:** | Heiko Kubach |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-104609 | Combustion Engines II (S. 255) | 5 | Rainer Koch, Heiko Kubach |

**Verbrennungsmotoren II**
Non-Compulsory Block; You must choose at least 4 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105044 | Fundamentals of Catalytic Exhaust Gas Aftertreatment (S. 348) | 4 | Olaf Deutschmann, Jan-Dierk Grunwaldt, Heiko Kubach, Egbert Lox |
| T-MACH-105173 | Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines (S. 210) | 4 | Marcus Gohl |
| T-MACH-105184 | Fuels and Lubricants for Combustion Engines (S. 347) | 4 | Bernhard Ulrich Kehrwald, Heiko Kubach |
| T-MACH-105167 | Analysis Tools for Combustion Diagnostics (S. 211) | 4 | Jürgen Pfeil |
| T-MACH-102197 | Gas Engines (S. 350) | 4 | Rainer Golloch |
| T-MACH-102199 | Model Based Application Methods (S. 449) | 4 | Frank Kirschbaum |
| T-MACH-105169 | Engine Measurement Techniques (S. 323) | 4 | Sören Bernhardt |

**Learning Control / Examinations**
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.

**Conditions**
None

**Modeled Conditions**
The following conditions must be met:

- The module [M-MACH-101275] *Combustion Engines I* must have been started.

**Qualification Objectives**
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

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

| | |
|---|---|
| **Responsibility:** | Heiner Wirbser |
| **Organisation:** | Institut für Technische Thermodynamik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each winter term | 1 term | 4 | 1 |

**Compulsory**

| Identifier | Course | | ECTS | Responsibility |
|---|---|---|---|---|
| T-MACH-102211 | Energy and Process Technology I (S. 312) | | 9 | Hans-Jörg Bauer, Corina Schwitzke, Amin Velji, Heiner Wirbser |

**Learning Control / Examinations**

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

**Conditions**

None

**Qualification Objectives**

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

**Content**

Energy and Process Technology 1:
1. thermodynamic basics and cycle processes (ITT)
2. basics of piston engines (IFKM)
3. basics of turbomachines (FSM)
4. basics of thermal turbomachines (ITS)

**Remarks**

All lectures and exams are hold in German only.

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

| | |
|---|---|
| **Responsibility:** | Heiner Wirbser |
| **Organisation:** | Institut für Technische Thermodynamik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each summer term | 1 term | 4 | 1 |

**Compulsory**

| Identifier | Course | | ECTS | Responsibility |
|---|---|---|---|---|
| T-MACH-102212 | Energy and Process Technology II (S. 313) | | 9 | Corina Schwitzke, Heiner Wirbser |

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

**Conditions**
None

**Qualification Objectives**
In this modul students achieve the ability to evaluate solitary and interconnected energy systems with respect to societal and economical aspects

**Content**
Energy and Process Technology 2:
1. basics in combustion and pollutant formation (ITT)
2. technical realisation and application of piston engines (IFKM) fluid flow engines (FSM) and thermal turbomachines (ITS)
3. technical aspects of energy supply systems and networks (ITS)

**Remarks**
All lectures and exams are hold in German only.

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

**Responsibility:**    Gisela Lanza

**Organisation:**    KIT-Fakultät für Maschinenbau

**Curricular Anchorage:**    Compulsory Elective

**Contained in:**    Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences

| ECTS | Recurrence | Duration | Language | Version |
|------|-----------|----------|----------|---------|
| 9 | Each term | 2 terms | German | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-105158 | Global Production and Logistics - Part 1: Global Production (S. 358) | 4 | Gisela Lanza |
| T-MACH-105159 | Global Production and Logistics - Part 2: Global Logistics (S. 360) | 4 | Kai Furmans |

**Globale Produktion und Logistik (Ergänzungsbereich)**
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-102128 | Information Systems and Supply Chain Management (S. 377) | 4 | Christoph Kilger |
| T-MACH-105188 | Integrative Strategies in Production and Development of High Performance Cars (S. 388) | 4 | Karl-Hubert Schlichtenmayer |
| T-MACH-105783 | Learning Factory "Global Production" (S. 409) | 4 | Gisela Lanza |
| T-MACH-105165 | Automotive Logistics (S. 223) | 4 | Kai Furmans |
| T-WIWI-103091 | Production and Logistics Controlling (S. 524) | 3 | Helmut Wlcek |
| T-MACH-102107 | Quality Management (S. 535) | 4 | Gisela Lanza |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
The students

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

**Content**
The module Global Production and Logistics provides comprehensive and well-founded basics for the main topics of global production and logistics. The lectures aim to show opportunities and market conditions for global enterprises. Part 1 focuses on economic backgrounds, opportunities and risks of global production. Part 2 focuses on the structure of

international logistics, their modeling, design and analysis. The threats in international logistics are discussed in case studies.

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

# M  Module: Integrated Product Development  [M-MACH-102626]

| | |
|---|---|
| **Responsibility:** | Albert Albers |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 16 | Each winter term | 1 term | German | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105401 | Integrated Product Development (S. 384) | 16 | Albert Albers, Albers Assistenten |

**Learning Control / Examinations**
oral examination (60 minutes)

**Conditions**
None

**Qualification Objectives**
By working practically in experience-based learning arrangements with industrial development tasks, graduates are able to succeed in new and unknown situations when developing innovative products by using methodological and systematic approaches. They can apply and adapt strategies of development and innovation management, technical system analysis and team leadership to the situation. As a result, they are able to foster the development of innovative products in industrial development teams in prominent positions, taking into account social, economic and ethical aspects.

**Content**
Organizational integration: integrated product development model, core team management and simultaneous engineering, informational integration: innovation management, cost management, quality management and knowledge management
Personal integration: team development and leadership
Guest lectures from the industry

**Remarks**
The participation in "Integrated Product Development" requires the concurrent participation in lectures (2145156), tutorials (2145157) and project work (2145300).
Due to organizational reasons, the number of participants is limited. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK hompage from april to july. The selection itself is made by Prof. Albers in personal interviews.

**Workload**
The work load is about 480 hours, corresponding to 16 credit points.

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

| | |
|---|---|
| **Responsibility:** | Gisela Lanza |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|------------|----------|----------|-------|---------|
| 9 | Each summer term | 1 term | German | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-109054 | Integrated Production Planning in the Age of Industry 4.0 (S. 386) | 9 | Gisela Lanza |

**Learning Control / Examinations**
Written Exam (120 min)

**Conditions**
none

**Qualification Objectives**
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

# M  Module: Introduction to Logistics  [M-MACH-101263]

| | |
|---|---|
| **Responsibility:** | Kai Furmans |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 1 term | German | 4 | 2 |

**Pflichtblock**
Non-Compulsory Block; You must choose between 1 und 2 courses and 6 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102151 | Material Flow in Logistic Systems (S. 437) | 6 | Kai Furmans |
| T-MACH-102163 | Basics of Technical Logistics (S. 225) | 6 | Martin Mittwollen, Jan Oellerich |

**Einführung in die Logistik (Ergänzungsbereich)**
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102128 | Information Systems and Supply Chain Management (S. 377) | 4 | Christoph Kilger |
| T-MACH-105151 | Energy Efficient Intralogistic Systems (S. 315) | 4 | Meike Braun, Frank Schönung |
| T-MACH-105165 | Automotive Logistics (S. 223) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 209) | 4 | André Richter |
| T-MACH-105187 | IT-Fundamentals of Logistics (S. 399) | 4 | Frank Thomas |
| T-MACH-105174 | Warehousing and Distribution Systems (S. 664) | 4 | Kai Furmans |
| T-MACH-105171 | Safety Engineering (S. 549) | 4 | Hans-Peter Kany |
| T-WIWI-103091 | Production and Logistics Controlling (S. 524) | 3 | Helmut Wlcek |
| T-MACH-102159 | Elements and Systems of Technical Logistics (S. 305) | 4 | Georg Fischer, Martin Mittwollen |
| T-MACH-108946 | Elements and Systems of Technical Logistics - Project (S. 306) | 2 | Georg Fischer, Martin Mittwollen |

**Learning Control / Examinations**

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.

To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the IFL. The term paper may not be convalidated in the seminar module.

**Conditions**

**Modeled Conditions**

1 of 2 conditions must be met:

1. The module [M-MACH-101277] *Material Flow in Logistic Systems* must not have been started.
2. The module [M-MACH-101279] *Technical Logistics* must not have been started.

**Qualification Objectives**

The student

- acquires an overview of different logistic questions in practice,
- is able to model logistic systems with adequate accuracy by using simple models,
- is able to handle analytical methods for a performance evaluation of logistic systems,
- is able to identify cause and effects within logistic systems.

**Content**

The module *Introduction to Logistics* provides well-founded knowledge in main questions of logistics. In this module, focuses on the acquisition of theoretical basics linked with exemplary practice questions are laid. To gain a deeper understanding, the course is accompanied by exercises and further improved by case studies.

**Workload**

270 hours

## M | Module: Logistics in Value Chain Networks [M-MACH-101280]

**Responsibility:** Kai Furmans

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|------------|----------|----------|-------|---------|
| 9 | Each term | 2 terms | German | 4 | 2 |

### Logistik in Wertschöpfungsnetzwerken (Kernbereich)
Non-Compulsory Block; You must choose one course and at least 6 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-105181 | Supply Chain Management (S. 630) | 6 | Knut Alicke |
| T-MACH-102089 | Logistics - Organisation, Design and Control of Logistic Systems (S. 415) | 6 | Kai Furmans |

### Logistik in Wertschöpfungsnetzwerken (Ergänzungsbereich)
Non-Compulsory Block; You must choose one course and at least 3 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-105174 | Warehousing and Distribution Systems (S. 664) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 209) | 4 | André Richter |
| T-MACH-105165 | Automotive Logistics (S. 223) | 4 | Kai Furmans |
| T-MACH-102128 | Information Systems and Supply Chain Management (S. 377) | 4 | Christoph Kilger |
| T-WIWI-103091 | Production and Logistics Controlling (S. 524) | 3 | Helmut Wlcek |

**Learning Control / Examinations**

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.

To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the IFL. The term paper may not be convalidated in the seminar module.

**Conditions**

**Modeled Conditions**

1 of 2 conditions must be met:

1. The module [M-MACH-101282] *Global Production and Logistics* must have been started.

2. The course [T-MACH-102151] *Material Flow in Logistic Systems* must have been started.

**Qualification Objectives**

The student

- is able to plan logistic systems and evaluate their performance,
- can use approaches of Supply Chain Management within the operational practice,

- identifies, analyses and evaluates risks within logistic systems.

**Content**

The module *Logistics in value chain networks* provides basics for the main topics of logistics. Within the lecture basic methods for planning and running logistic systems are introduced. Furthermore special issues like supply chain management and risks in logistic systems are focused. To gain a deeper understanding, the course is accompanied by exercises.

**Workload**

270 hours

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

| | |
|---|---|
| **Responsibility:** | Jürgen Fleischer |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|------------|----------|----------|-------|---------|
| 9 | Each winter term | 1 term | German | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-102158 | Machine Tools and Industrial Handling (S. 421) | 9 | Jürgen Fleischer |

**Learning Control / Examinations**
Written exam (120 minutes)

**Conditions**
None

**Qualification Objectives**
The students

- are capable to explain the use and application of machine tools and handling devices as well as differentiate their characteristics and structure.
- are able to name and describe the essential components (frame, main spindles, feed axis, peripheral equipment, control) of machine tools.
- Are capable to distinguish and select and describe the essential components regarding structure, characteristics advantages and disadvantages.
- are enabled to dimension the main components of machine tools.
- are able to name and describe the control principles of machine tools.
- are capable to name examples of machine tools and industrial handling as well as to deduce compare the essential components. Additionally they can allocate manufacturing processes.
- are enabled to identify drawbacks as well as derive and asses measures for improvements.
- are qualified to apply methods for selection and evaluation of machine tools.
- are experienced to deduce the particular failure characteristics of a ball screw.

**Content**
The module overviews the assembly, dimensioning and application of machine tools and industrial handling. A consolidated and practice oriented knowledge is imparted about the choice, dimensioning and assessment of production machines. At first, the major components of machine tools are explained systematically. At this, the characteristics of dimensioning of machine tools are described in detail. Finally, the application of machine tools is demonstrated by means of example machines of the manufacturing processes turning, milling, grinding, massive forming, sheet metal forming and toothing.

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

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

| | |
|---|---|
| **Responsibility:** | Volker Schulze |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|:---:|:---:|:---:|:---:|:---:|:---:|
| 9 | Each winter term | 1 term | German | 4 | 3 |

**Compulsory**

| Identifier | Course | | ECTS | Responsibility |
|---|---|---|---|---|
| T-MACH-102105 | Manufacturing Technology (S. 428) | | 9 | Volker Schulze, Frederik Zanger |

**Learning Control / Examinations**
Written Exam (180 min)

**Conditions**
None

**Qualification Objectives**
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

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

| | |
|---|---|
| **Responsibility:** | Kai Furmans |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences<br>Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences<br>Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 1 term | German | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102151 | Material Flow in Logistic Systems (S. 437) | 6 | Kai Furmans |

**Materialfluss in Logistiksystemen (Ergänzungsbereich)**
Non-Compulsory Block; You must choose one course and at least 3 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105174 | Warehousing and Distribution Systems (S. 664) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 209) | 4 | André Richter |
| T-MACH-105165 | Automotive Logistics (S. 223) | 4 | Kai Furmans |
| T-WIWI-103091 | Production and Logistics Controlling (S. 524) | 3 | Helmut Wlcek |

**Learning Control / Examinations**
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal. To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the IFL. The term paper may not be convalidated in the seminar module.

**Conditions**
none

**Qualification Objectives**
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

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

| | |
|---|---|
| **Responsibility:** | Kai Furmans |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|:---:|:---:|:---:|:---:|:---:|
| 9 | Each term | 2 terms | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105189 | Mathematical Models and Methods for Production Systems (S. 440) | 6 | Kai Furmans, Marion Rimmele |

**Materialfluss in vernetzten Logistiksystemen**
Non-Compulsory Block; You must choose at least 3 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105174 | Warehousing and Distribution Systems (S. 664) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 209) | 4 | André Richter |
| T-MACH-105165 | Automotive Logistics (S. 223) | 4 | Kai Furmans |
| T-WIWI-103091 | Production and Logistics Controlling (S. 524) | 3 | Helmut Wlcek |

**Learning Control / Examinations**
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.
To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the IFL. The term paper may not be convalidated in the seminar module.

**Conditions**
The course "*Mathematical models and methods for Production Systems*" [T-MACH-102151] is compulsory and must be examined.
In combination with this module, the course "Material Flow in Logistics Systems" [T-MACH-102151] must be completed.

**Modeled Conditions**
The following conditions must be met:

- The course [T-MACH-102151] *Material Flow in Logistic Systems* must have been started.

**Qualification Objectives**
The student

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

**Content**

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

**Recommendations**

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

**Workload**

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

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

| | |
|---|---|
| **Responsibility:** | Jan Gerrit Korvink |
| **Organisation:** | Institut für Mikrostrukturtechnik |
| **Curricular An-chorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 1 term | German | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102166 | Fabrication Processes in Microsystem Technology (S. 339) | 3 | Klaus Bade |

**Mikrofertigung (Ergänzungsbereich)**
Non-Compulsory Block; You must choose at least 6 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 511) | 3 | Arndt Last |
| T-MACH-100530 | Physics for Engineers (S. 492) | 6 | Martin Dienwiebel, Peter Gumbsch, Alexander Nesterov-Müller, Daniel Weygand |
| T-MACH-102167 | Nanotribology and -Mechanics (S. 459) | 3 | Martin Dienwiebel, Hendrik Hölscher |
| T-MACH-102191 | Polymers in MEMS B: Physics, Microstructuring and Applications (S. 499) | 3 | Matthias Worgull |
| T-MACH-102192 | Polymers in MEMS A: Chemistry, Synthesis and Applications (S. 497) | 3 | Bastian Rapp |
| T-MACH-102200 | Polymers in MEMS C: Biopolymers and Bioplastics (S. 501) | 3 | Bastian Rapp, Matthias Worgull |
| T-MACH-105556 | Practical Course Polymers in MEMS (S. 506) | 3 | Bastian Rapp, Matthias Worgull |
| T-MACH-109122 | X-ray Optics (S. 679) | 4 | Arndt Last |

**Learning Control / Examinations**

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.

**Conditions**

**Modeled Conditions**

The following conditions must be met:

- The course [T-MACH-102166] *Fabrication Processes in Microsystem Technology* must not have been started.

**Qualification Objectives**

The student

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

**Content**

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

**Workload**

270 hours

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

| | |
|---|---|
| **Responsibility:** | Jan Gerrit Korvink |
| **Organisation:** | Institut für Mikrostrukturtechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences<br>Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences<br>Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 1 term | German | 4 | 2 |

**Mikrooptik**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 511) | 3 | Arndt Last |
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 556) | 3 | Timo Mappes |
| T-MACH-101910 | Microactuators (S. 444) | 3 | Manfred Kohl |
| T-ETIT-100741 | Laser Physics (S. 406) | 4 | Christian Koos |
| T-ETIT-101945 | Optical Waveguides and Fibers (S. 475) | 4 | Christian Koos |
| T-MACH-109122 | X-ray Optics (S. 679) | 4 | Arndt Last |

**Learning Control / Examinations**
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.

**Conditions**
none

**Qualification Objectives**
The student

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

**Content**
Optical imaging, measuring and sensor systems are a base for modern natural sciences. In particular life sciences and telecommunications have an intrinsic need for the application of optical technologies. Numerous fields of physics and engineering, e.g. astronomy and material sciences, require optical techniques. Micro optical systems are introduced in medical diagnostics and biological sensing as well as in products of the daily life.
In this module, an introduction to the basics of optics is provided; optical effects are presented with respect to their technical use.

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

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

**Workload**
270 hours

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

**Responsibility:** Jan Gerrit Korvink

**Organisation:** Institut für Mikrostrukturtechnik

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 1 term | German | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-MACH-105182 | Introduction to Microsystem Technology I (S. 395) | 3 | Vlad Badilita, Mazin Jouda, Jan Gerrit Korvink |

**Mikrosystemtechnik (Ergänzungsbereich)**
Non-Compulsory Block; You must choose at least 6 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 556) | 3 | Timo Mappes |
| T-MACH-100967 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 227) | 3 | Andreas Guber |
| T-MACH-100968 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 229) | 3 | Andreas Guber |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists (S. 230) | 3 | Hendrik Hölscher |
| T-MACH-105183 | Introduction to Microsystem Technology II (S. 396) | 3 | Mazin Jouda, Jan Gerrit Korvink |
| T-MACH-101910 | Microactuators (S. 444) | 3 | Manfred Kohl |
| T-MACH-102080 | Nanotechnology with Clusterbeams (S. 458) | 3 | Jürgen Gspann |
| T-MACH-102152 | Novel Actuators and Sensors (S. 468) | 4 | Manfred Kohl, Martin Sommer |
| T-ETIT-101907 | Optoelectronic Components (S. 477) | 4 | Wolfgang Freude |
| T-MACH-100530 | Physics for Engineers (S. 492) | 6 | Martin Dienwiebel, Peter Gumbsch, Alexander Nesterov-Müller, Daniel Weygand |
| T-MACH-102192 | Polymers in MEMS A: Chemistry, Synthesis and Applications (S. 497) | 3 | Bastian Rapp |
| T-MACH-102191 | Polymers in MEMS B: Physics, Microstructuring and Applications (S. 499) | 3 | Matthias Worgull |
| T-MACH-102200 | Polymers in MEMS C: Biopolymers and Bioplastics (S. 501) | 3 | Bastian Rapp, Matthias Worgull |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 511) | 3 | Arndt Last |

**Learning Control / Examinations**

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.

**Conditions**

**Qualification Objectives**

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

**Workload**

270 hours

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

| | |
|---|---|
| **Responsibility:** | Jan Gerrit Korvink |
| **Organisation:** | Institut für Mikrostrukturtechnik |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 1 term | German | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105180 | Nanotechnology for Engineers and Natural Scientists (S. 457) | 4 | Martin Dienwiebel, Hendrik Hölscher, Stefan Walheim |

**Nanotechnologie (Ergänzungsbereich)**
Non-Compulsory Block; You must choose at least 5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102080 | Nanotechnology with Clusterbeams (S. 458) | 3 | Jürgen Gspann |
| T-MACH-102167 | Nanotribology and -Mechanics (S. 459) | 3 | Martin Dienwiebel, Hendrik Hölscher |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 511) | 3 | Arndt Last |
| T-MACH-102152 | Novel Actuators and Sensors (S. 468) | 4 | Manfred Kohl, Martin Sommer |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists (S. 230) | 3 | Hendrik Hölscher |
| T-ETIT-100740 | Quantum Functional Devices and Semiconductor Technology (S. 537) | 3 | Christian Koos |

**Learning Control / Examinations**
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.

**Conditions**
none

**Qualification Objectives**
The student

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

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

**Workload**

270 hours

# M  Module: Optoelectronics and Optical Communication  [M-MACH-101295]

**Responsibility:**  Jan Gerrit Korvink

**Organisation:**  Institut für Mikrostrukturtechnik

**Curricular Anchorage:**  Compulsory Elective

**Contained in:**  Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 1 term | German | 4 | 2 |

### Optoelektronik und Optische Kommunikationstechnik (Kernbereich)
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-ETIT-100639 | Optical Transmitters and Receivers (S. 474) | 4 | Wolfgang Freude |

### Optoelektronik und Optische Kommunikationstechnik (Ergänzungsbereich)
Non-Compulsory Block; You must choose at least 5 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-MACH-102152 | Novel Actuators and Sensors (S. 468) | 4 | Manfred Kohl, Martin Sommer |
| T-ETIT-101938 | Communication Systems and Protocols (S. 256) | 5 | Jürgen Becker |
| T-ETIT-100741 | Laser Physics (S. 406) | 4 | Christian Koos |
| T-ETIT-100740 | Quantum Functional Devices and Semiconductor Technology (S. 537) | 3 | Christian Koos |
| T-ETIT-101945 | Optical Waveguides and Fibers (S. 475) | 4 | Christian Koos |

**Learning Control / Examinations**
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.

**Conditions**
none

**Qualification Objectives**
Student has basic knowledge of optical communication systems and related device and fabrication technologies.

- He/she can apply this knowledge to specific problems.

**Content**
This module covers practical and theoretical aspects in the areas of optical communications and optoelectronics. System aspects of communication networks are complemented by fundamental principles and device technologies of optoelectronics as well as and microsystem fabrication technologies.

**Workload**
270 hours

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

| | |
|---|---|
| **Responsibility:** | Volker Schulze |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Vertiefung der Produktionstechnik**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-MACH-105188 | Integrative Strategies in Production and Development of High Performance Cars (S. 388) | 4 | Karl-Hubert Schlichtenmayer |
| T-MACH-105783 | Learning Factory "Global Production" (S. 409) | 4 | Gisela Lanza |
| T-MACH-105166 | Materials and Processes for Body Leightweight Construction in the Automotive Industry (S. 439) | 4 | Stefan Kienzle, Dieter Steegmüller |
| T-MACH-108878 | Laboratory Production Metrology (S. 403) | 4 | Benjamin Häfner |
| T-MACH-102107 | Quality Management (S. 535) | 4 | Gisela Lanza |
| T-MACH-105185 | Control Technology (S. 267) | 4 | Christoph Gönnheimer |
| T-MACH-105177 | Metal Forming (S. 441) | 3 | Thomas Herlan |
| T-MACH-102148 | Gear Cutting Technology (S. 351) | 4 | Markus Klaiber |

**Learning Control / Examinations**
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.

**Conditions**
none

**Qualification Objectives**
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.

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

**Responsibility:**  Kai Furmans

**Organisation:**  KIT-Fakultät für Maschinenbau

**Curricular Anchorage:**  Compulsory Elective

**Contained in:**  Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|------------|----------|----------|-------|---------|
| 9 | Each winter term | 2 terms | German | 4 | 2 |

### Technische Logistik (Kernbereich)
Non-Compulsory Block; You must choose one course and at least 6 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-102163 | Basics of Technical Logistics (S. 225) | 6 | Martin Mittwollen, Jan Oellerich |

### Technische Logistik (Ergänzungsbereich)
Non-Compulsory Block; You must choose one course and at least 3 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-MACH-105174 | Warehousing and Distribution Systems (S. 664) | 4 | Kai Furmans |
| T-MACH-105171 | Safety Engineering (S. 549) | 4 | Hans-Peter Kany |
| T-MACH-105151 | Energy Efficient Intralogistic Systems (S. 315) | 4 | Meike Braun, Frank Schönung |
| T-MACH-102159 | Elements and Systems of Technical Logistics (S. 305) | 4 | Georg Fischer, Martin Mittwollen |
| T-MACH-102160 | Selected Applications of Technical Logistics (S. 552) | 4 | Viktor Milushev, Martin Mittwollen |
| T-MACH-105187 | IT-Fundamentals of Logistics (S. 399) | 4 | Frank Thomas |
| T-WIWI-103091 | Production and Logistics Controlling (S. 524) | 3 | Helmut Wlcek |
| T-MACH-108946 | Elements and Systems of Technical Logistics - Project (S. 306) | 2 | Georg Fischer, Martin Mittwollen |
| T-MACH-108945 | Selected Applications of Technical Logistics - Project (S. 553) | 2 | Viktor Milushev, Martin Mittwollen |

**Learning Control / Examinations**

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.

To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the IFL. The term paper may not be convalidated in the seminar module.

**Conditions**

**Modeled Conditions**

The following conditions must be met:

- The course [T-MACH-102163] *Basics of Technical Logistics* must not have been started.

**Qualification Objectives**

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

## M  Module: Virtual Engineering A  [M-MACH-101283]

| | |
|---|---|
| **Responsibility:** | Jivka Ovtcharova |
| **Organisation:** | KIT-Fakultät für Maschinenbau |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 2 terms | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102123 | Virtual Engineering I (S. 660) | 4 | Jivka Ovtcharova |

**Virtual Engineering A**
Non-Compulsory Block; You must choose at least 5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102153 | PLM-CAD Workshop (S. 496) | 4 | Jivka Ovtcharova |
| T-MACH-102181 | PLM for Product Development in Mechatronics (S. 495) | 4 | Martin Eigner |
| T-MACH-102209 | Information Engineering (S. 373) | 3 | Jivka Ovtcharova |
| T-MACH-106740 | Virtual Engineering Lab (S. 662) | 4 | Jivka Ovtcharova |
| T-MACH-106741 | Virtual training factory 4.X (S. 663) | 4 | Jivka Ovtcharova |
| T-MACH-106743 | IoT platform for engineering (S. 398) | 4 | Jivka Ovtcharova |
| T-MACH-108491 | Digitalization of Products, Services & Production (S. 296) | 4 | |
| T-MACH-102185 | CATIA CAD Training Course (S. 250) | 2 | Jivka Ovtcharova |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
The students should:

- have basic knowledge about the industrial application of Information Technology in product development,
- have understanding about current and future application of information systems in product development processes in the context of Product Lifecycle Management and Virtual Engineering,
- be able to operate current CAx- and PLM-systems in the product development process
- understands demands and relevance of interconnected IT-systems and respective methods for product development

**Content**
The Module Virtual Engineering A gives an overview about product development processes, beginning with requirement

engineering, verification of manufacturing feasibility and virtual operation in the scope of Digital Factory. The guest-lectures contained in this module complete the content of the lecture with introducing current product development processes focusing.

**Workload**

- regular attendance: 140 hours
- Preparation and reworking: 20 hours
- Exam and exam revision/preparation: 110 hours

# M Module: Virtual Engineering B  [M-MACH-101281]

**Responsibility:** Jivka Ovtcharova

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences
Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|---------------|
| T-MACH-102124 | Virtual Engineering II (S. 661) | 4 | Jivka Ovtcharova |

**Virtual Engineering B**
Non-Compulsory Block; You must choose at least 5 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|---------------|
| T-MACH-102181 | PLM for Product Development in Mechatronics (S. 495) | 4 | Martin Eigner |
| T-MACH-102209 | Information Engineering (S. 373) | 3 | Jivka Ovtcharova |
| T-MACH-102153 | PLM-CAD Workshop (S. 496) | 4 | Jivka Ovtcharova |
| T-MACH-102185 | CATIA CAD Training Course (S. 250) | 2 | Jivka Ovtcharova |
| T-MACH-106740 | Virtual Engineering Lab (S. 662) | 4 | Jivka Ovtcharova |
| T-MACH-106741 | Virtual training factory 4.X (S. 663) | 4 | Jivka Ovtcharova |
| T-MACH-106743 | IoT platform for engineering (S. 398) | 4 | Jivka Ovtcharova |
| T-MACH-108491 | Digitalization of Products, Services & Production (S. 296) | 4 | |

**Learning Control / Examinations**

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.

**Conditions**

keine

**Qualification Objectives**

The students should:

- have basic knowledge about industrial practice of Information Technology in the field of product development,
- have basic knowledge about innovative visualization techniques like Virtual Reality and feasible application of Virtual Mock-Ups (VMU) for validating product properties.
- Is able to estimate potentials and risks of current Virtual Reality Systems in product development.
- understands demands and relevance of interconnected IT-systems and respective methods for product development

**Content**

The module Virtual Engineering B communicates basics of Virtual Reality applications and their fields of application for validating product properties and for supporting product development processes.

Optional courses of this module complete the content with practical application of VR techniques in product development (Virtual Reality Exercise) and current product development processes.

**Workload**
Workload at 9 graduate credits / credit points: ca. 270 hours.

- regular attendance: 100 hours
- Preparation and reworking: 50 hours
- Exam and exam revision/preparation: 120 hours

Detailed apportionment results from credit points of the courses of the module

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

**Responsibility:**     Berthold Wigger

**Organisation:**       KIT-Fakultät für Wirtschaftswissenschaften

**Curricular An-**      Compulsory Elective
**chorage:**

**Contained in:**       Economics
                        Compulsory Elective Modules 1 / Compulsory Modules / Economics
                        Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
                        Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 3 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102740 | Public Management (S. 532) | 4,5 | Berthold Wigger |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose between 4,5 and 5 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-108880 | Blockchains & Cryptofinance (S. 231) | 4,5 | Philipp Schuster, Marliese Uhrig-Homburg |
| T-WIWI-108711 | Basics of German Company Tax Law and Tax Planning (S. 224) | 4,5 | Gerd Gutekunst, Berthold Wigger |
| T-WIWI-102739 | Public Revenues (S. 534) | 4,5 | Berthold Wigger |

**Learning Control / Examinations**
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.

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

**Qualification Objectives**
The student

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

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

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

**Recommendations**

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

**Remarks**

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

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

**Workload**

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

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

**Responsibility:**  Hagen Lindstädt

**Organisation:**  KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:**  Compulsory Elective

**Contained in:**  Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|-----------|----------|----------|---------|
| 9 | Irregular | 2 terms | German | 1 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-106188 | Workshop Current Topics in Strategy and Management (S. 678) | 3 | Hagen Lindstädt |
| T-WIWI-106189 | Workshop Business Wargaming – Analyzing Strategic Interactions (S. 677) | 3 | Hagen Lindstädt |
| T-WIWI-106190 | Strategy and Management Theory: Developments and "Classics" (S. 627) | 3 | Hagen Lindstädt |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
Students

- are able to analyze business strategies and derive recommendations using appropriate frameworks

- learn to express their position through compelling reasoning in structured discussions

- are qualified to critically examine recent research topics in the field of strategic management

- can derive own conclusions from less structured information by using interdisciplinary knowledge

**Content**
The module is divided into three main topics:
The students

- analyze and discuss a wide range of business strategies on the basis of collectively selected case studies.

- participate in a business wargaming workshop and analyze strategic interactions.

- write a paper about current topics in the field of strategic management theory.

**Recommendations**
None

**Remarks**
This course is admission restricted. After being admitted to one course of this module, the participation at the other courses will be guaranteed.
Every course of this module will be at least offered every second term. Thus, it will be possible to complete the module within two terms.
This module will be offered for the first time in the winter term 2017/18.

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

**Responsibility:**    Ingrid Ott

**Organisation:**    KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:**    Compulsory Elective

**Contained in:**    Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 208) | 4,5 | Kay Mitusch |
| T-WIWI-109194 | Dynamic Macroeconomics (S. 300) | 4,5 | Johannes Brumm |
| T-WIWI-102840 | Innovationtheory and -Policy (S. 379) | 4,5 | Ingrid Ott |
| T-WIWI-103107 | Spatial Economics (S. 614) | 4,5 | Ingrid Ott |

**Learning Control / Examinations**
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must add up to at least 9.
The overall grade for the module is the average of the grades for each course weighted by the credits.

**Conditions**
None

**Qualification Objectives**
The student

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

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

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

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

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

**Responsibility:** Oliver Grothe

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Statistics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Statistics
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|-----------|----------|----------|---------|
| 9 | Each term | 2 terms | German | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-103123 | Advanced Statistics (S. 206) | 4,5 | Oliver Grothe |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose between 4,5 and 5 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-106341 | Machine Learning 2 – Advanced Methods (S. 419) | 5 | Johann Marius Zöllner |
| T-WIWI-103124 | Multivariate Statistical Methods (S. 456) | 4,5 | Oliver Grothe |

**Learning Control / Examinations**

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.

**Conditions**

The course "*Advanced Statistics*" is compulsory.

**Qualification Objectives**

A Student

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

**Content**

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

**Remarks**

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

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

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

**Responsibility:**  Johannes Philipp Reiß

**Organisation:**  KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:**  Compulsory Elective

**Contained in:**  Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 1 term | German | 4 | 3 |

### Ergänzungsangebot
Non-Compulsory Block; You must choose between 1 und 2 courses and at least 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102613 | Auction Theory (S. 218) | 4,5 | Karl-Martin Ehrhart |
| T-WIWI-102614 | Experimental Economics (S. 337) | 4,5 | Jella Pfeiffer, Christof Weinhardt |
| T-WIWI-102622 | Corporate Financial Policy (S. 271) | 4,5 | Martin Ruckes |
| T-WIWI-102623 | Financial Intermediation (S. 344) | 4,5 | Martin Ruckes |
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 430) | 4,5 | Christof Weinhardt |
| T-WIWI-102862 | Predictive Mechanism and Market Design (S. 513) | 4,5 | Johannes Philipp Reiß |
| T-WIWI-105781 | Incentives in Organizations (S. 369) | 4,5 | Petra Nieken |

### Wahlpflichtangebot
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102861 | Advanced Game Theory (S. 198) | 4,5 | Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß |
| T-WIWI-106623 | Technical conditions met (S. 639) | 0 | |

**Learning Control / Examinations**
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.

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

**Qualification Objectives**
Students

- can model and analyze complex situations of strategic interaction using advanced game theoretic concepts;

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

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

**Recommendations**
Basic knowledge in game theory is assumed.

**Remarks**
The course *Predictive Mechanism and Market Design* is not offered each year.
The course "Decision Theory" [2520365] will not be offered any more from summer term 2015 on. The examination will be offered latest until winter term 2015/2016 (repeaters only).

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

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

**Responsibility:** Christof Weinhardt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102639 | Business Models in the Internet: Planning and Implementation (S. 243) | 4,5 | Timm Teubner |
| T-WIWI-102706 | Special Topics in Information Engineering & Management (S. 615) | 4,5 | Christof Weinhardt |
| T-WIWI-102847 | Recommender Systems (S. 541) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102848 | Personalization and Services (S. 482) | 4,5 | Andreas Sonnenbichler |
| T-WIWI-102641 | Service Innovation (S. 602) | 4,5 | Gerhard Satzger |
| T-WIWI-102799 | Practical Seminar Service Innovation (S. 508) | 4,5 | Gerhard Satzger |
| T-WIWI-106201 | Digital Transformation of Organizations (S. 294) | 4,5 | Alexander Mädche |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
The student should

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

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

**Recommendations**

None

**Remarks**

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

**Workload**

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

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

**Responsibility:**   Clemens Puppe

**Organisation:**   KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:**   Compulsory Elective

**Contained in:**   Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 2 |

**Compulsory**

| Identifier | Course | | ECTS | Responsibility |
|------------|--------|---|------|----------------|
| T-WIWI-102740 | Public Management (S. 532) | | 4,5 | Berthold Wigger |
| T-WIWI-102859 | Social Choice Theory (S. 610) | | 4,5 | Clemens Puppe |

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

**Conditions**
None

**Qualification Objectives**
Students

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

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

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

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

**Responsibility:** Marcus Wouters

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|------------|----------|----------|---------|
| 9 | Each term | 1 term | German | 5 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102885 | Advanced Management Accounting (S. 205) | 4,5 | Marcus Wouters |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-105777 | Business Intelligence Systems (S. 241) | 4,5 | Alexander Mädche, Mario Nadj, Peyman Toreini |
| T-WIWI-105781 | Incentives in Organizations (S. 369) | 4,5 | Petra Nieken |
| T-WIWI-102835 | Marketing Strategy Business Game (S. 434) | 1,5 | Martin Klarmann |
| T-WIWI-107720 | Market Research (S. 432) | 4,5 | |
| T-WIWI-102803 | Modeling Strategic Decision Making (S. 453) | 4,5 | Hagen Lindstädt |
| T-WIWI-102883 | Pricing (S. 517) | 4,5 | Sven Feurer |
| T-WIWI-102812 | Product and Innovation Management (S. 523) | 3 | Martin Klarmann |
| T-WIWI-102621 | Valuation (S. 659) | 4,5 | Martin Ruckes |
| T-WIWI-108651 | Extraordinary additional course in the module Cross-Functional Management Accounting (S. 338) | 4,5 | Marcus Wouters |

**Learning Control / Examinations**
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.

**Conditions**
The course "Advanced Management Accounting" is compulsory.
The additional courses can only be chosen after the compulsory course has been completed successfully.

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

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

and strategy.

**Recommendations**
None

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

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

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

**Responsibility:** Andreas Geyer-Schulz

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular An-** Compulsory Elective
**chorage:**

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 1 term | German | 4 | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102847 | Recommender Systems (S. 541) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102848 | Personalization and Services (S. 482) | 4,5 | Andreas Sonnenbichler |
| T-WIWI-102762 | Business Dynamics (S. 239) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-105778 | Service Analytics A (S. 598) | 4,5 | Hansjörg Fromm, Thomas Setzer |
| T-WIWI-103549 | Intelligent CRM Architectures (S. 389) | 4,5 | Andreas Geyer-Schulz |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
The student

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

**Content**
Building on the basics of CRM from the Bachelor's degree program, the module "Data Science: Advanced CRM" is focusing on the use of information technology and its related economic issues in the CRM environment. The course "Intelligent CRM Architectures" deals with the design of modern intelligent systems. The focus is on the software architecture and design patterns that are relevant to learning systems. It also covers important aspects of machine learning that complete the picture of an intelligent system. Examples of presented systems are "Taste Map"-architectures, "Counting Services", as well as architectures of "Business Games". The impact of management decisions in complex systems are considered in the course "Business dynamics". The understanding, modeling and simulation of complex systems allows the analysis, the goal-oriented design and the optimization of markets, business processes and regulations throughout the company. Specific problems of intelligent systems are covered in the courses "Personalization and Services", "Recommender Systems",

"Service Analytics" and "Social Network Analysis in CRM". The content includes procedures and methods to create user-oriented services. The measurement and monitoring of service systems, the design of personalized offers, and the generation of recommendations based on the collected data of products and customers are discussed. The importance of user modeling and -recognition, data security and privacy are adressed as well.

**Recommendations**
None

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

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

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

| | |
|---|---|
| **Responsibility:** | Martin Klarmann |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |

| | |
|---|---|
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Version |
|------|-----------|----------|----------|---------|
| 9 | Each term | 2 terms | German | 5 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-103139 | Marketing Analytics (S. 433) | 4,5 | Martin Klarmann |
| T-WIWI-107720 | Market Research (S. 432) | 4,5 | |

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

**Conditions**
Keine.

**Qualification Objectives**
Students

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

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

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

**Recommendations**
None

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

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

**Responsibility:** Alexander Mädche

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|-----------|----------|----------|---------|
| 9 | Each term | 1 term | German/English | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-108461 | Interactive Information Systems (S. 391) | 4,5 | Alexander Mädche, Stefan Morana |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-105773 | Digital Service Design (S. 291) | 4,5 | Alexander Mädche |
| T-WIWI-108437 | Practical Seminar: Information Systems and Service Design (S. 510) | 4,5 | Norbert Koppenhagen, Alexander Mädche |

**Learning Control / Examinations**
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.

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

**Qualification Objectives**
The student

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

**Content**
Advanced information and communication technologies make interactive systems ever-present in the users' private and business life. They are an integral part of smartphones, devices in the smart home, mobility vehicles as well as at the working place in production and administration (e.g. in the form of dashboards).
With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. This module focuses on design processes and principles for interactive systems. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories,

practices and methods for the design of interactive systems. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

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

**Remarks**

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

**Workload**

The total workload for this module is approximately 270 hours.

## M  Module: Digital Service Systems in Industry  [M-WIWI-102808]

| | |
|---|---|
| **Responsibility:** | Wolf Fichtner, Stefan Nickel |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 5 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102872 | Challenges in Supply Chain Management (S. 251) | 4,5 | Esther Mohr |
| T-WIWI-102822 | Industrial Services (S. 371) | 4,5 | Hansjörg Fromm |
| T-WIWI-107043 | Liberalised Power Markets (S. 411) | 3 | Wolf Fichtner |
| T-WIWI-106200 | Modeling and OR-Software: Advanced Topics (S. 452) | 4,5 | Stefan Nickel |
| T-WIWI-106201 | Digital Transformation of Organizations (S. 294) | 4,5 | Alexander Mädche |
| T-WIWI-106563 | Practical Seminar Digital Service Systems (S. 507) | 4,5 | Wolf Fichtner, Alexander Mädche, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt |

**Learning Control / Examinations**
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

**Conditions**
This module can only be assigned as an elective module.

**Qualification Objectives**
Students

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

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

**Recommendations**
None

**Remarks**

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

**Workload**

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

## M Module: Disruptive FinTech Innovations [M-WIWI-103261]

| | |
|---|---|
| **Responsibility:** | Maxim Ulrich |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Each summer term | 1 term | English | 1 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-106193 | Engineering FinTech Solutions (S. 324) | 4,5 | Maxim Ulrich |
| T-WIWI-106496 | Computational FinTech with Python and C++ (S. 260) | 1,5 | |
| T-WIWI-106495 | Automated Financial Advisory (S. 219) | 3 | Maxim Ulrich |

**Learning Control / Examinations**
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 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.

**Conditions**
None.

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

**Content**
See respective lecture

**Recommendations**
None

**Remarks**
See respective lecture

**Workload**
The total workload for this module is approximately 270 hours. For further information, see respective lecture.

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

| | |
|---|---|
| **Responsibility:** | Melanie Schienle |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Statistics |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Statistics |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | German | 3 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103125 | Applied Econometrics (S. 214) | 4,5 | Melanie Schienle |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose between 4,5 and 5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103066 | Data Mining and Applications (S. 279) | 4,5 | Rheza Nakhaeizadeh |
| T-WIWI-103064 | Financial Econometrics (S. 343) | 4,5 | Melanie Schienle |
| T-WIWI-103126 | Non- and Semiparametrics (S. 461) | 4,5 | Melanie Schienle |
| T-WIWI-103127 | Panel Data (S. 479) | 4,5 | Wolf-Dieter Heller |
| T-WIWI-103065 | Statistical Modeling of generalized regression models (S. 621) | 4,5 | Wolf-Dieter Heller |

**Learning Control / Examinations**
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.

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

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

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

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

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

**Responsibility:** Melanie Schienle

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Statistics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Statistics
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|------------|----------|----------|---------|
| 9 | Each term | 1 term | German | 2 |

**Wahlplfichtangebot**
Non-Compulsory Block; You must choose between 9 and 10 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-103066 | Data Mining and Applications (S. 279) | 4,5 | Rheza Nakhaeizadeh |
| T-WIWI-103064 | Financial Econometrics (S. 343) | 4,5 | Melanie Schienle |
| T-WIWI-103124 | Multivariate Statistical Methods (S. 456) | 4,5 | Oliver Grothe |
| T-WIWI-103126 | Non- and Semiparametrics (S. 461) | 4,5 | Melanie Schienle |
| T-WIWI-103127 | Panel Data (S. 479) | 4,5 | Wolf-Dieter Heller |
| T-WIWI-103128 | Portfolio and Asset Liability Management (S. 503) | 4,5 | Mher Safarian |
| T-WIWI-103065 | Statistical Modeling of generalized regression models (S. 621) | 4,5 | Wolf-Dieter Heller |
| T-WIWI-103129 | Stochastic Calculus and Finance (S. 622) | 4,5 | Mher Safarian |

**Learning Control / Examinations**
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.

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

**Modeled Conditions**
The following conditions must be met:

- The module [M-WIWI-101638] *Econometrics and Statistics I* must have been started.

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

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

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

## M   Module: Economic Theory and its Application in Finance   [M-WIWI-101502]

**Responsibility:** Kay Mitusch

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 1 term | German | 4 | 3 |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102622 | Corporate Financial Policy (S. 271) | 4,5 | Martin Ruckes |
| T-WIWI-102623 | Financial Intermediation (S. 344) | 4,5 | Martin Ruckes |
| T-WIWI-102647 | Asset Pricing (S. 217) | 4,5 | Martin Ruckes, Marliese Uhrig-Homburg |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 208) | 4,5 | Kay Mitusch |
| T-WIWI-102861 | Advanced Game Theory (S. 198) | 4,5 | Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß |

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

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

**Qualification Objectives**
The students

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

**Content**

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

**Workload**

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

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

**Responsibility:** Christof Weinhardt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|-----------|----------|----------|---------|
| 9 | Each term | 1 term | German | 1 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-107501 | Energy Market Engineering (S. 316) | 4,5 | Christof Weinhardt |
| T-WIWI-107503 | Energy Networks and Regulation (S. 318) | 4,5 | Christof Weinhardt |
| T-WIWI-107504 | Smart Grid Applications (S. 609) | 4,5 | Johannes Gärttner, Christof Weinhardt |

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

**Conditions**
None.

**Qualification Objectives**
The student

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

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

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

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

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

**Responsibility:** Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Informatics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Informatics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 6 |

**Wahlplfichtangebot**
Non-Compulsory Block; You must choose between 9 and 10 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102651 | Applied Informatics II - IT Systems for eCommerce (S. 215) | 5 | Ali Sunyaev |
| T-WIWI-102680 | Computational Economics (S. 258) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102661 | Database Systems and XML (S. 283) | 5 | Andreas Oberweis |
| T-WIWI-102655 | Efficient Algorithms (S. 301) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102668 | Enterprise Architecture Management (S. 326) | 5 | Thomas Wolf |
| T-WIWI-106423 | Information Service Engineering (S. 375) | 5 | Harald Sack |
| T-WIWI-102666 | Knowledge Discovery (S. 402) | 5 | York Sure-Vetter |
| T-WIWI-102667 | Management of IT-Projects (S. 425) | 5 | Roland Schätzle |
| T-WIWI-106340 | Machine Learning 1 - Basic Methods (S. 418) | 5 | Johann Marius Zöllner |
| T-WIWI-106341 | Machine Learning 2 – Advanced Methods (S. 419) | 5 | Johann Marius Zöllner |
| T-WIWI-102697 | Business Process Modelling (S. 245) | 5 | Andreas Oberweis |
| T-WIWI-102679 | Nature-Inspired Optimisation Methods (S. 460) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102874 | Semantic Web Technologies (S. 557) | 5 | York Sure-Vetter |
| T-WIWI-105801 | Service Oriented Computing (S. 604) | 5 | York Sure-Vetter |
| T-WIWI-102895 | Software Quality Management (S. 612) | 5 | Andreas Oberweis |
| T-WIWI-102676 | Special Topics of Enterprise Information Systems (S. 617) | 5 | Andreas Oberweis |
| T-WIWI-102657 | Special Topics of Efficient Algorithms (S. 616) | 5 | Hartmut Schmeck |
| T-WIWI-102678 | Special Topics of Software- and Systemsengineering (S. 618) | 5 | Andreas Oberweis |
| T-WIWI-108751 | Special Topics of Web Science (S. 619) | 5 | York Sure-Vetter |
| T-WIWI-102669 | Strategic Management of Information Technology (S. 625) | 5 | Thomas Wolf |
| T-WIWI-103112 | Web Science (S. 668) | 5 | York Sure-Vetter |
| T-WIWI-102662 | Workflow-Management (S. 675) | 5 | Andreas Oberweis |
| T-WIWI-103523 | Advanced Lab Informatics (S. 199) | 4 | Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner |
| T-WIWI-109248 | Critical Information Infrastructures (S. 275) | 5 | Ali Sunyaev |
| T-WIWI-109246 | Digital Health (S. 288) | 4 | Ali Sunyaev |
| T-WIWI-109250 | Emerging Trends in Criticial Information Infrastructures (S. 307) | 4 | Ali Sunyaev |
| T-WIWI-109249 | Sociotechnical Information Systems Development (S. 611) | 4 | Ali Sunyaev |
| T-WIWI-109251 | Selected Issues in Critical Information Infrastructures (S. 554) | 4 | Ali Sunyaev |

| T-WIWI-109270 | Human Factors in Security and Privacy (S. 367) | 5 | Melanie Volkamer |
| T-WIWI-109271 | Advanced Lab User Studies in Security (S. 204) | 4 | Melanie Volkamer |
| T-WIWI-108439 | Advanced Lab Security, Usability and Society (S. 203) | 4 | Melanie Volkamer |

**Learning Control / Examinations**

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

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

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

**Conditions**

None.

**Qualification Objectives**

The student

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

**Content**

The thematic focus will be based on the choice of courses in the areas of Effiziente Algorithmen, Betriebliche Informations- und Kommunikationssysteme, Wissensmanagement, Komplexitätsmanagement and Software- und Systems Engineering.

**Remarks**

The course T-WIWI-102759 "Requirements Analysis and Requirements Management" will no longer be offered in the module as of winter semester 2018/2019.

**Workload**

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

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

**Responsibility:**     Andreas Geyer-Schulz

**Organisation:**       KIT-Fakultät für Wirtschaftswissenschaften
**Curricular An-**      Compulsory Elective
**chorage:**

**Contained in:**       Business Administration
                        Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
                        Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
                        Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 2 terms | German | 4 | 4 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-108880 | Blockchains & Cryptofinance (S. 231) | 4,5 | Philipp Schuster, Marliese Uhrig-Homburg |
| T-WIWI-102762 | Business Dynamics (S. 239) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102886 | Business Administration in Information Engineering and Management (S. 235) | 5 | Andreas Geyer-Schulz |
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 430) | 4,5 | Christof Weinhardt |
| T-WIWI-105946 | Price Management (S. 514) | 4,5 | Andreas Geyer-Schulz, Paul Glenn |
| T-WIWI-102713 | Telecommunication and Internet Economics (S. 643) | 4,5 | Kay Mitusch |

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

**Conditions**
None

**Qualification Objectives**
The student

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

**Content**
What are the conditions that make electronic markets develop and how can one analyse and optimize such markets?
In this module, the selection of the type of organization as an optimization of transaction costs is treated. Afterwards, the efficiency of electronic markets (price, information and allocation efficiency) as well as reasons for market failure are described. Finally, motivational issues llike bounded rationality and information assymetries (private information and moral hazard), as well as the development of incentive schemes, are presented. Regarding the market design, especially

the interdependencies of market organization, market mechanisms, institutions and products are described and theoretical foundations are lectured.

Electronic markets are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics such markets can be modelled. Simulations of complex systems allow the analysis and optimization of markets, business processes, policies, and organizations.

Topics include:

- classification, analysis, and design of markets
- simulation of markets
- auction methods and auction theory
- automated negotiations
- nonlinear pricing
- continuous double auctions
- market-maker, regulation, control

**Recommendations**

None

**Remarks**

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

**Workload**

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

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

**Responsibility:** Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules 1 / Compulsory Modules / Informatics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Informatics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 6 |

**Wahlplfichtangebot**

Non-Compulsory Block; You must choose between 9 and 10 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102651 | Applied Informatics II - IT Systems for eCommerce (S. 215) | 5 | Ali Sunyaev |
| T-WIWI-102680 | Computational Economics (S. 258) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102661 | Database Systems and XML (S. 283) | 5 | Andreas Oberweis |
| T-WIWI-102655 | Efficient Algorithms (S. 301) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102668 | Enterprise Architecture Management (S. 326) | 5 | Thomas Wolf |
| T-WIWI-106423 | Information Service Engineering (S. 375) | 5 | Harald Sack |
| T-WIWI-102666 | Knowledge Discovery (S. 402) | 5 | York Sure-Vetter |
| T-WIWI-102667 | Management of IT-Projects (S. 425) | 5 | Roland Schätzle |
| T-WIWI-106340 | Machine Learning 1 - Basic Methods (S. 418) | 5 | Johann Marius Zöllner |
| T-WIWI-106341 | Machine Learning 2 – Advanced Methods (S. 419) | 5 | Johann Marius Zöllner |
| T-WIWI-102697 | Business Process Modelling (S. 245) | 5 | Andreas Oberweis |
| T-WIWI-102679 | Nature-Inspired Optimisation Methods (S. 460) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102874 | Semantic Web Technologies (S. 557) | 5 | York Sure-Vetter |
| T-WIWI-105801 | Service Oriented Computing (S. 604) | 5 | York Sure-Vetter |
| T-WIWI-102895 | Software Quality Management (S. 612) | 5 | Andreas Oberweis |
| T-WIWI-102676 | Special Topics of Enterprise Information Systems (S. 617) | 5 | Andreas Oberweis |
| T-WIWI-102657 | Special Topics of Efficient Algorithms (S. 616) | 5 | Hartmut Schmeck |
| T-WIWI-102678 | Special Topics of Software- and Systemsengineering (S. 618) | 5 | Andreas Oberweis |
| T-WIWI-108751 | Special Topics of Web Science (S. 619) | 5 | York Sure-Vetter |
| T-WIWI-102669 | Strategic Management of Information Technology (S. 625) | 5 | Thomas Wolf |
| T-WIWI-103112 | Web Science (S. 668) | 5 | York Sure-Vetter |
| T-WIWI-102662 | Workflow-Management (S. 675) | 5 | Andreas Oberweis |
| T-WIWI-103523 | Advanced Lab Informatics (S. 199) | 4 | Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner |
| T-WIWI-109248 | Critical Information Infrastructures (S. 275) | 5 | Ali Sunyaev |
| T-WIWI-109246 | Digital Health (S. 288) | 4 | Ali Sunyaev |
| T-WIWI-109250 | Emerging Trends in Criticial Information Infrastructures (S. 307) | 4 | Ali Sunyaev |
| T-WIWI-109249 | Sociotechnical Information Systems Development (S. 611) | 4 | Ali Sunyaev |
| T-WIWI-109251 | Selected Issues in Critical Information Infrastructures (S. 554) | 4 | Ali Sunyaev |

| T-WIWI-109270 | Human Factors in Security and Privacy (S. 367) | 5 | Melanie Volkamer |
| T-WIWI-109271 | Advanced Lab User Studies in Security (S. 204) | 4 | Melanie Volkamer |
| T-WIWI-108439 | Advanced Lab Security, Usability and Society (S. 203) | 4 | Melanie Volkamer |

**Learning Control / Examinations**

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

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

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

**Conditions**

None.

**Qualification Objectives**

The student

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

**Content**

The thematic focus will be based on the choice of courses in the areas of Effiziente Algorithmen, Betriebliche Informations- und Kommunikationssysteme, Wissensmanagement, Komplexitätsmanagement and Software- und Systems Engineering.

**Remarks**

The course T-WIWI-102759 "Requirements Analysis and Requirements Management" will no longer be offered in the module as of winter semester 2018/2019.

**Workload**

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

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

**Responsibility:** Wolf Fichtner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 3 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-107043 | Liberalised Power Markets (S. 411) | 3 | Wolf Fichtner |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at least 6 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102691 | Energy Trade and Risk Management (S. 321) | 4 | Clemens Cremer, Wolf Fichtner, Dogan Keles |
| T-WIWI-107501 | Energy Market Engineering (S. 316) | 4,5 | Christof Weinhardt |
| T-WIWI-108016 | Simulation Game in Energy Economics (S. 605) | 3 | Massimo Genoese |
| T-WIWI-107446 | Quantitative Methods in Energy Economics (S. 536) | 3 | Dogan Keles, Patrick Plötz |
| T-WIWI-102712 | Regulation Theory and Practice (S. 544) | 4,5 | Kay Mitusch |

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

**Conditions**
The lecture Liberalised Power Markets has to be examined.

**Qualification Objectives**
The student

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

**Content**
Liberalised Power Markets: The European liberalisation process, energy markets, pricing, market failure, investment incentives, market power
*Energy Trade and Risk Management:* trade centres, trade products, market mechanisms, position and risk management
*Gas-Markets*: producing countries, provision structures, market places, pricing

*Energy Policy*: Management of energy flows, energy-political targets and instruments (emission trading etc.)
*Simulation Game in Energy Economics*: Simulation of the German electricity system

**Recommendations**
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.

**Remarks**
From winter term 2017/2018 the course T-WIWI-102607Energy Policy will not be offered anymore in this module.

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

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

**Responsibility:** Wolf Fichtner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102793 | Efficient Energy Systems and Electric Mobility (S. 302) | 3,5 | Patrick Jochem, Russell McKenna |
| T-WIWI-102650 | Energy and Environment (S. 311) | 4,5 | Ute Karl |
| T-WIWI-102830 | Energy Systems Analysis (S. 320) | 3 | Valentin Bertsch |
| T-WIWI-107464 | Smart Energy Infrastructure (S. 608) | 3 | Armin Ardone, Andrej Marko Pustisek |
| T-WIWI-102694 | Technological Change in Energy Economics (S. 640) | 3 | Martin Wietschel |
| T-WIWI-102695 | Heat Economy (S. 363) | 3 | Wolf Fichtner |

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

**Conditions**
None

**Qualification Objectives**
The student

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

**Content**
*Strategical Aspects of Energy Economy*: Long-term planning methods, generation technologies
*Technological Change in Energy Economics:* Future energy technologies, learning curves, energy demand
*Heat Economy*: district heating, heating technologies, reduction of heat demand, statutory provisions
*Energy Systems Analysis*: Interdependencies in energy economics, energy systems modelling approaches in energy economics
*Energy and Environment:* emission factors, emission reduction measures, environmental impact

*Efficient Energy Systems and Electric Mobility:* concepts and current trends in energy efficiency, Overview of and economical, ecological and social impacts through electric mobility

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

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

**Responsibility:** Orestis Terzidis

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 6 |

### Pflichtbestandteil
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102864 | Entrepreneurship (S. 328) | 3 | Orestis Terzidis |

### Wahlpflichtangebot
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102865 | Business Planning (S. 244) | 3 | Orestis Terzidis |
| T-WIWI-102866 | Design Thinking (S. 286) | 3 | Orestis Terzidis |
| T-WIWI-102833 | Entrepreneurial Leadership & Innovation Management (S. 327) | 3 | Carsten Linz, Orestis Terzidis |
| T-WIWI-102894 | Entrepreneurship Research (S. 329) | 3 | Orestis Terzidis |

### Ergänzungsangebot
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102612 | Managing New Technologies (S. 427) | 5 | Thomas Reiß |
| T-WIWI-102893 | Innovation Management: Concepts, Strategies and Methods (S. 378) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-102639 | Business Models in the Internet: Planning and Implementation (S. 243) | 4,5 | Timm Teubner |
| T-WIWI-102851 | Developing Business Models for the Semantic Web (S. 287) | 3 | Rudi Studer |
| T-WIWI-102852 | Case Studies Seminar: Innovation Management (S. 249) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-102853 | Roadmapping (S. 548) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102833 | Entrepreneurial Leadership & Innovation Management (S. 327) | 3 | Carsten Linz, Orestis Terzidis |
| T-WIWI-102865 | Business Planning (S. 244) | 3 | Orestis Terzidis |
| T-WIWI-102866 | Design Thinking (S. 286) | 3 | Orestis Terzidis |
| T-WIWI-102894 | Entrepreneurship Research (S. 329) | 3 | Orestis Terzidis |
| T-WIWI-109064 | Joint Entrepreneurship Summer School (S. 401) | 6 | Orestis Terzidis |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Qualification Objectives**
See German version.

**Recommendations**
None

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

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

**Responsibility:** Kay Mitusch

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 1 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102615 | Environmental Economics and Sustainability (S. 332) | 5 | Rainer Walz |
| T-WIWI-102616 | Environmental and Ressource Policy (S. 330) | 4 | Rainer Walz |
| T-WIWI-102650 | Energy and Environment (S. 311) | 4,5 | Ute Karl |
| T-WIWI-100007 | Transport Economics (S. 652) | 4,5 | Kay Mitusch, Eckhard Szimba |
| T-INFO-101348 | Environmental Law (S. 333) | 3 | Matthias Bäcker |

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

**Conditions**
None

**Qualification Objectives**
The students

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

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

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

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

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

| | |
|---|---|
| **Responsibility:** | Johannes Philipp Reiß |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Economics |
| | Compulsory Elective Modules 1 / Compulsory Modules / Economics |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 5 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102862 | Predictive Mechanism and Market Design (S. 513) | 4,5 | Johannes Philipp Reiß |
| T-WIWI-102863 | Topics in Experimental Economics (S. 647) | 4,5 | Johannes Philipp Reiß |
| T-WIWI-105781 | Incentives in Organizations (S. 369) | 4,5 | Petra Nieken |
| T-WIWI-102614 | Experimental Economics (S. 337) | 4,5 | Jella Pfeiffer, Christof Weinhardt |

**Learning Control / Examinations**
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.

**Conditions**
None.

**Qualification Objectives**
Students

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

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

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

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

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

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

| | |
|---|---|
| **Responsibility:** | Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Once | 1 term | 4 | 2 |

**Wahlpflichtangebot**

Non-Compulsory Block; You must choose between 9 and 12 credits.

| Identifier | Course | ECTS Responsibility |
|---|---|---|
| T-WIWI-106291 | PH APL-ING-TL01 (S. 484) | 3 |
| T-WIWI-106292 | PH APL-ING-TL02 (S. 485) | 3 |
| T-WIWI-106293 | PH APL-ING-TL03 (S. 486) | 3 |
| T-WIWI-106294 | PH APL-ING-TL04 ub (S. 487) | 0 |
| T-WIWI-106295 | PH APL-ING-TL05 ub (S. 488) | 0 |
| T-WIWI-106296 | PH APL-ING-TL06 ub (S. 489) | 0 |
| T-WIWI-108384 | PH APL-ING-TL07 (S. 490) | 3 |

**Learning Control / Examinations**

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.

**Conditions**

See German version.

**Qualification Objectives**

See German version.

## M  Module: Finance 1  [M-WIWI-101482]

| | |
|---|---|
| **Responsibility:** | Martin Ruckes, Marliese Uhrig-Homburg |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 1 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102643 | Derivatives (S. 285) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102621 | Valuation (S. 659) | 4,5 | Martin Ruckes |
| T-WIWI-102647 | Asset Pricing (S. 217) | 4,5 | Martin Ruckes, Marliese Uhrig-Homburg |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
The student

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

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

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

## M Module: Finance 2 [M-WIWI-101483]

**Responsibility:** Martin Ruckes, Marliese Uhrig-Homburg

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular An-** Compulsory Elective
**chorage:**

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102647 | Asset Pricing (S. 217) | 4,5 | Martin Ruckes, Marliese Uhrig-Homburg |
| T-WIWI-108880 | Blockchains & Cryptofinance (S. 231) | 4,5 | Philipp Schuster, Marliese Uhrig-Homburg |
| T-WIWI-102625 | Exchanges (S. 336) | 1,5 | Jörg Franke |
| T-WIWI-102622 | Corporate Financial Policy (S. 271) | 4,5 | Martin Ruckes |
| T-WIWI-109050 | Corporate Risk Management (S. 272) | 3 | Martin Ruckes |
| T-WIWI-102643 | Derivatives (S. 285) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102600 | eFinance: Information Engineering and Management for Securities Trading (S. 303) | 4,5 | Christof Weinhardt |
| T-WIWI-102644 | Fixed Income Securities (S. 345) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102900 | Financial Analysis (S. 342) | 4,5 | Torsten Luedecke |
| T-WIWI-102623 | Financial Intermediation (S. 344) | 4,5 | Martin Ruckes |
| T-WIWI-102626 | Business Strategies of Banks (S. 247) | 3 | Wolfgang Müller |
| T-WIWI-102646 | International Finance (S. 392) | 3 | Marliese Uhrig-Homburg |
| T-WIWI-102645 | Credit Risk (S. 274) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102621 | Valuation (S. 659) | 4,5 | Martin Ruckes |

**Learning Control / Examinations**

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.

**Conditions**

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

**Modeled Conditions**

The following conditions must be met:

- The module [M-WIWI-101482] *Finance 1* must have been started.

**Qualification Objectives**

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

**Content**

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

**Remarks**

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

**Workload**

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

## M  Module: Finance 3  [M-WIWI-101480]

| | |
|---|---|
| **Responsibility:** | Martin Ruckes, Marliese Uhrig-Homburg |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102647 | Asset Pricing (S. 217) | 4,5 | Martin Ruckes, Marliese Uhrig-Homburg |
| T-WIWI-108880 | Blockchains & Cryptofinance (S. 231) | 4,5 | Philipp Schuster, Marliese Uhrig-Homburg |
| T-WIWI-102625 | Exchanges (S. 336) | 1,5 | Jörg Franke |
| T-WIWI-102622 | Corporate Financial Policy (S. 271) | 4,5 | Martin Ruckes |
| T-WIWI-109050 | Corporate Risk Management (S. 272) | 3 | Martin Ruckes |
| T-WIWI-102643 | Derivatives (S. 285) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102600 | eFinance: Information Engineering and Management for Securities Trading (S. 303) | 4,5 | Christof Weinhardt |
| T-WIWI-102644 | Fixed Income Securities (S. 345) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102900 | Financial Analysis (S. 342) | 4,5 | Torsten Luedecke |
| T-WIWI-102623 | Financial Intermediation (S. 344) | 4,5 | Martin Ruckes |
| T-WIWI-102626 | Business Strategies of Banks (S. 247) | 3 | Wolfgang Müller |
| T-WIWI-102646 | International Finance (S. 392) | 3 | Marliese Uhrig-Homburg |
| T-WIWI-102645 | Credit Risk (S. 274) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102621 | Valuation (S. 659) | 4,5 | Martin Ruckes |

**Learning Control / Examinations**
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.

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

**Modeled Conditions**
The following conditions must be met:

1. The module [M-WIWI-101482] *Finance 1* must have been started.
2. The module [M-WIWI-101483] *Finance 2* must have been started.

**Qualification Objectives**

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

**Content**

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

**Remarks**

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

**Workload**

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

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

**Responsibility:**     Ingrid Ott

**Organisation:**     KIT-Fakultät für Wirtschaftswissenschaften

**Curricular An-**     Compulsory Elective
**chorage:**

**Contained in:**     Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 3 |

**Wahlpflichtangebot**

Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-109194 | Dynamic Macroeconomics (S. 300) | 4,5 | Johannes Brumm |
| T-WIWI-102785 | Theory of Endogenous Growth (S. 646) | 4,5 | Ingrid Ott |
| T-WIWI-103107 | Spatial Economics (S. 614) | 4,5 | Ingrid Ott |

**Learning Control / Examinations**
The assessment is carried out as partial written exams (see the lectures descriptions).
The overall grade for the module is the average of the grades for each course weighted by the credits.

**Conditions**
None

**Qualification Objectives**
The student

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

**Content**
The module includes the contents of the lectures *Endogenous Growth Theory* [2561503], *Spatial Economics* [2561260] and *International Economic Policy* [2560254]. While the first two lectures have a more formal-analytic focus, the third lecture approaches fundamental ideas and problems from the field of international economic policy from a more verbal perspective.
The common underlying principle of all three lectures in this module is that, based on different theoretical models, economic policy recommendations are derived.

**Recommendations**
Attendance of the course *Introduction Economic Policy* [2560280] is recommended.
Successful completion of the courses*Economics I: Microeconomics*and*Economics II: Macroeconomics*is required.

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

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

**Responsibility:** Frank Schultmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular An-** Compulsory Elective
**chorage:**

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each winter term | 1 term | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102631 | Planning and Management of Industrial Plants (S. 494) | 5,5 | Frank Schultmann |

**Ergänzungsangebot aus dem Modul Industrielle Produktion III**
Non-Compulsory Block; You must choose at most 1 courses.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102763 | Supply Chain Management with Advanced Planning Systems (S. 634) | 3,5 | Claus J. Bosch, Mathias Göbelt |
| T-WIWI-102826 | Risk Management in Industrial Supply Networks (S. 546) | 3,5 | Marcus Wiens |
| T-WIWI-102828 | Supply Chain Management in the Automotive Industry (S. 631) | 3,5 | Tilman Heupel, Hendrik Lang |
| T-WIWI-103134 | Project Management (S. 526) | 3,5 | Frank Schultmann |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 1 courses.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102634 | Emissions into the Environment (S. 308) | 3,5 | Ute Karl |
| T-WIWI-102882 | International Management in Engineering and Production (S. 393) | 3,5 | Henning Sasse |
| T-WIWI-103133 | Life Cycle Assessment (S. 413) | 3,5 | Heiko Keller |

**Learning Control / Examinations**
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course *Planning and Managing of Industrial Plants* [2581952] and one further single course of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

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

**Qualification Objectives**

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

**Content**

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

**Remarks**

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

**Workload**

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

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

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

| | |
|---|---|
| **Responsibility:** | Frank Schultmann |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each summer term | 1 term | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102632 | Production and Logistics Management (S. 525) | 5,5 | Frank Schultmann |

**Ergänzungsangebot aus dem Modul Industrielle Produktion II**
Non-Compulsory Block; You must choose at most 1 courses.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102634 | Emissions into the Environment (S. 308) | 3,5 | Ute Karl |
| T-WIWI-102882 | International Management in Engineering and Production (S. 393) | 3,5 | Henning Sasse |
| T-WIWI-103133 | Life Cycle Assessment (S. 413) | 3,5 | Heiko Keller |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 1 courses.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102763 | Supply Chain Management with Advanced Planning Systems (S. 634) | 3,5 | Claus J. Bosch, Mathias Göbelt |
| T-WIWI-102826 | Risk Management in Industrial Supply Networks (S. 546) | 3,5 | Marcus Wiens |
| T-WIWI-102828 | Supply Chain Management in the Automotive Industry (S. 631) | 3,5 | Tilman Heupel, Hendrik Lang |
| T-WIWI-103134 | Project Management (S. 526) | 3,5 | Frank Schultmann |

**Learning Control / Examinations**

The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course *Production and Logistics Management* [2581954] and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Conditions**

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

**Qualification Objectives**

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

**Content**

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

**Remarks**

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

**Workload**

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

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

**Responsibility:** Andreas Oberweis, Harald Sack, York Sure-Vetter, Johann Marius Zöllner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Informatics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 7 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 9 and 10 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102651 | Applied Informatics II - IT Systems for eCommerce (S. 215) | 5 | Ali Sunyaev |
| T-WIWI-102680 | Computational Economics (S. 258) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102661 | Database Systems and XML (S. 283) | 5 | Andreas Oberweis |
| T-WIWI-102655 | Efficient Algorithms (S. 301) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102668 | Enterprise Architecture Management (S. 326) | 5 | Thomas Wolf |
| T-WIWI-106423 | Information Service Engineering (S. 375) | 5 | Harald Sack |
| T-WIWI-102666 | Knowledge Discovery (S. 402) | 5 | York Sure-Vetter |
| T-WIWI-102667 | Management of IT-Projects (S. 425) | 5 | Roland Schätzle |
| T-WIWI-106340 | Machine Learning 1 - Basic Methods (S. 418) | 5 | Johann Marius Zöllner |
| T-WIWI-106341 | Machine Learning 2 – Advanced Methods (S. 419) | 5 | Johann Marius Zöllner |
| T-WIWI-102697 | Business Process Modelling (S. 245) | 5 | Andreas Oberweis |
| T-WIWI-102679 | Nature-Inspired Optimisation Methods (S. 460) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102874 | Semantic Web Technologies (S. 557) | 5 | York Sure-Vetter |
| T-WIWI-105801 | Service Oriented Computing (S. 604) | 5 | York Sure-Vetter |
| T-WIWI-102895 | Software Quality Management (S. 612) | 5 | Andreas Oberweis |
| T-WIWI-102676 | Special Topics of Enterprise Information Systems (S. 617) | 5 | Andreas Oberweis |
| T-WIWI-102657 | Special Topics of Efficient Algorithms (S. 616) | 5 | Hartmut Schmeck |
| T-WIWI-102678 | Special Topics of Software- and Systemsengineering (S. 618) | 5 | Andreas Oberweis |
| T-WIWI-102669 | Strategic Management of Information Technology (S. 625) | 5 | Thomas Wolf |
| T-WIWI-103112 | Web Science (S. 668) | 5 | York Sure-Vetter |
| T-WIWI-108751 | Special Topics of Web Science (S. 619) | 5 | York Sure-Vetter |
| T-WIWI-102662 | Workflow-Management (S. 675) | 5 | Andreas Oberweis |
| T-WIWI-103523 | Advanced Lab Informatics (S. 199) | 4 | Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner |
| T-WIWI-109248 | Critical Information Infrastructures (S. 275) | 5 | Ali Sunyaev |
| T-WIWI-109246 | Digital Health (S. 288) | 4 | Ali Sunyaev |
| T-WIWI-109250 | Emerging Trends in Criticial Information Infrastructures (S. 307) | 4 | Ali Sunyaev |
| T-WIWI-109249 | Sociotechnical Information Systems Development (S. 611) | 4 | Ali Sunyaev |
| T-WIWI-109251 | Selected Issues in Critical Information Infrastructures (S. 554) | 4 | Ali Sunyaev |
| T-WIWI-109270 | Human Factors in Security and Privacy (S. 367) | 5 | Melanie Volkamer |

| | | | |
|---|---|---|---|
| T-WIWI-109271 | Advanced Lab User Studies in Security (S. 204) | 4 | Melanie Volkamer |
| T-WIWI-108439 | Advanced Lab Security, Usability and Society (S. 203) | 4 | Melanie Volkamer |

**Learning Control / Examinations**

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

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

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

Please note the following information about the module component exams of Prof. Dr. H. Schmeck:

The examinations in Algorithms for Internet Applications [T-WIWI-102658], Efficient Algorithms [T-WIWI-102655], Organic Computing [T-WIWI-102659] and Smart Energy Distribution [T-WIWI-102845] are offered latest until summer term 2017 (repeaters only).

**Conditions**

It is only allowed to choose one lab.

**Qualification Objectives**

The student

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

**Content**

The thematic focus will be based on the choice of courses in the areas of Effiziente Algorithmen, Betriebliche Informations- und Kommunikationssysteme, Wissensmanagement, Komplexitätsmanagement and Software- und Systems Engineering.

**Remarks**

The course T-WIWI-102759 "Requirements Analysis and Requirements Management" will no longer be offered in the module as of winter semester 2018/2019.

**Workload**

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

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

| | |
|---|---|
| **Responsibility:** | Christof Weinhardt |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102638 | Principles of Information Engineering and Management (S. 519) | 5 | Timm Teubner, Christof Weinhardt |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose between 4 and 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 430) | 4,5 | Christof Weinhardt |
| T-WIWI-102706 | Special Topics in Information Engineering & Management (S. 615) | 4,5 | Christof Weinhardt |
| T-WIWI-107501 | Energy Market Engineering (S. 316) | 4,5 | Christof Weinhardt |

**Learning Control / Examinations**
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.

**Conditions**
The course *Principles of Information Engineering and Management* [2540450] is compulsory and must be examined.

**Qualification Objectives**
The student

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

**Content**
In the lecture *Principles of Information Engineering and Management*, a clear distinction of information as a production, competitive, and economic good is introduced. The central role of information is explained through the concept of the "information lifecycle". The single phases from existence/generation through allocation and evaluation until the

distribution and usage of information are analyzed from the business administration perspective and the microeconomic perspective.

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

**Recommendations**

None

**Remarks**

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

**Workload**

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

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

**Responsibility:** Alexander Mädche

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|------------|----------|----------|---------|
| 9 | Each term | 2 terms | German | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-105777 | Business Intelligence Systems (S. 241) | 4,5 | Alexander Mädche, Mario Nadj, Peyman Toreini |
| T-WIWI-106201 | Digital Transformation of Organizations (S. 294) | 4,5 | Alexander Mädche |
| T-WIWI-108461 | Interactive Information Systems (S. 391) | 4,5 | Alexander Mädche, Stefan Morana |
| T-WIWI-108437 | Practical Seminar: Information Systems and Service Design (S. 510) | 4,5 | Norbert Koppenhagen, Alexander Mädche |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
The student

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

**Content**
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, companies have to rethink their way of doing business, from an internal as well as an external digitalization perspective.
This module focuses on the internal digitalization perspective. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for information systems in

organizations. The students get the necessary knowledge to guide the successful digitalization of organizations. Each lecture in the module is accompanied with a capstone project that is carried out in cooperation with an industry partner.

**Remarks**

New module starting summer term 2018.

**Workload**

The total workload for this module is approximately 270 hours.

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

**Responsibility:**  Ingrid Ott

**Organisation:**  KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:**  Compulsory Elective

**Contained in:**  Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9    | Each term | 1 term   | 4     | 3       |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 9 and 10 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|---------------|
| T-WIWI-109194 | Dynamic Macroeconomics (S. 300) | 4,5 | Johannes Brumm |
| T-WIWI-102785 | Theory of Endogenous Growth (S. 646) | 4,5 | Ingrid Ott |
| T-WIWI-102840 | Innovationtheory and -Policy (S. 379) | 4,5 | Ingrid Ott |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
Students shall be given the ability to

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

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

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

**Workload**
Total expenditure of time for 9 credits: 270 hours

Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

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

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

**Responsibility:**    Ingrid Ott

**Organisation:**    KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:**    Compulsory Elective

**Contained in:**    Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 1 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 9 and 10 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102840 | Innovationtheory and -Policy (S. 379) | 4,5 | Ingrid Ott |
| T-WIWI-102812 | Product and Innovation Management (S. 523) | 3 | Martin Klarmann |
| T-WIWI-102789 | Seminar in Economic Policy (S. 573) | 3 | Ingrid Ott |
| T-WIWI-102906 | Methods in Economic Dynamics (S. 443) | 1,5 | Ingrid Ott |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
Students shall be given the ability to

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

**Content**
The module provides students with knowledge about implications of technological and organizational changes.
Addressed economic issues are incentives for developing innovations, diffusion processes, and associated effects. In this context the module analyses appropriate policies in the presence of market failures to take corrective action on the market process and thus to increase the dynamic efficiency of economies.
Furthermore, the module offers the possibility to learn about different aspects of theoretical modelling of innovation-based growth as a part of the seminar and the methods-workshop. This includes the implementation of formal models in computer algebra systems as well as recording, processing and econometric analysis of related data from relational databases (concerning for example patents or trademarks). Moreover, methods of network theory are applied.

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

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

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

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

**Responsibility:**   Marion Weissenberger-Eibl

**Organisation:**   KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:**   Compulsory Elective

**Contained in:**   Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 3 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102893 | Innovation Management: Concepts, Strategies and Methods (S. 378) | 3 | Marion Weissenberger-Eibl |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102873 | Current Issues in Innovation Management (S. 276) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-102852 | Case Studies Seminar: Innovation Management (S. 249) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-108774 | Analyzing and Evaluating Innovation Processes (S. 212) | 3 | Daniela Beyer, Marion Weissenberger-Eibl |
| T-WIWI-102853 | Roadmapping (S. 548) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102858 | Technology Assessment (S. 642) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102854 | Technologies for Innovation Management (S. 641) | 3 | Daniel Jeffrey Koch |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose one course.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102873 | Current Issues in Innovation Management (S. 276) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-102866 | Design Thinking (S. 286) | 3 | Orestis Terzidis |
| T-WIWI-108875 | Digital Transformation and Business Models (S. 293) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102833 | Entrepreneurial Leadership & Innovation Management (S. 327) | 3 | Carsten Linz, Orestis Terzidis |
| T-WIWI-102864 | Entrepreneurship (S. 328) | 3 | Orestis Terzidis |
| T-WIWI-102852 | Case Studies Seminar: Innovation Management (S. 249) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-108774 | Analyzing and Evaluating Innovation Processes (S. 212) | 3 | Daniela Beyer, Marion Weissenberger-Eibl |
| T-WIWI-102853 | Roadmapping (S. 548) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102854 | Technologies for Innovation Management (S. 641) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102858 | Technology Assessment (S. 642) | 3 | Daniel Jeffrey Koch |

**Learning Control / Examinations**
See German version.

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

**Qualification Objectives**
Students develop a comprehensive understanding of the innovation process and its conditionality. There is an additional focus on the concepts and processes which are of particular relevance with regard to shaping the entire process. Various strategies and methods are then taught based on this.
After completing the module, students should have developed a systemic understanding of the innovation process and be able to shape this by developing and applying suitable methods.

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

**Recommendations**
None

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

## M  Module: Insurance Management I  [M-WIWI-101469]

**Responsibility:**   Ute Werner

**Organisation:**   KIT-Fakultät für Wirtschaftswissenschaften

**Curricular An-**   Compulsory Elective
**chorage:**

**Contained in:**   Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 3 |

**Wahlpflichtangebot**

Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102603 | Principles of Insurance Management (S. 521) | 4,5 | Ute Werner |
| T-WIWI-102601 | Insurance Marketing (S. 381) | 4,5 | Edmund Schwake |
| T-WIWI-102648 | Insurance Production (S. 382) | 4,5 | Ute Werner |
| T-WIWI-102637 | Current Issues in the Insurance Industry (S. 277) | 2 | Wolf-Rüdiger Heilmann |
| T-WIWI-102636 | Insurance Risk Management (S. 383) | 2,5 | Harald Maser |
| T-WIWI-102797 | P&C Insurance Simulation Game (S. 478) | 3 | Ute Werner |
| T-WIWI-102649 | Risk Communication (S. 545) | 4,5 | Ute Werner |
| T-WIWI-102841 | Modelling, Measuring and Managing of Extreme Risks (S. 454) | 2,5 | Ute Werner |

**Learning Control / Examinations**

From 01.10.2017 (winter term 2017/2018) the module is no longer available.

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

**Conditions**

None

**Qualification Objectives**

See German version.

**Content**

See German version.

**Remarks**

Please note:

- T-WIWI-102636Insurance Risk Managementwill be offered as a seminar startingsummer term2017.
- T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on;
- T-WIWI-102603Principles of Insurance Managementwill be offered latest until summer term 2017 (beginners only);
- T-WIWI-102648Insurance Productionwill be offered latest until summer term 2017 (beginners only);
- T-WIWI-102636Insurance Risk Managementwill be offered latest until summer term 2017 (beginners only);
- T-WIWI-102649Risk Communication will be offered latest until winterterm 2017/2018 (beginners only);
- T-WIWI-102841Modelling, Measuring and Managing of Extreme Riskswill be offered latest until summer term 2017 (beginners only).

**Workload**
See German version.

## M Module: Insurance Management II [M-WIWI-101449]

| | |
|---|---|
| **Responsibility:** | Ute Werner |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102601 | Insurance Marketing (S. 381) | 4,5 | Edmund Schwake |
| T-WIWI-102648 | Insurance Production (S. 382) | 4,5 | Ute Werner |
| T-WIWI-102637 | Current Issues in the Insurance Industry (S. 277) | 2 | Wolf-Rüdiger Heilmann |
| T-WIWI-102636 | Insurance Risk Management (S. 383) | 2,5 | Harald Maser |
| T-WIWI-102649 | Risk Communication (S. 545) | 4,5 | Ute Werner |
| T-WIWI-102797 | P&C Insurance Simulation Game (S. 478) | 3 | Ute Werner |
| T-WIWI-102603 | Principles of Insurance Management (S. 521) | 4,5 | Ute Werner |
| T-WIWI-102841 | Modelling, Measuring and Managing of Extreme Risks (S. 454) | 2,5 | Ute Werner |

**Learning Control / Examinations**
From 01.10.2017 (winter term 2017/2018) the module is no longer available.
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module 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.

**Conditions**
It is only possible to choose this module in combination with the module *Insurance Management I*. The module is passed only after the final partial exam of *Insurance Management I* has been passed.

**Modeled Conditions**
The following conditions must be met:

- The module [M-WIWI-101469] *Insurance Management I* must have been started.

**Qualification Objectives**
See German version.

**Content**
See German version.

**Recommendations**
The courses chosen from the modules Insurance Management I or Insurance Management II are supposed to complement each other. Advice and information is available from the person responsible for the examination process at the Insurance Department of FBV.

**Remarks**

Please note:

- T-WIWI-102636 Insurance Risk Management will be offered as a seminar starting summer term 2017.
- T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on;
- T-WIWI-102603 Principles of Insurance Management will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102648 Insurance Production will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102636 Insurance Risk Management will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102649 Risk Communication will be offered latest until winter term 2017/2018 (beginners only);
- T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks will be offered latest until summer term 2017 (beginners only).

**Workload**

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

## M  Module: Intelligent Risk and Investment Advisory  [M-WIWI-103247]

**Responsibility:**   Maxim Ulrich

**Organisation:**   KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:**   Compulsory Elective

**Contained in:**   Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|------|-----------|----------|----------|---------|
| 9 | Each term | 1 term | English | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-106442 | Building Intelligent and Robo-Adviced Portfolios (S. 233) | 9 | Maxim Ulrich |
| T-WIWI-107032 | Computational Risk and Asset Management I (S. 261) | 4,5 | Maxim Ulrich |
| T-WIWI-106494 | Computational Risk and Asset Management II (S. 262) | 4,5 | Maxim Ulrich |
| T-WIWI-106193 | Engineering FinTech Solutions (S. 324) | 4,5 | Maxim Ulrich |

**Learning Control / Examinations**
In winter semester 2018/2019 no exam for the courses "Building Intelligent and Robo-Adviced Portfolios" and "Computational Risk and Asset Management I / II" will be offered.
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 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.

**Conditions**
None.

**Qualification Objectives**
Students obtain a practical and yet research oriented introduction into the field of quantitative and computational risk and investment management. Students learn how to use concepts from computer science, statistics, OR and economics to build intelligent risk and investment systems. Based on personal preferences, students can specialize within the module on either more practical programming and statistical learning points or more on the economic and mathematical insights and intuition.
After successful completion of the module, students know the industry intuition as well as state-of-the-art academic 'financial engineering' methods necessary to successfully contribute to sustainable and value oriented innovations in the field of intelligent risk and investment advisory.

**Content**
See respective lecture

**Recommendations**
None

**Remarks**
See respective lecture

**Workload**

The total workload for this module is approximately 270 hours. For further information, see respective lecture.

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

| | |
|---|---|
| **Responsibility:** | Marcus Wouters |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular An-chorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 2 terms | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102800 | Management Accounting 1 (S. 423) | 4,5 | Marcus Wouters |
| T-WIWI-102801 | Management Accounting 2 (S. 424) | 4,5 | Marcus Wouters |

**Learning Control / Examinations**

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.

**Conditions**

None

**Qualification Objectives**

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.

**Remarks**

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  Module: Market Engineering  [M-WIWI-101446]

| | |
|---|---|
| **Responsibility:** | Christof Weinhardt |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|------|-----------|----------|-------|---------|
| 9 | Each term | 1 term | 4 | 3 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 430) | 4,5 | Christof Weinhardt |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102613 | Auction Theory (S. 218) | 4,5 | Karl-Martin Ehrhart |
| T-WIWI-108880 | Blockchains & Cryptofinance (S. 231) | 4,5 | Philipp Schuster, Marliese Uhrig-Homburg |
| T-WIWI-102600 | eFinance: Information Engineering and Management for Securities Trading (S. 303) | 4,5 | Christof Weinhardt |
| T-WIWI-107501 | Energy Market Engineering (S. 316) | 4,5 | Christof Weinhardt |
| T-WIWI-107503 | Energy Networks and Regulation (S. 318) | 4,5 | Christof Weinhardt |
| T-WIWI-102614 | Experimental Economics (S. 337) | 4,5 | Jella Pfeiffer, Christof Weinhardt |

**Learning Control / Examinations**
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.

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

**Qualification Objectives**
The students

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

**Content**

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

**Recommendations**

None

**Remarks**

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

**Workload**

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

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

| | |
|---|---|
| **Responsibility:** | Martin Klarmann |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each summer term | 1 term | 4 | 9 |

### Wahlpflichtangebot
Non-Compulsory Block; You must choose at least 1 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-107720 | Market Research (S. 432) | 4,5 | |
| T-WIWI-102883 | Pricing (S. 517) | 4,5 | Sven Feurer |
| T-WIWI-102812 | Product and Innovation Management (S. 523) | 3 | Martin Klarmann |

### Ergänzungsangebot
Non-Compulsory Block; You must choose at most 1 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-106137 | Country Manager Simulation (S. 273) | 1,5 | Sven Feurer |
| T-WIWI-102835 | Marketing Strategy Business Game (S. 434) | 1,5 | Martin Klarmann |
| T-WIWI-102842 | Strategic Brand Management (S. 624) | 1,5 | Joachim Blickhäuser, Martin Klarmann |

**Learning Control / Examinations**
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.
When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Conditions**
None

**Qualification Objectives**
Students
- have an advanced knowledge about central marketing contents
- have a fundamental understanding of the marketing instruments
- know and understand several strategic concepts and how to implement them
- are able to implement their extensive marketing knowledge in a practical context
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the Marketing department

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

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

**Remarks**

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

**Workload**

The total workload for this module is approximately 270 hours.

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

| | |
|---|---|
| **Responsibility:** | Oliver Stein |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Operations Research |
| | Compulsory Elective Modules 1 / Compulsory Modules / Operations Research |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Operations Research |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 4 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102719 | Mixed Integer Programming I (S. 445) | 4,5 | Oliver Stein |
| T-WIWI-102726 | Global Optimization I (S. 352) | 4,5 | Oliver Stein |
| T-WIWI-103638 | Global optimization I and II (S. 354) | 9 | Oliver Stein |
| T-WIWI-102856 | Convex Analysis (S. 268) | 4,5 | Oliver Stein |
| T-WIWI-102724 | Nonlinear Optimization I (S. 462) | 4,5 | Oliver Stein |
| T-WIWI-103637 | Nonlinear Optimization I and II (S. 464) | 9 | Oliver Stein |
| T-WIWI-102855 | Parametric Optimization (S. 480) | 4,5 | Oliver Stein |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-106548 | Advanced Stochastic Optimization (S. 207) | 4,5 | Steffen Rebennack |
| T-WIWI-102720 | Mixed Integer Programming II (S. 446) | 4,5 | Oliver Stein |
| T-WIWI-102727 | Global Optimization II (S. 356) | 4,5 | Oliver Stein |
| T-WIWI-102723 | Graph Theory and Advanced Location Models (S. 362) | 4,5 | Stefan Nickel |
| T-WIWI-106549 | Large-scale Optimization (S. 405) | 4,5 | Steffen Rebennack |
| T-WIWI-102725 | Nonlinear Optimization II (S. 466) | 4,5 | Oliver Stein |
| T-WIWI-102715 | Operations Research in Supply Chain Management (S. 473) | 4,5 | Stefan Nickel |

**Learning Control / Examinations**
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.

**Conditions**
At least one of the courses "Mixed Integer Programming I", "Parametric Optimization", "Convex Analysis", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

**Qualification Objectives**
The student

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

**Content**

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

**Remarks**

The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).
For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

**Workload**

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

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

**Responsibility:** Clemens Puppe

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|---------------|
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 208) | 4,5 | Kay Mitusch |
| T-WIWI-102861 | Advanced Game Theory (S. 198) | 4,5 | Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß |
| T-WIWI-102859 | Social Choice Theory (S. 610) | 4,5 | Clemens Puppe |
| T-WIWI-102613 | Auction Theory (S. 218) | 4,5 | Karl-Martin Ehrhart |
| T-WIWI-105781 | Incentives in Organizations (S. 369) | 4,5 | Petra Nieken |

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

**Conditions**
None

**Qualification Objectives**
Students

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

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

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

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

# M  Module: Module Masterarbeit  [M-WIWI-101659]

**Responsibility:** Martin Ruckes

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory

**Contained in:** Master Thesis

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 30 | Each term | 1 term | German | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-103142 | Master Thesis (S. 436) | 30 | Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften |

**Learning Control / Examinations**
See German version.

**Conditions**
See German version.

**Qualification Objectives**
The student can independently handle a complex and unfamiliar subject based on scientific criteria and on the current state of research.
He/she is in a position to critically analyze and structure the researched information as well as derive principles and regularities. He/she knows how to apply the thereby achieved results to solve the task at hand. Taking into account this knowledge and his/her interdisciplinary knowledge, he/she can draw own conclusions, derive improvement potentials, propose and implement science-based decisions.
This is basically also done under consideration of social and/or ethical aspects.
He/she can interpret, evaluate and if required, graphically present the obtained results.
He/she is in a position to sensibly structure a research paper, document them and clearly communicate the results in scientific form.

**Content**
See German version.

**Remarks**
See German version.

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

## M  Module: Natural Hazards and Risk Management 1  [M-WIWI-101642]

| | |
|---|---|
| **Responsibility:** | Michael Kunz |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | German | 3 |

**Wahlpflichtangebot**

Non-Compulsory Block; You must choose between 9 and 12 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-102997 | River and Floodplain Ecology (S. 547) | 3 | Florian Wittmann |
| T-BGU-108943 | Engineering Hydrology (S. 325) | 3 | Uwe Ehret |
| T-BGU-101859 | Morphodynamics (S. 455) | 3 | Franz Nestmann |
| T-BGU-106620 | Examination Prerequisite Environmental Communication (S. 335) | 0 | Charlotte Kämpf |
| T-BGU-101676 | Environmental Communication (S. 331) | 4 | Charlotte Kämpf |

**Learning Control / Examinations**

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.

**Conditions**

None

**Qualification Objectives**

See German version

**Content**

See German version

**Remarks**

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

**Workload**

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

## M  Module: Natural Hazards and Risk Management 2  [M-WIWI-101644]

| | |
|---|---|
| **Responsibility:** | Michael Kunz |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Compulsory Elective Modules 1 / Compulsory Modules / Natural and Engineering Sciences |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Natural and Engineering Sciences |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | German | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 9 and 12 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-102997 | River and Floodplain Ecology (S. 547) | 3 | Florian Wittmann |
| T-BGU-108943 | Engineering Hydrology (S. 325) | 3 | Uwe Ehret |
| T-BGU-101859 | Morphodynamics (S. 455) | 3 | Franz Nestmann |
| T-BGU-106620 | Examination Prerequisite Environmental Communication (S. 335) | 0 | Charlotte Kämpf |
| T-BGU-101676 | Environmental Communication (S. 331) | 4 | Charlotte Kämpf |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
See German version

**Content**
See German version

**Recommendations**
See German version

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

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

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

| **Responsibility:** | Kay Mitusch |
|---|---|
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |

**Contained in:**  Economics
Compulsory Elective Modules 1 / Compulsory Modules / Economics
Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|:---:|:---:|:---:|:---:|:---:|
| 9 | Each term | 1 term | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-100005 | Competition in Networks (S. 257) | 4,5 | Kay Mitusch |
| T-WIWI-100007 | Transport Economics (S. 652) | 4,5 | Kay Mitusch, Eckhard Szimba |
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 208) | 4,5 | Kay Mitusch |
| T-WIWI-102712 | Regulation Theory and Practice (S. 544) | 4,5 | Kay Mitusch |
| T-WIWI-102713 | Telecommunication and Internet Economics (S. 643) | 4,5 | Kay Mitusch |

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

**Conditions**
None

**Qualification Objectives**
The students

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

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

**Recommendations**

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

**Workload**

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

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

| | |
|---|---|
| **Responsibility:** | Stefan Nickel |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Operations Research |
| | Compulsory Elective Modules 1 / Compulsory Modules / Operations Research |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Operations Research |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 5 |

### Wahlpflichtangebot
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102723 | Graph Theory and Advanced Location Models (S. 362) | 4,5 | Stefan Nickel |
| T-WIWI-106200 | Modeling and OR-Software: Advanced Topics (S. 452) | 4,5 | Stefan Nickel |
| T-WIWI-102715 | Operations Research in Supply Chain Management (S. 473) | 4,5 | Stefan Nickel |

### Ergänzungsangebot
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-106546 | Introduction to Stochastic Optimization (S. 397) | 4,5 | Steffen Rebennack |
| T-WIWI-102718 | Discrete-Event Simulation in Production and Logistics (S. 298) | 4,5 | Stefan Nickel |
| T-WIWI-102719 | Mixed Integer Programming I (S. 445) | 4,5 | Oliver Stein |
| T-WIWI-102720 | Mixed Integer Programming II (S. 446) | 4,5 | Oliver Stein |
| T-WIWI-106549 | Large-scale Optimization (S. 405) | 4,5 | Steffen Rebennack |
| T-WIWI-102704 | Facility Location and Strategic Supply Chain Management (S. 340) | 4,5 | Stefan Nickel |
| T-WIWI-102714 | Tactical and Operational Supply Chain Management (S. 636) | 4,5 | Stefan Nickel |

**Learning Control / Examinations**

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.

**Conditions**

At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and "Special Topics of Stochastic Optimization (elective)" has to be taken.

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

Exemption for the **summer term 2017**:

In the summer term 2017, the two OR master modules "Mathematical Optimization" and "Operations Research in Supply Chain Management" can be taken without compulsory courses. This corresponds to the already existing regulation when taking OR modules in the elective area. The derogation does not apply to the **winter term 2017/18**.

**Qualification Objectives**

The student

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

**Content**

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

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

**Recommendations**

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

**Remarks**

Some lectures and courses are offered irregularly.

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

**Workload**

Total effort for 9 credits: ca. 270 hours

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

## M   Module: Real Estate Economics and Sustainability  [M-WIWI-101508]

**Responsibility:**      David Lorenz

**Organisation:**        KIT-Fakultät für Wirtschaftswissenschaften
**Curricular An-**       Compulsory Elective
**chorage:**

**Contained in:**        Business Administration
                         Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
                         Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
                         Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each winter term | 2 terms | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102838 | Real Estate Economics and Sustainability Part 1: Basics and Valuation (S. 538) | 4,5 | David Lorenz |
| T-WIWI-102839 | Real Estate Economics and Sustainability Part 2: Reporting and Rating (S. 539) | 4,5 | David Lorenz |

**Learning Control / Examinations**

It is currently unclear whether the course "Real Estate Economics and Sustainability Part 2: Reporting and Rating" can be offered in summer term 2018. It must therefore be expected that the corresponding module M-WIWI-101508 "Real Estate Management and Sustainability" can not be completed according to schedule.

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

The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (Part 1: Basics and Valuation and Part 2: Reporting and Rating) happen in the same semester in which the lectures take place.

Therefore, Part I currently only takes place in the winter semester and Part II takes place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

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

It is possible to include the grade of a seminar paper, dealing with a topic from the area of Real Estate Economics and Sustainability, into the final grade of the module (according to Section 4(2), 3 of the examination regulation). The seminar has a weight of 20 percent.

**Conditions**

None

**Qualification Objectives**

The student

- possesses an overview of key interrelationships within the real estate industry concerning macro- and microeconomic questions as well as the interaction of the industry's key players;
- is aware of the basics concerning the sustainable development debate and knows about the possible contribution of buildings and the real estate industry to a more sustainable development;
- knows the basics, key methods and tools of property valuation and is able to apply them;
- is aware of the key influencing factors of a building's market value and is able to factor in sustainability considerations into market value estimates;
- possess an overview of important other methods and processes – besides property valuation – which are applied within the real estate industry to assess property related risks (e.g. property ratings) and to communicate property

performance towards third parties (e.g. sustainability assessment of buildings and sustainability reporting of companies).

## Content
The implementation of sustainable development principles within the real estate industry requires taking into account sustainability considerations within real estate related procedures and decision making processes. Within this context, property valuation and valuation professionals play an important role.

Property valuations are carried out in almost any phase of the building life cycle and support, for example, financing as well as by and sell decisions.

Valuation methods and procedures, however, have to be adjusted to changing market participants' preferences and their willingness to pay. For this reason, the issue of "valuation and sustainability" is of particular topicality and relevance.

Within the real estate industry professionals are sought which combine micro- and macroeconomic knowledge and real estate specific expertise with knowledge and skills regarding the sustainability of buildings and building stocks.

The real estate industry offers attractive working and career opportunities. This teaching module / course therefore offers insights into key methods applied within the real estate industry (particularly valuation) and places them into the context of sustainable development. The focus of the module / course, however, is not only on theoretical content but also on the provisioning of linkages to real estate practice; this will be realized, amongst other issues, by practical tutorials which are offered in addition to the course lectures.

## Recommendations
A combination with courses in the area of
- Finance
- Insurance
- Civil engineering and architecture

is recommended.

Particularly recommended is the successful completion of the following Bachelor-Modules:
- Real Estate Management I and II
- Design, Construction and Assessment of Green Buildings I and II

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

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

**Responsibility:** Martin Klarmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each winter term | 1 term | 4 | 6 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102890 | Sales Management and Retailing (S. 550) | 3 | Martin Klarmann |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 1 courses.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-106137 | Country Manager Simulation (S. 273) | 1,5 | Sven Feurer |
| T-WIWI-102834 | Case Studies in Sales and Pricing (S. 248) | 1,5 | Martin Klarmann |
| T-WIWI-106981 | Digital Marketing and Sales in B2B (S. 289) | 1,5 | Anja Konhäuser |
| T-WIWI-102891 | Price Negotiation and Sales Presentations (S. 516) | 1,5 | Martin Klarmann, Mark Schröder |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-107720 | Market Research (S. 432) | 4,5 | |
| T-WIWI-102883 | Pricing (S. 517) | 4,5 | Sven Feurer |

**Learning Control / Examinations**
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

**Conditions**
The course "Sales Management and Retailing" is compulsory.

**Qualification Objectives**
Students

- have an advanced knowledge about sales management (design and structure of sales systems, relationship with sales partners and important customers)
- have a fundamental understanding of price management (in particular consumer behavior of pricing, pricing strategy, price determination)
- are able to handle particularities and challenges in sales management
- know several qualitative and quantitative approaches to prepare decisions in Marketing

- are able to implement their extensive sales and pricing knowledge in a practical context
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the sales department

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

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

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

# M  Module: Seminar Module  [M-WIWI-101808]

| | |
|---|---|
| **Responsibility:** | Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory |
| **Contained in:** | Compulsory Elective Modules 1 / Seminars |

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | German | 5 |

**Seminar Wirtschaftswissenschaften, Mathematik und Recht**
Non-Compulsory Block; You must choose between 3 and 6 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103474 | Seminar in Business Administration A (Master) (S. 561) | 3 | Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters |
| T-WIWI-103476 | Seminar in Business Administration B (Master) (S. 567) | 3 | Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters |
| T-WIWI-103477 | Seminar in Economics B (Master) (S. 576) | 3 | Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger |

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103478 | Seminar in Economics A (Master) (S. 574) | 3 | Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger |
| T-WIWI-103479 | Seminar in Informatics A (Master) (S. 579) | 3 | Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner |
| T-WIWI-103480 | Seminar in Informatics B (Master) (S. 582) | 3 | Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner |
| T-WIWI-103481 | Seminar in Operations Research A (Master) (S. 585) | 3 | Stefan Nickel, Steffen Rebennack, Oliver Stein |
| T-WIWI-103482 | Seminar in Operations Research B (Master) (S. 587) | 3 | Stefan Nickel, Steffen Rebennack, Oliver Stein |
| T-WIWI-103483 | Seminar in Statistics A (Master) (S. 589) | 3 | Oliver Grothe, Melanie Schienle |
| T-WIWI-103484 | Seminar in Statistics B (Master) (S. 590) | 3 | Oliver Grothe, Melanie Schienle |
| T-INFO-101997 | Seminar: Legal Studies I (S. 594) | 3 | Thomas Dreier |
| T-INFO-105945 | Seminar: Legal Studies II (S. 596) | 3 | Thomas Dreier |

### Seminar Ingenieurwissenschaften
Non-Compulsory Block; You must choose at most 1 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-109062 | Seminar Production Technology (S. 593) | 3 | Jürgen Fleischer, Gisela Lanza, Volker Schulze |
| T-MACH-108737 | Seminar Data-Mining in Production (S. 560) | 3 | Gisela Lanza |
| T-ETIT-100754 | Seminar Creating a Patent Specification (S. 559) | 3 | Wilhelm Stork |
| T-WIWI-108763 | Seminar in Engineering Science Master (approval) (S. 578) | 3 | Fachvertreter ingenieurwissenschaftlicher Fakultäten |

### SQ-Seminar
Non-Compulsory Block; You must choose between 3 and 4 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-104680 | Wildcard Key Competences Seminar 1 (S. 669) | 1 | |
| T-WIWI-104681 | Wildcard Key Competences Seminar 2 (S. 197) | 2 | |
| T-WIWI-104682 | Wildcard Key Competences Seminar 3 (S. 670) | 3 | |
| T-WIWI-104683 | Wildcard Key Competences Seminar 4 (S. 671) | 1 | |
| T-WIWI-104684 | Wildcard Key Competences Seminar 5 (S. 672) | 2 | |
| T-WIWI-104685 | Wildcard Key Competences Seminar 6 (S. 673) | 3 | |
| T-WIWI-105956 | Wildcard Key Competences Seminar 8 (S. 674) | 4 | |

**Learning Control / Examinations**

The modul examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examintaion regulation). A detailed description of every singled assessment is given in the specific course characerization.

The final mark for the module is the average of the marks for each of the two seminars weighted by the credits and truncated after the first decimal. Grades of the KQ courses are not included.

**Conditions**

The course specific preconditions must be observed.

- *Seminars*: Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.
- Alternatively one of the two seminars can be absolved at a engineering department. The seminar has to be offered by a representative of the respective department as well. The assessment has to meet the demands of the Department of Economics and Management (active participation, term paper with a workload of at least 80 h, presentation). This alternative seminar **requires an official approval** and can be applied at the examination office of the Department of Economics and Management. Seminars at the institutes wbk and IFL do not require these approval.
- *Key Qualification (KQ)-course(s)*: One or more courses with at least 3 CP in total of additional key qualifications have to be chosen among the courses [HoC, ZAK, Sprachenzentrum].

**Qualification Objectives**

- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

**Content**

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

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A 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.

**Remarks**

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

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

**Workload**

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

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

**Responsibility:** Hansjörg Fromm, Christof Weinhardt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Language | Level | Version |
|------|-----------|----------|----------|-------|---------|
| 9 | Each term | 2 terms | German | 4 | 4 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-108715 | Artificial Intelligence in Service Systems (S. 216) | 4,5 | Gerhard Satzger |
| T-WIWI-105777 | Business Intelligence Systems (S. 241) | 4,5 | Alexander Mädche, Mario Nadj, Peyman Toreini |
| T-WIWI-102822 | Industrial Services (S. 371) | 4,5 | Hansjörg Fromm |
| T-WIWI-102899 | Modeling and Analyzing Consumer Behavior with R (S. 450) | 4,5 | Verena Dorner, Jella Pfeiffer, Christof Weinhardt |
| T-WIWI-105778 | Service Analytics A (S. 598) | 4,5 | Hansjörg Fromm, Thomas Setzer |
| T-WIWI-102706 | Special Topics in Information Engineering & Management (S. 615) | 4,5 | Christof Weinhardt |

**Learning Control / Examinations**
The course T-WIWI-105779 "Service Analytics B - Enterprise Data Reduction and Prediction" will be discontinued in the winter semester 2018/2019.
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.

**Conditions**
None

**Qualification Objectives**
Students

- knows the theoretical bases and the key components of Business Intelligence systems,

- acquires the basic skills to make use of business intelligence and analytics software in the service context

- are introduced into various application scenarios of analytics in the service context

- are able to distinguish different analytics methods and apply them in context

- learn how to apply analytics software in the service context

- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

**Content**

The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

**Recommendations**

The courses Service Analytics A [2595501] or Service Analytics B [2540498] should be applied.

**Remarks**

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

**Workload**

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

## M   Module: Service Design Thinking   [M-WIWI-101503]

| | |
|---|---|
| **Responsibility:** | Gerhard Satzger, Christof Weinhardt |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration<br>Compulsory Elective Modules 1 / Compulsory Modules / Business Administration<br>Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration<br>Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 1 |

**Compulsory**

| Identifier | Course | | ECTS | Responsibility |
|---|---|---|---|---|
| T-WIWI-102849 | Service Design Thinking (S. 600) | | 9 | Gerhard Satzger, Christof Weinhardt |

**Learning Control / Examinations**

The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

**Conditions**

None

**Qualification Objectives**

- Deep knowledge of the innovation method Design Thinking, as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Learn to apply the method to a real innovation projects issued by industry partners.

**Content**

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (intern. Design Thinking network).
- Design Space Exploration: Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are in the focus of this phase.
- Funky Prototype: Integration of the individually tested and successful functions to several complete solution scenarios, which are further tested and developed.
- Functional Prototype: Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is lade out in detail and tested with users.
- Final Prototype: Implementing the functional prototype and presenting it to the customer.

**Recommendations**

This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

**Remarks**

Due to practical project work as a component of the program, access is limited.

The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.

For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).

Furthermore, the KSRI conducts an information event for applicants every year in May.

This module is part of the KSRI Teaching Program „Digital Service Systems". For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

**Workload**

Workload for this course is comparably high as the course runs in cooperation with partner universities from around the world as well as partner companies. This causes overhead.

## M | Module: Service Economics and Management  [M-WIWI-102754]

| | |
|---|---|
| **Responsibility:** | Gerhard Satzger, Christof Weinhardt |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102881 | Business and IT Service Management (S. 237) | 4,5 | Gerhard Satzger |
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 430) | 4,5 | Christof Weinhardt |
| T-WIWI-106201 | Digital Transformation of Organizations (S. 294) | 4,5 | Alexander Mädche |

**Learning Control / Examinations**
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.

**Conditions**
None

**Qualification Objectives**
Students

- understand the scientific basics of the management of digital services and corresponding systems

- gain a comprehensive insight in the importance and the most important features of information systems as an central component of the digitalization of business processes, products and services

- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully

- understand the OR methods in the sector of service management and apply them adequately

- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems

- are able to develop market-oriented coordination mechanisms and apply service systems.

**Content**
This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

**Recommendations**

None

**Remarks**

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

**Workload**

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

# M Module: Service Innovation, Design & Engineering [M-WIWI-102806]

| | |
|---|---|
| **Responsibility:** | Alexander Mädche, Gerhard Satzger |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration |
| | Compulsory Elective Modules 1 / Compulsory Modules / Business Administration |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 2 terms | German | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-105773 | Digital Service Design (S. 291) | 4,5 | Alexander Mädche |
| T-WIWI-102639 | Business Models in the Internet: Planning and Implementation (S. 243) | 4,5 | Timm Teubner |
| T-WIWI-108437 | Practical Seminar: Information Systems and Service Design (S. 510) | 4,5 | Norbert Koppenhagen, Alexander Mädche |
| T-WIWI-102799 | Practical Seminar Service Innovation (S. 508) | 4,5 | Gerhard Satzger |
| T-WIWI-102641 | Service Innovation (S. 602) | 4,5 | Gerhard Satzger |

**Learning Control / Examinations**
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.

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

**Qualification Objectives**
Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.

- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.

- are able to embed the concepts of innovation management, development and design of services into organisations

- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation

- elaborate concrete and problem-solving solutions for practical tasks in teams.

**Content**

This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

**Recommendations**

Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].

Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

**Remarks**

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

**Workload**

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

# M Module: Service Management  [M-WIWI-101448]

| | |
|---|---|
| **Responsibility:** | Gerhard Satzger, Christof Weinhardt |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Business Administration<br>Compulsory Elective Modules 1 / Compulsory Modules / Business Administration<br>Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration<br>Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Each term | 1 term | 4 | 4 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102881 | Business and IT Service Management (S. 237) | 4,5 | Gerhard Satzger |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose 4,5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-108715 | Artificial Intelligence in Service Systems (S. 216) | 4,5 | Gerhard Satzger |
| T-WIWI-106201 | Digital Transformation of Organizations (S. 294) | 4,5 | Alexander Mädche |
| T-WIWI-102822 | Industrial Services (S. 371) | 4,5 | Hansjörg Fromm |
| T-WIWI-102899 | Modeling and Analyzing Consumer Behavior with R (S. 450) | 4,5 | Verena Dorner, Jella Pfeiffer, Christof Weinhardt |
| T-WIWI-105778 | Service Analytics A (S. 598) | 4,5 | Hansjörg Fromm, Thomas Setzer |
| T-WIWI-102641 | Service Innovation (S. 602) | 4,5 | Gerhard Satzger |

**Learning Control / Examinations**
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.

**Conditions**
The course *Business and IT Service Management* [2590484] is compulsory and must be examined.

**Qualification Objectives**
The students

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- systematically use vast amounts of available data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

**Content**
The module service management addresses the basics of developing and managing IT-based services. The lectures contained in this module teach the basics of developing and managing IT-based services and the application of OR

methods in the field of service management. Moreover, students learn to systematically analyze vast amounts of data for planning, operation and improvement for complex service offerings. These tools enhance operational and strategic decision support and help to analyze and understand the overall innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

**Recommendations**
None

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

## M  Module: Service Operations  [M-WIWI-102805]

| | |
|---|---|
| **Responsibility:** | Stefan Nickel |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular Anchorage:** | Compulsory Elective |
| **Contained in:** | Operations Research |
| | Compulsory Elective Modules 1 / Compulsory Modules / Operations Research |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Operations Research |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Each term | 1 term | German | 4 | 5 |

### Wahlpflichtangebot
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102718 | Discrete-Event Simulation in Production and Logistics (S. 298) | 4,5 | Stefan Nickel |
| T-WIWI-102884 | Operations Research in Health Care Management (S. 472) | 4,5 | Stefan Nickel |
| T-WIWI-102715 | Operations Research in Supply Chain Management (S. 473) | 4,5 | Stefan Nickel |
| T-WIWI-102716 | Practical Seminar: Health Care Management (with Case Studies) (S. 509) | 4,5 | Stefan Nickel |

### Ergänzungsangebot
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102860 | Supply Chain Management in the Process Industry (S. 632) | 4,5 | Stefan Nickel |
| T-WIWI-102872 | Challenges in Supply Chain Management (S. 251) | 4,5 | Esther Mohr |

**Learning Control / Examinations**
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.

**Conditions**
At least one of the fourcourses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management orDiscrete-Event Simulation in Production and Logistics has to be assigned.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

**Qualification Objectives**
Students

- knows the theoretical bases and the key components of Business Intelligence systems,

- acquires the basic skills to make use of business intelligence and analytics software in the service context

- are introduced into various application scenarios of analytics in the service context

- are able to distinguish different analytics methods and apply them in context

- learn how to apply analytics software in the service context

- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

**Content**

The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

**Recommendations**

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

**Remarks**

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

**Workload**

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

## M  Module: Stochastic Optimization  [M-WIWI-103289]

**Responsibility:** Steffen Rebennack

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Operations Research
Compulsory Elective Modules 1 / Compulsory Modules / Operations Research
Compulsory Elective Modules 2 / Compulsory Elective Modules / Operations Research
Additional Examinations

| ECTS | Recurrence | Duration | Version |
|------|-----------|----------|---------|
| 9 | Each term | 1 term | 5 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-106546 | Introduction to Stochastic Optimization (S. 397) | 4,5 | Steffen Rebennack |
| T-WIWI-106548 | Advanced Stochastic Optimization (S. 207) | 4,5 | Steffen Rebennack |
| T-WIWI-106549 | Large-scale Optimization (S. 405) | 4,5 | Steffen Rebennack |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|-----------|--------|------|----------------|
| T-WIWI-102723 | Graph Theory and Advanced Location Models (S. 362) | 4,5 | Stefan Nickel |
| T-WIWI-102719 | Mixed Integer Programming I (S. 445) | 4,5 | Oliver Stein |
| T-WIWI-102720 | Mixed Integer Programming II (S. 446) | 4,5 | Oliver Stein |
| T-WIWI-103124 | Multivariate Statistical Methods (S. 456) | 4,5 | Oliver Grothe |
| T-WIWI-102715 | Operations Research in Supply Chain Management (S. 473) | 4,5 | Stefan Nickel |
| T-WIWI-106545 | Optimization under uncertainty (S. 476) | 5 | Steffen Rebennack |
| T-WIWI-106552 | Simulation of Stochastic Systems (S. 606) | 4,5 | Oliver Grothe, Steffen Rebennack |

### Learning Control / Examinations
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.

### Conditions
At least one of the courses "Advanced Stochastic Optimization" and "Large-scale Optimization" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

### Qualification Objectives
The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,

- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

**Content**
The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

**Recommendations**
It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

**Remarks**
The course "Introduction to Stochastic Optimization" will be offered until the winter semester 2018/2019 as an additional option in the elective offer of the module. Thereafter, the course can only be selected in the supplementary offer.
The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

**Workload**
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

## M  Module: Strategy, Communication, and Data Analysis  [M-WIWI-101489]

**Responsibility:**   Martin Klarmann

**Organisation:**   KIT-Fakultät für Wirtschaftswissenschaften
**Curricular An-**   Compulsory Elective
**chorage:**

**Contained in:**   Business Administration
Compulsory Elective Modules 1 / Compulsory Modules / Business Administration
Compulsory Elective Modules 2 / Compulsory Elective Modules / Business Administration
Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 6 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-102899 | Modeling and Analyzing Consumer Behavior with R (S. 450) | 4,5 | Verena Dorner, Jella Pfeiffer, Christof Weinhardt |
| T-WIWI-102883 | Pricing (S. 517) | 4,5 | Sven Feurer |

**Learning Control / Examinations**
The module can not be attended as of winter term 18/19. Students already enrolled in the module can complete it regularly.

**Conditions**
None

**Qualification Objectives**
Students

- are familiar with general procedures and characteristics to develop new products and services under conditions of market orientation,
- can analyse customer needs, learn to realize competitive advantages and to work out interdisciplinary solutions,
- improve their statistic skills to cope with applied Marketing issues.

**Content**
The core product is everything a customer or business consumer receives. Marketers must understand what it takes to develop a new product successfully. It is important to understand that innovations differ in their degree of newness (up to radical innovations). This helps to determine how quickly the products will be adopted by a target market. Market orientation is on the front side of the medal, the reverse side includes meeting the needs of diverse stakeholders. To find out the critical drivers of success a deep understanding of analytical and statistical methods is essential. As a result, the developing of an effective marketing strategy is discussed as an empirical, scientific process. In addition, consumer behavior approaches in marketing are discussed as an important research area with a strong interdisciplinary and empirical orientation.

**Recommendations**
None

**Remarks**
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

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

**M** **Module: Transport Infrastructure Policy and Regional Development [M-WIWI-101485]**

| | |
|---|---|
| **Responsibility:** | Kay Mitusch |
| **Organisation:** | KIT-Fakultät für Wirtschaftswissenschaften |
| **Curricular An-chorage:** | Compulsory Elective |
| **Contained in:** | Economics |
| | Compulsory Elective Modules 1 / Compulsory Modules / Economics |
| | Compulsory Elective Modules 2 / Compulsory Elective Modules / Economics |
| | Additional Examinations |

| ECTS | Recurrence | Duration | Level | Version |
|------|------------|----------|-------|---------|
| 9 | Each term | 2 terms | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 2 courses.

| Identifier | Course | ECTS | Responsibility |
|------------|--------|------|----------------|
| T-WIWI-103107 | Spatial Economics (S. 614) | 4,5 | Ingrid Ott |
| T-WIWI-100007 | Transport Economics (S. 652) | 4,5 | Kay Mitusch, Eckhard Szimba |

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

**Conditions**
None

**Qualification Objectives**
The students

- understand the economic issues related to transport and regional development with a main focus on economic policy issues generated by the relationship of transport and regional development with the public sector
- are able to compare different considerations of politics, regulation and the private sector and to analyse and assess the respective decision problems both qualitatively and by applying appropriate methods from economic theory
- are prepared for careers in the public sector, particularly for public companies, politics, regulatory agencies, related consultancies, mayor construction companies or infrastructure project corporations

**Content**
The development infrastructure (e.g. transport, energy, telecommunications) has always been one of the most relevant factors for economic development and particularly influences the development of the regional economy. From the repertoire of state actions, investments into transport infrastructure are often regarded the most important measure to foster regional economic growth. Besides the direct effects of transport policy on passenger and freight transport, a variety of individual economic activities is significantly dependent on the available or potential transport options. Decisions on the planning, financing and realization of mayor infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs.

Through its combination of lectures the module reflects the complex interdependencies between infrastructure policy, transport industry and regional policy and provides its participants with a comprehensive understanding of the functionalities of one of the most important sectors of the economy and its relevance for economic policy.

**Remarks**

The courses *Assessment of Public Policies and Projects I* (winter term) and *Assessment of Public Policies and Projects II* (summer term) will no longer be part of this module. Student who have already had exams in this courses can integrate these exams in this module.

**Workload**

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

# Part V
# Module component exams

**T**   **Course: Wildcard Key Competences Seminar 2 [T-WIWI-104681]**

**Responsibility:**
**Contained in:**    [M-WIWI-101808] Seminar Module

| ECTS | Exam type | Version |
|------|-----------|---------|
| 2 | Studienleistung | 1 |

## T  Course: Advanced Game Theory [T-WIWI-102861]

**Responsibility:** Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß
**Contained in:** [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101453] Applied Strategic Decisions

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2521533 | Advanced Game Theory | Vorlesung (V) | 2 | Karl-Martin Ehrhart, Michael Müller, Clemens Puppe |
| WS 18/19 | 2521534 | | Übung (Ü) | 1 | Michael Müller, Clemens Puppe |

**Learning Control / Examinations**
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.

**Conditions**
None

**Recommendations**
Basic knowledge of mathematics and statistics is assumed.

## V  Event excerpt: Advanced Game Theory (WS 18/19)

**Aim**
The student
- deepens and broadens his/her basic knowledge of Game Theory,
- develops a rigorous understanding of newer concepts in Game Theory,
- develops the capability to independently model and analyze complex systems of strategic decision-making, and to develop appropriate solutions.

**Content**
This course offers an advanced and rigorous treatment of game theory.

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

## T  Course: Advanced Lab Informatics [T-WIWI-103523]

**Responsibility:** Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2400115 | Machine Learning Practical Course | Praktikum (P) | 3 | Rüdiger Dillmann, Johann Marius Zöllner |
| SS 2018 | 2512101 | | Praktikum (P) | 3 | Andreas Drescher, Andreas Oberweis, Frederic Toussaint, Meike Ullrich |
| SS 2018 | 2512300 | | Seminar / Praktikum (S/P) | 3 | Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma |
| SS 2018 | 2512400 | | Praktikum (P) | | Theresa Kromat, Ali Sunyaev |
| SS 2018 | 2512500 | | Praktikum (P) | 3 | Johann Marius Zöllner |
| SS 2018 | 2512550 | Advanced Lab Privacy Friendly Apps | Praktikum (P) | 3 | Oksana Kulyk, Peter Mayer, Melanie Volkamer |
| SS 2018 | 2513306 | Data Science & Real-time Big Data Analytics | Seminar / Praktikum (S/P) | 2 | Dominik Riemer, Suad Sejdovic, York Sure-Vetter |
| WS 18/19 | 2512100 | Security | Praktikum (P) | 4 | Ingmar Baumgart, Sven Maier, Melanie Volkamer |
| WS 18/19 | 2512301 | Linked Data and the Semantic Web | Seminar / Praktikum (S/P) | 3 | Maribel Acosta Deibe, Lars Heling, Tobias Christof Käfer, York Sure-Vetter, Tobias Weller |
| WS 18/19 | 2512311 | Data Science with Open Data | Seminar / Praktikum (S/P) | 3 | Matthias Frank, York Sure-Vetter |
| WS 18/19 | 2512312 | Cooperation seminar: Innovative applications on single board computers as well as their economic relevance | Seminar / Praktikum (S/P) | 3 | David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller |
| WS 18/19 | 2512400 | | Praktikum (P) | | Theresa Kromat, Ali Sunyaev |
| WS 18/19 | 2512501 | | Praktikum (P) | 3 | Johann Marius Zöllner |
| WS 18/19 | 2512551 | | Praktikum (P) | 3 | Melanie Volkamer |
| WS 18/19 | 2512600 | | Praktikum (P) | 2 | Harald Sack |

**Learning Control / Examinations**
**Advanced Lab "Privacy Friendly Apps":**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of of a practical work in which a software functionality must be implemented and three interim submissions of the software to be developed. The weighting of the individual components will be announced during the first meeting.
**All other courses of the Institute AIFB:**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

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

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

**Conditions**
None

**Remarks**
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.

## V  Event excerpt: Linked Data and the Semantic Web (WS 18/19)

**Workload**
Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

## V  Event excerpt: Machine Learning Practical Course (SS 2018)

**Aim**
Umsetzung einzelner, durch die Studenten ausgewählter Verfahren des Maschinellen Lernens an einer konkreten Aufgabenstellung entweder aus dem Bereich Robotik oder kognitive Automobile.

Die einzelnen Projekte erfordern die Analyse der gestellten Aufgabe, Auswahl geeigneter Lernverfahren, Spezifikation und Implementierung und Evaluierung eines Lösungsansatzes. Schließlich ist die gewählte Lösung zu dokumentieren und in einem Kurzvortrag vorzustellen.
Die Studierenden können Kenntnisse aus der Vorlesung Maschinelles Lernen auf einem ausgewählten Gebiet der aktuellen Forschung im Bereich Robotik oder kognitive Automobile praktisch anwenden.
Die Studierenden beherrschen die Analyse und Lösung entsprechender Problemstellungen im Team.
Die Studierenden können ihre Konzepte und Ergebnisse evaluieren, dokumentieren und präsentieren.

## V  Event excerpt:  (SS 2018)

**Content**
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

**Literature**
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

## Ⅴ Event excerpt: (WS 18/19)

**Aim**

- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

**Workload**
4 ECTS = approx. 120 h

## Ⅴ Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

**Content**
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

## Ⅴ Event excerpt: Advanced Lab Privacy Friendly Apps (SS 2018)

**Aim**
The students

- are able to identify privacy-critical parts of an app and to model and implement them in a privacy-friendly way,
- know frameworks for the development of mobile apps as well as the dedicated development environments,
- have the ability to use "git" (on the example of Github) as a basis for software development,
- have experience in software development using "Human Centered Design".

**Content**
The Privacy Friendly Apps (PFAs) are a group of Android apps that are optimized regarding privacy. In the past, more than 20 Privacy Friendly Apps have been developed at the Technische Universität Darmstadt and published in the Google Playstore as well as in the alternative App Store F-Droid. The source code of each Privacy Friendly App is available on Github and licensed "open-source". The "Privacy Friendly QR Scanner" was downloaded more than 15,000 times from the Playstore. Further information can be found at https://secuso.org/pfa.
In the practical course "Privacy Friendly Apps", apps are implemented in small groups or existing Privacy Friendly Apps are extended. Initially, Android apps will be in the foreground. In the medium term, it is planned to develop IOS apps as well.
The focus of the practical course is on the privacy-friendly and user-centered implementation of the respective task as an app. Therefore, privacy-critical points are identified and technical measures for the protection of privacy (for example the blocking of screenshots) as well as for the support of the user (for example explanations) are determined. These will be implemented during the internship.

## Ⅴ Event excerpt: (WS 18/19)

**Aim**

Die Studierenden können Kenntnisse aus der Vorlesung Maschinelles Lernen auf einem ausgewählten Gebiet der aktuellen Forschung im Bereich Robotik oder kognitive Automobile praktisch anwenden.
Die Studierenden beherrschen die Analyse und Lösung entsprechender Problemstellungen im Team.
Die Studierenden können ihre Konzepte und Ergebnisse evaluieren, dokumentieren und präsentieren.

**Workload**

Der Arbeitsaufwand von 3 SWS setzt sich zusammen aus Präsenzzeit am Versuchsort zur praktischen Umsetzung der gewählten Lösung, sowie der Zeit für Literaturrecherchen und Planung/Spezifikation der geplanten Lösung. Zusätzlich wird ein kurzer Bericht und eine Präsentation der durchgeführten Arbeit erstellt.

## V Event excerpt: (SS 2018)

**Aim**

Die Studierenden können Kenntnisse aus der Vorlesung Maschinelles Lernen auf einem ausgewählten Gebiet der aktuellen Forschung im Bereich Robotik oder kognitive Automobile praktisch anwenden.
Die Studierenden beherrschen die Analyse und Lösung entsprechender Problemstellungen im Team.
Die Studierenden können ihre Konzepte und Ergebnisse evaluieren, dokumentieren und präsentieren.

**Content**

Umsetzung einzelner, durch die Studenten ausgewählter Verfahren des Maschinellen Lernens an einer konkreten Aufgabenstellung entweder aus dem Bereich Robotik oder kognitive Automobile.

Die einzelnen Projekte erfordern die Analyse der gestellten Aufgabe, Auswahl geeigneter Lernverfahren, Spezifikation und Implementierung und Evaluierung eines Lösungsansatzes. Schließlich ist die gewählte Lösung zu dokumentieren und in einem Kurzvortrag vorzustellen.

**Workload**

Der Arbeitsaufwand von 3 SWS setzt sich zusammen aus Präsenzzeit am Versuchsort zur praktischen Umsetzung der gewählten Lösung, sowie der Zeit für Literaturrecherchen und Planung/Spezifikation der geplanten Lösung. Zusätzlich wird ein kurzer Bericht und eine Präsentation der durchgeführten Arbeit erstellt.

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

**Responsibility:** Melanie Volkamer
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4 | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**

The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) 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.

**Conditions**

None

**Recommendations**

Knowledge from the lecture "Information Security" is recommended.

**Remarks**

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

## T  Course: Advanced Lab User Studies in Security [T-WIWI-109271]

**Responsibility:** Melanie Volkamer
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4 | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**

The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) 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.

**Conditions**

None

## T  Course: Advanced Management Accounting [T-WIWI-102885]

**Responsibility:** Marcus Wouters
**Contained in:** [M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2579907 | Advanced Management Accounting | Vorlesung (V) | 3 | Frederik Riar, Marcus Wouters |

**Learning Control / Examinations**
The assessment consists of an oral exam (20 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
None.

**Recommendations**
The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

**Remarks**
This course is held in English. Lectures and tutorials are integrated.
The course is compulsory and must be examined.

## V  Event excerpt: Advanced Management Accounting (WS 18/19)

**Aim**
Students will be able to consider advanced management accounting methods in an interdisciplinary way and to apply these to managerial decision-making problems in operations and innovation. They will also be able to identify relevant research results on such methods.

**Content**
The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

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

**Literature**
Literature is mostly made available via ILIAS.

## T  Course: Advanced Statistics [T-WIWI-103123]

**Responsibility:**  Oliver Grothe
**Contained in:**  [M-WIWI-101637] Analytics and Statistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | l | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2550552 | | Vorlesung (V) | 2 | Oliver Grothe |
| WS 18/19 | 2550553 | | Übung (Ü) | 2 | Maximilian Coblenz, Oliver Grothe, Anika Kaplan |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4). The exam is offered every semester. Re-examinations are offered only for repeaters.

**Conditions**
None

**Remarks**
New course starting winter term 2015/2016

## V  Event excerpt:  (WS 18/19)

**Aim**
Students

- cope with advanced fundamentals of statistics as well as simulation and resampling methods.
- know the fundamentals of point and interval estimation as well as testing of hypotheses.
- know basic principles of information theory.
- learn, how to conduct controlled simulation studies.

**Content**
Basic principles
Types of convergence and limit theorems
Multivariate Distributions
Copulas
Simulation techniques, Bootstrap
Statistical Estimation
Statistical Testing
Simulation studies

**Literature**
Comprehensive lecture notes

## T Course: Advanced Stochastic Optimization [T-WIWI-106548]

**Responsibility:** Steffen Rebennack
**Contained in:** [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
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.

**Conditions**
None.

## T   Course: Advanced Topics in Economic Theory [T-WIWI-102609]

**Responsibility:** Kay Mitusch
**Contained in:**  [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101406] Network Economics
[M-WIWI-101497] Agglomeration and Innovation

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The course T-WIWI-102609 "Advanced Topics in Economic Theory" restarts in summer term 2019.
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

**Conditions**
None

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

## T  Course: Airport Logistics [T-MACH-105175]

**Responsibility:** André Richter
**Contained in:** [M-MACH-101277] Material Flow in Logistic Systems
[M-MACH-101263] Introduction to Logistics
[M-MACH-101280] Logistics in Value Chain Networks
[M-MACH-101278] Material Flow in Networked Logistic Systems

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2117056 | Airport logistics | Vorlesung (V) | 2 | André Richter |

**Learning Control / Examinations**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

## V  Event excerpt: Airport logistics (WS 18/19)

**Aim**
Students are able to:

- Describe material handling and informations technology activities on airports,
- Evaluate processes and systems on airports as the law stands, and
- Choose appropriate processes and material handling systems for airports.

**Content**
Introduction
airport installations
luggage transport
passenger transport
security on the airport
legal bases of the air traffic
freight on the airport

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
„Gepäcklogistik auf Flughäfen" à http://www.springer.com/de/book/9783642328527

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

**Responsibility:** Marcus Gohl
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2134150 | Analysis of Exhaust Gas und Lubricating Oil Vorlesung (V) in Combustion Engines | | 2 | Marcus Gohl |

**Learning Control / Examinations**
Letter of attendance or oral exam (25 minutes, no auxillary means)

**Conditions**
none

## V Event excerpt: Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines (SS 2018)

**Aim**
The Students can point out the challenges concerning the current emission standards in engine development. They can name and explain the basic principles of measurement techniques and methods to analyse exhaust gas components and components of engine oil. Hence, the students have the ability to choose the right methods for a given Problem and to interpret the results.

**Content**
The students get involved in the application of different measurement techniques in the field of exhaust gas and lubricating oil analysis. The functional principles of the systems as well as the application areas of the latter are discussed. In addition to a general overview of standard applications, current specific development and research activities are introduced.

**Workload**
regular attendance: 24 hrs
self study: 96 hrs

**Literature**
The lecture documents are distributed during the courses.

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

**Responsibility:** Jürgen Pfeil
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2134134 | Analysis tools for combustion diagnostics | Vorlesung (V) | 2 | Jürgen Pfeil |

**Learning Control / Examinations**
oral examination, Duration: 25 min., no auxiliary means

**Conditions**
none

## V  Event excerpt: Analysis tools for combustion diagnostics (SS 2018)

**Aim**
The students can name and explain state-of-the-art methods to analyse the process in combustion as well as special measuring techniques such as optical and laser analysis. They are able to thermodynamically model, analyse and evaluate the engine process.

**Content**
energy balance at the engine
energy conversion in the combustion chamber
thermodynamics of the combustion process

flow velocities

flame propagation

special measurement techniques

**Workload**
regular attendance: 24 hours
self-study: 96 hours

**Literature**
Lecture notes available in the lectures

## T  Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]

**Responsibility:**   Daniela Beyer, Marion Weissenberger-Eibl
**Contained in:**   [M-WIWI-101507] Innovation Management

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | l | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2545108 | | Seminar (S) | 2 | Daniela Beyer |

**Learning Control / Examinations**
Non exam assessment (following §4(2) 3 of the examination regulation).
Innovation plan (exposé) (20%), Guided interviews/ quantitative survey (20%), presentation of results (20%), seminar paper (about 5 pages per person) (40%).

**Conditions**
None

**Recommendations**
Prior attendance of the course Innovation Management [2545015] is recommended.

## T  Course: Application of Social Science Methods (WiWi) [T-GEISTSOZ-109052]

**Responsibility:** Gerd Nollmann
**Contained in:** [M-GEISTSOZ-101169] Sociology

| ECTS | Recurrence | Version |
|:---:|:---:|:---:|
| 9 | Jedes Sommersemester | 1 |

**Modeled Conditions**

The following conditions must be met:

- The course [T-GEISTSOZ-104565] *Computer Aided Data Analysis* must have been passed.

# T   Course: Applied Econometrics [T-WIWI-103125]

**Responsibility:** Melanie Schienle
**Contained in:** [M-WIWI-101638] Econometrics and Statistics I

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation.

**Conditions**
None

**Remarks**
The course is not offered regularly.

## T   Course: Applied Informatics II - IT Systems for eCommerce [T-WIWI-102651]

**Responsibility:**   Ali Sunyaev
**Contained in:**   [M-WIWI-101472] Informatics
               [M-WIWI-101630] Electives in Informatics
               [M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2511032 | Applied Informatics II: IT Systems for e-Commerce | Vorlesung (V) | 2 | Ali Sunyaev |
| SS 2018 | 2511033 | | Übung (Ü) | 1 | Ali Sunyaev |

**Learning Control / Examinations**

The assessment consists of a written exam (120 min) according to Section 4(2), 1 of the examination regulation.

The successful completion of the compulsory exercises is prerequisite for the admission to the written exam.

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

By successful processing 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).

**Conditions**

None

**Recommendations**

Knowledge of content of the modules Foundations in Informatics [IW1INF1] and Algorithms I [IW2INF2] is expected.

## V   Event excerpt: Applied Informatics II: IT Systems for e-Commerce (SS 2018)

**Aim**

The student learns about concepts and technologies for designing big, distributed application architectures. Students apply industryrelevant technology to solve application-oriented problems in lab classes.

**Content**

The course Applied Informatics II [2511032] covers various facets of electronic commerce which have to be supported by adequate and efficient distributed information systems. Key topics are middleware technologies and distributed application architectures. Document description and exchange (incl. XML), Java EE, Web technologies, and Web services are additional topics.

**Workload**

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

**Literature**

Tba in the lecture.

## T  Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

**Responsibility:** Gerhard Satzger
**Contained in:** [M-WIWI-101506] Service Analytics
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2595650 | Artificial Intelligence in Service Systems | Vorlesung (V) | 2 | Niklas Kühl |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) according to §4(2), 1 of the examination regulations.

**Conditions**
None

## V  Event excerpt: Artificial Intelligence in Service Systems (WS 18/19)

**Aim**
Students of this course will be able to understand and implement the complete lifecycle of a typical Artificial Intelligence use case with supervised machine learning. Furthermore, they understand the importance and the means of applying AI and Machine Learning within service systems, which allows multiple, independent entities to collaborate and derive insights. Students will be proficient with typical Python code for AI challenges.

**Content**
Artificial Intelligence and the application of machine learning is becoming more and more popular to solve relevant business challenges. However, it is not only important to be familiar with precise algorithms, but rather a general understanding of the necessary steps with a holistic view—from real-world challenge to successful deployment of an AI. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. We then take this knowledge to the more complex case of service systems with different entities (e.g. companies) who interact with each other and show possibilities on how to derive holistic insights. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.

## T | Course: Asset Pricing [T-WIWI-102647]

**Responsibility:** Martin Ruckes, Marliese Uhrig-Homburg
**Contained in:** [M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101480] Finance 3
[M-WIWI-101482] Finance 1
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530555 | Asset Pricing | Vorlesung (V) | 2 | Martin Ruckes, Marliese Uhrig-Homburg |
| SS 2018 | 2530556 | | Übung (Ü) | 1 | Marcel Müller, Martin Ruckes, Marliese Uhrig-Homburg |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Recommendations**
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

## V | Event excerpt: Asset Pricing (SS 2018)

**Aim**
Students are familiar with advanced concepts in asset pricing (in particular the stochastic discount factor model). They are able to apply their acquired skills to solve empirical questions related to securities.

**Content**
This lecture deals with the valuation of risky cash flows. A stochastic discount model and a central equation will be introduced, which form the basis of nearly every valuation model in finance. That includes the valuation of stocks, bonds and derivatives. The first part of the lecture will present the theory, the second part covers empirical questions related to this approach.

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

**Literature**
**Basic literature**

- Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

**Elective literature**

- Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.
- The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

## T  Course: Auction Theory [T-WIWI-102613]

**Responsibility:** Karl-Martin Ehrhart
**Contained in:** [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101446] Market Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2520408 | | Vorlesung (V) | 2 | Karl-Martin Ehrhart |
| WS 18/19 | 2520409 | | Übung (Ü) | 1 | Karl-Martin Ehrhart |

**Learning Control / Examinations**
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

**Conditions**
None

## V  Event excerpt:  (WS 18/19)

**Aim**
The student

- learns the game-theoretic modeling and analysis of auctions,
- learns about various auction formats and their specific characteristics,
- understands the challenge for participating in auctions as bidder,
- understands the challenge of designing auctions as auctioneer,
- gains insight into practice by case studies,
- participates in and analyzes demonstration experiments.

**Content**
This course deals with the analysis and modeling of auction which are based on game theory. This also includes aspects of applying and designing auctions as well as experiences with auctions. Main topics are:

- Single- and multi-unit auctions
- Selling and procurement auctions
- Electronic auctions (e.g. eBay, C2C, B2B)
- Multi-attributive auctions.

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

**Literature**

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

## T   Course: Automated Financial Advisory   [T-WIWI-106495]

**Responsibility:**   Maxim Ulrich
**Contained in:**   [M-WIWI-103261] Disruptive FinTech Innovations

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | englisch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2530372 | Automated Financial Advisory | Seminar (S) | 2 | Elmar Jakobs, Maxim Ulrich |
| WS 18/19 | 2500002 | Automated Financial Advisory | Seminar (S) | 2 | Maxim Ulrich |

**Learning Control / Examinations**
The grade consists of a written thesis and an oral presentation.

**Conditions**
There are two conditions for taking this course:

1. This course is only open for registered students of the module "Disruptive FinTech Innovations".
2. Registered students do also attend in the same semester the lecture "Engineering FinTech Solutions" and the programming internship "Computational FinTech with Python and C++".

**Modeled Conditions**
The following conditions must be met:

1. The course [T-WIWI-106193] *Engineering FinTech Solutions* must have been started.
2. The course [T-WIWI-106496] *Computational FinTech with Python and C++* must have been started.


## V   Event excerpt: Automated Financial Advisory (SS 2018)

**Aim**
In this seminar students work on issues related to the automatization of risk and investment management applications.

**Content**
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**
The total workload for this course is approximately 90 hours.

**Literature**
Literature will be distributed during the first lecture.


## V   Event excerpt: Automated Financial Advisory (WS 18/19)

**Aim**
In this seminar students work on issues related to the automatization of risk and investment management applications.

**Content**
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**
The total workload for this course is approximately 90 hours.

**Literature**
Literature will be distributed during the first lecture.

## T Course: Automated Manufacturing Systems [T-MACH-102162]

**Responsibility:** Jürgen Fleischer
**Contained in:** [M-MACH-101298] Automated Manufacturing Systems

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 9 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2150904 | Automated Manufacturing Systems | Vorlesung / Übung (VÜ) | 6 | Jürgen Fleischer |

**Learning Control / Examinations**
written exam (120 minutes)

**Conditions**
"T-MACH-108844 - Automatisierte Produktionsanlagen" must not be commenced.

## V Event excerpt: Automated Manufacturing Systems (SS 2018)

**Aim**
The students . . .

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

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

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

An interdisciplinary view of these subareas enables Industry 4.0 solutions.
In the second part of the lecture, the basics are illustrated using implemented manufacturing processes for the production of automotive components (chassis and drive technology). The analysis of automated manufacturing systems for manufacturing of
defined components is also included.
In the field of vehicle power train both, the automated manufacturing process for the production of the conventional internal-combustion engine and the automated manufacturing process for the production of the prospective electric power

train
(electric motor and battery) are considered. In the field of car body, the focus is on the analysis of the process chain for the automated manufacturing of conventional sheet metal body parts, as well as for automated manufacturing of body components made out of
fiber-reinforced plastics.
Within tutorials, the contents from the lecture are advanced and
applied to specific problems and tasks.

**Workload**
**MACH:**
regular attendance: 63 hours
self-study: 177 hours
**WING/TVWL:**
regular attendance: 63 hours
self-study: 207 hours

**Literature**
Lecture Notes

## T Course: Automation of Discrete Event and Hybrid Systems [T-ETIT-100981]

**Responsibility:** Sören Hohmann
**Contained in:** [M-ETIT-101157] Control Engineering II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2303160 | | Vorlesung (V) | 2 | Mathias Kluwe |

**Conditions**

## T  Course: Automotive Logistics [T-MACH-105165]

**Responsibility:** Kai Furmans
**Contained in:** [M-MACH-101277] Material Flow in Logistic Systems
[M-MACH-101263] Introduction to Logistics
[M-MACH-101280] Logistics in Value Chain Networks
[M-MACH-101282] Global Production and Logistics
[M-MACH-101278] Material Flow in Networked Logistic Systems

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2118085 | Automotive Logistics | Vorlesung (V) | 2 | Kai Furmans |

**Learning Control / Examinations**
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

**Conditions**
none

## V  Event excerpt: Automotive Logistics (SS 2018)

**Aim**
Students are able to:

- Describe essential logistic questions, in a complex production network. As an example the automobile industry is used.
- Choose and apply solution possibilities for logistic problems in this area.

**Content**

- Logistic questions within the automobile industry
- basic model of automobile production and distribution
- relation with the suppliers
- Disposition and physical execution
- Vehicle production in the interaction of shell, paint shop and assembly
- Sequence planning
- Assembly supply
- vehicle distribution and linkage with selling processes
- Physical execution, planning and control

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
None.

## T  Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

**Responsibility:** Gerd Gutekunst, Berthold Wigger
**Contained in:** [M-WIWI-101511] Advanced Topics in Public Finance

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2560134 | Basics of German Company Tax Law and Tax Planning | Vorlesung (V) | 3 | Gerd Gutekunst, Berthold Wigger |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Conditions**
None

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

## T  Course: Basics of Technical Logistics [T-MACH-102163]

**Responsibility:** Martin Mittwollen, Jan Oellerich
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 6 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2117095 | Basics of Technical Logistics | Vorlesung / Übung (VÜ) | 4 | Martin Mittwollen, Jan Oellerich |

**Learning Control / Examinations**
The assessment consists of a written exam (90 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Conditions**
none

## V  Event excerpt: Basics of Technical Logistics (WS 18/19)

**Aim**
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.

**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

**Workload**
presence: 48h
rework: 132h

**Literature**
Recommendations during lessons

## T  Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I [T-MACH-100966]

**Responsibility:** Andreas Guber
**Contained in:** [M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2141864 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I | Vorlesung (V) | 2 | Andreas Guber |

**Learning Control / Examinations**
written exam (75 Min.)

**Conditions**
none

## V  Event excerpt: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (WS 18/19)

**Aim**
The lecture will first address relevant microtechnical manufacturing methods. Then,
selected biomedical applications will be presented, as the increasing use of
microstructures and microsystems in Life-Sciences und in medicine leads to improved medico-technical
products, instruments, and operation and analysis systems.

**Content**
Introduction into various microtechnical manufacturing methods: LIGA, Micro milling, Silicon Micromachining, Laser Microstructuring, μEDM, Metal-Etching
Biomaterials, Sterilisation.
Examples of use in the life science sector: basic micro fluidic strucutures: micro channels, micro filters, micromixers, micropumps, microvalves, Micro and nanotiter plates, Microanalysis systems (μTAS),
Lab-on-chip applications.

**Workload**
Literature: 20 h
Lessions: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

**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   Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]

**Responsibility:**  Andreas Guber
**Contained in:**   [M-MACH-101293] Microsystem Technology
                    [M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142883 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II | Vorlesung (V) | 2 | Andreas Guber |

**Learning Control / Examinations**
Written exam (75 Min.)

**Conditions**
none

## V   Event excerpt: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (SS 2018)

### Aim
The lecture will first shortly address some relevant microtechnical manufacturing methods. Then,
selected biomedical applications will be presented, as the increasing use of
microstructures and microsystems in Life-Sciences und in medicine leads to improved medico-technical
products, instruments, and operation and analysis systems.

### 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

### Workload
Literature: 20 h
Lessions: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

### 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 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III [T-MACH-100968]

**Responsibility:** Andreas Guber
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142879 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III | Vorlesung (V) | 2 | Andreas Guber |

**Learning Control / Examinations**
Written exam (75 Min.)

**Conditions**
none

## V Event excerpt: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (SS 2018)

### Aim
The lecture will first shortly address some relevant microtechnical manufacturing methods. Then, selected biomedical applications will be presented, as the increasing use of microstructures and microsystems in Life-Sciences und in medicine leads to improved medico-technical products, instruments, and operation and analysis systems.

### 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

### Workload
Literature: 20 h
Lessions: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

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

**Responsibility:** Hendrik Hölscher
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101294] Nanotechnology
[M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142140 | Bionics for Engineers and Natural Scientists | Vorlesung (V) | 2 | Christian Greiner, Hendrik Hölscher, Stefan Walheim |

**Learning Control / Examinations**
written or oral exam

**Conditions**
none

## V Event excerpt: Bionics for Engineers and Natural Scientists (SS 2018)

**Aim**
The students should be able analyze, judge, plan and develop biomimetic strategies and products.

**Content**
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.

**Workload**
lectures 30 h
self study 30 h
preparation for examination 30 h

**Literature**
Werner Nachtigall: Bionik – Grundlagen und Beispiele für Ingenieure und Naturwissenschaftler. Springer-Verlag Berlin (2002), 2. Aufl.

## T  Course: Blockchains & Cryptofinance [T-WIWI-108880]

**Responsibility:** Philipp Schuster, Marliese Uhrig-Homburg
**Contained in:** [M-WIWI-101511] Advanced Topics in Public Finance
[M-WIWI-101480] Finance 3
[M-WIWI-101409] Electronic Markets
[M-WIWI-101483] Finance 2
[M-WIWI-101446] Market Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2530567 | Blockchains & Cryptofinance | Vorlesung (V) | 2 | Philipp Schuster, Marliese Uhrig-Homburg |
| WS 18/19 | 2530568 | | Übung (Ü) | 1 | Marcel Müller |

**Learning Control / Examinations**
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations).

**Conditions**
None

**Recommendations**
None

**Remarks**
New course starting winter term 2018/2019.

## V  Event excerpt: Blockchains & Cryptofinance (WS 18/19)

**Aim**
Ziel der Veranstaltung ist es, die Studierenden mit den Grundlagen zu Blochchains und Kryptowährungen vertraut zu machen. Studierende werden in die Lage versetzt, eine einfache Blockchain selbst zu implementieren, Handelsstrategien mit Kryptowährungen umzusetzen und strategische Entscheidungen zur Einführung disruptiver Plattformtechnologien wie der Blockchain im Unternehmenskontext zu treffen.

**Content**
Nach einer Einführung in die krytografischen Grundlagen der Blockchain-Technologie behandelt die Vorlesung die verschiedenen Eigenschaften des Bitcoin-Netzwerkes. Hierbei wird auch auf die unterschiedlichen Akteure (Anwender, Miner, . . . ) und ihre ökonomischen Anreize eingegangen. Im zweiten Teil der Vorlesung wird dann zunächst der Einsatz von Krytowährungen als Geldeinheiten diskutiert, bevor dann auf den Handel mit Kryptowährungen an Börsen sowie auf Bitcoin-Derivate eingegangen wird. Der dritte Teil soll potentielle Anwendungen der Blockchain-Technologie in einem Finanzsystem der Zukunft aufdecken. Zunächst werden dazu die Potentiale von Smart-Contracts diskutiert. Anschließend werden exemplarisch die Abwicklung von Wertpapiertransaktionen über dezentrale Systeme wie die Blockchain sowie Unternehmensfinanzierung über Kryptoassets (Inital Coin Offerings) besprochen.
In der begleitend zur Vorlesung angebotenen Übung werden u.a. eine eigene Blockchain implementiert, Arbitrage-Strategien mit Kryptowährungen analysiert sowie die Einführung disruptiver Plattformtechnologien wie der Blockchain im Unternehmenskontext diskutiert.

**Workload**
Gesamtaufwand bei 4,5 Leistungspunkten: ca. 135.0 Stunden
Präsenzzeit: 30 Stunden
Vor – und Nachbereitung der LV: 45.0 Stunden

Prüfung und Prüfungsvorbereitung: 60.0 Stunden

**Literature**

Narayanan, A.; J. Bonneau; E. Felten; A. Miller; S. Goldfeder (2016): Bitcoin and Crytocurrency Technologies – A Comprehensive Introduction, Princeton University Press.

Schär, F., A. Berentsen (2017): Bitcoin, Blockchain und Kryptoassets: Eine umfassende Einführung, Books on Demand, 1. Auflage.

## T Course: Building Intelligent and Robo-Adviced Portfolios [T-WIWI-106442]

**Responsibility:** Maxim Ulrich
**Contained in:** [M-WIWI-103247] Intelligent Risk and Investment Advisory

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 9 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

No exam in winter semester 2018/2019.

There are two grading schemes. The student will be graded with the scheme that gives him the highest score. Grading Scheme A: 70% of the grade is based on the exam, 30% is based on problem sets and quizzes. Grading Scheme B: 100% of the grade is based on the exam.

The exam tests the material of the current semester and takes place during the lecture-free period. Students who don't pass the exam are allowed to re-take the exam.

**Conditions**

None.

**Recommendations**

Good skills in applied math modeling (differential equations).

**Remarks**

The course is not offered regularly.

## T Course: Building Laws [T-BGU-103429]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction
[M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6241803 | | Vorlesung (V) | 2 | Rainer Kohlhammer, Helmut Johannes Miernik |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Business Administration in Information Engineering and Management [T-WIWI-102886]

**Responsibility:** Andreas Geyer-Schulz
**Contained in:** [M-WIWI-101409] Electronic Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540500 | Business Administration in Information Engineering and Management | Vorlesung (V) | 2 | Andreas Geyer-Schulz |
| SS 2018 | 2540501 | | Übung (Ü) | 1 | Fabian Ball |

**Learning Control / Examinations**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively.

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.

Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

**Conditions**

None

**Recommendations**

Basic knowledge from Operations Research (linear programming) and from decision theory are expected.

## V Event excerpt: Business Administration in Information Engineering and Management (SS 2018)

**Aim**

The student is able to

- transfer models from Business Administration to situations in business whose basic conditions are changed due to the implementation of information and communication technology,
- apply methods from Business Administration (Decision theory, game theory, operations research, etc.) to questions of Information Engineering and Management,

- analyze the potential to automize the decision making process in businesses by data bases,
- describe the process to extract relevant data for decision making from operational accounting systems.

**Content**

In this lecture, classical Business Administration is applied to businesses in an information- and communicationtechnological environment. The process to extract relevant data for decision making from operational accounting systems receives special attention. In order to do so, topics such as activity-based costing and transaction costs models are addressed. The automization of the decision making process in businesses by data bases is another focus of the module. To solve such issues within a company, relevant methods such as decision theory and game theory are lectured. Finally, complex business relevant questions in a dynamically changing environment are adressed by presenting models and methods from system dynamics.

**Workload**

The total workload for this course is approximately 150 hours (5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 40h 00m
- Preparation of the examination: 31h 00m

**Sum: 150h 00m**

**Literature**

- G. Bamberg und A. G. Coenenberg (2006). Betriebswirtschaftliche Entscheidungslehre. (13. edition), chapter 1 - 8, pages 1 - 270.
- Russell, S. and Norvig, P. (1995). Artificial Intelligence: A Modern Approach The Intelligent Agent Book. Prentice-Hall, Upper Saddle River. chapter 2, pages 31 - 37.
- Porter, M. E. (1998a). Competitive Advantage: Creating and Sustaining Superior Performance. The Free Press, New York, 2 edition. chapter 1, pages 1 - 30
- Porter, M. E. (1998b). Competitive Strategy: Techniques for Analyzing Industries and Competitors. The Free Press, New York, 2 edition. chapters 1+2, pages 1 - 46
- Horngren, C. T., Datar, S. M., and Foster, G. (2003). Cost Accounting: A Managerial Emphasis. Prentice-Hall, Upper Saddle River, 11 edition. chapter 13, pages 446 - 460
- Cooper,W.W., Seiford, L. M., and Tone, K. (2000). Data Envelopment Analysis. Kluwer Academic Publishers, Boston. chapter 2, pages 21- 25
- Copeland, T. and Weston, F. (1988). Financial Theory and Corporate Policy. Addison-Wesley, Reading, 3 edition. pages 18 - 41 and chapter 4.E, pages 92 - 95].
- Myerson, R. B. (1997). Game Theory. Harvard University Press, London, 3 edition. pages 99-105.
- Milgrom, P. and Roberts, J. (1992). Economics, Organization and Management. Prentice Hill [Chapter 2, pp. 25-39].

## T  Course: Business and IT Service Management [T-WIWI-102881]

**Responsibility:** Gerhard Satzger
**Contained in:** [M-WIWI-102754] Service Economics and Management
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2595484 | Business and IT Service Management | Vorlesung (V) | 2 | Gerhard Satzger |
| WS 18/19 | 2595485 | | Übung (Ü) | 1 | Tobias Enders, Stefan Seebacher |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min.) (following §4(2), 1 SPOs) and by submitting written papers as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Business and IT Service Management (WS 18/19)

**Aim**
Students understand the importance of "servitization" for organizations, the challenges for the management of service-oriented enterprises and the interdependence of business and IT concepts and practices.
Students learn standard concepts and methods of service-oriented management and are able to apply them in practical case studies.
Student get familiar with current research and tools and are able to critically evaluate them.
Students practice to communicate in English and to work on solutions in teams.

**Content**
The rapid development of information and communication technology transforms many enterprises towards service-oriented structures, comprising new digital services, new business models and SOA-based process structures within larger service networks. Thus, strategic and operative management of service-oriented enterprises increasingly gains importance. In this course, we want to systematically acquire relevant know-how and apply this to real word examples. Focus will be placed on the interdependencies of business, IT aspects and concepts.

The course will be taught in English. It should provide ample opportunity for active participation of students. The course will integrate presentations of experts from business practice as well as a comprehensive case study ('en bloc' for 1-2 days) in which students will actively work on the strategic service-oriented shift of an enterprise.

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.

**Literature**
Fitzsimmons J./Fitzsimmons, M., Service Management, Operations, Strategy and Information Technology, 6. ed., 2007
Maister, David H., Managing The Professional Service Firm, 1997
Teboul, J. , Service is Front Stage: Positioning services for value advantage, 2006
Grönroos, Service Management and Marketing, 2007
Cardoso et al. (Hrsg.) (2015), Fundamentalson Service Systems

Böhmann et al. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79

Vargo, S./Lusch, R. (2004) Evolving to a New Dominant Logic for Marketing, in: JoM68 (1),1–17

Schüritz et al., (2017):Datatizationas the Next Frontier of Servitization,ICIS Proceedings

## T  Course: Business Dynamics [T-WIWI-102762]

**Responsibility:** Andreas Geyer-Schulz
**Contained in:** [M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101409] Electronic Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2540531 | Business Dynamics | Vorlesung (V) | 2 | Andreas Geyer-Schulz, Paul Glenn |
| WS 18/19 | 2540532 | Exercise Business Dynamics | Übung (Ü) | 1 | Andreas Geyer-Schulz, Paul Glenn |

**Learning Control / Examinations**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively.
The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Business Dynamics (WS 18/19)

**Aim**
Students

- aquire the system thinking worldview for economics
- utilize different methods and tools to map the structure of complex economic systems
- are able to relate dynamic effects to these structures
- learn how to simulate systems within the computer for testing purposes

- use simulation results to improve models
- can independently as well as in teams model, analyze, and optimize business processes and applications
- know how to offer business dynamics as a consulting service and work together with client teams

**Content**

Corporate growth, the diffusion of new technologies, business processes, project management, product development, service quality management – all these are examples for application areas of business dynamics. They all are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics such systems can be modelled. Simulations of complex systems allow the analysis, the goal centered design, as well as the optimization of markets, business processes, policies, and organizations.

**Workload**

The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

**Sum: 135h 00m**

**Literature**

John D. Sterman. Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, 2000.

## T  Course: Business Intelligence Systems [T-WIWI-105777]

**Responsibility:** Alexander Mädche, Mario Nadj, Peyman Toreini
**Contained in:** [M-WIWI-101506] Service Analytics
[M-WIWI-104068] Information Systems in Organizations
[M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2540422 | Business Intelligence Systems | Vorlesung (V) | 2 + 1 | Alexander Mädche, Mario Nadj |

**Learning Control / Examinations**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and the Business Intelligence System challenge (40%). The exam and the Business Intelligence System challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Business Intelligence System challenge.

**Conditions**
None

**Recommendations**
Basic knowledge on database systems is helpful.

## V  Event excerpt: Business Intelligence Systems (WS 18/19)

**Aim**
The students
- understand the theoretical foundations of key Business Intelligence concepts supporting decision making
- explore key capabilities of state-of-the-art Business Intelligence systems
- learn how to successfully implement and run Business Intelligence systems from multiple perspectives, e.g. architecture, governance, implementation projects, post-implementation management
- get hands-on experience by working with commercial Business Intelligence systems (SAP HANA and reporting clients) with real-world data

**Content**
· Conceptual Foundations
· Provisioning: ETL Process, Metadata, Data Warehouse & Data Marts and Big Data Technologies
· Consumption: Reporting, Dashboards and its relation to (Big Data) Analytics
· BI Strategy & Governance
· BI Implementation & Post-Implementation Management
· Business Intelligence System Challenge (in cooperation with industry partner)

**Literature**
Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. "Decision Support and Business Intelligence Systems". Pearson.
Watson, H. J. 2014. "Tutorial: Big Data Analytics: Concepts, Technologies, and Applications," Communications of the Association for Information Systems (34), p. 24.
Arnott, D., and Pervan, G. 2014. "A critical analysis of decision support systems research revisited: The rise of design science," Journal of Information Technology (29:4), Nature Publishing Group, pp. 269–293 (doi: 10.1057/jit.2014.16).
Carlo, V. (2009). "Business intelligence: data mining and optimization for decision making". Editorial John Wiley and Sons, 308-317.

Chen, H., Chiang, R. H. L, and Storey, V. C. 2012. „Business Intelligence and Analytics: From Big Data to Big Impact,“ MIS Quarterly (36:4), pp. 1165-1188.

Davenport, T. 2014. Big Data @ Work, Boston, MA: Harvard Business Review.

Economist Intelligence Unit. 2015 "Big data evolution: Forging new corporate capabilities for the long term"

Power, D. J. 2008. "Decision Support Systems: A Historical Overview," Handbook on Decision Support Systems, pp. 121–140 (doi: 10.1007/978-3-540-48713-5_7).

Sharma, R., Mithras, S., and Kankanhalli, A. 2014. „Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations,“ European Journal of Information Systems (23:4), pp. 433-441.

Silver, M. S. 1991. "Decisional Guidance for Computer-Based Decision Support," MIS Quarterly (15:1), pp. 105-122.

## T Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

**Responsibility:** Timm Teubner
**Contained in:** [M-WIWI-102806] Service Innovation, Design & Engineering
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-WIWI-101410] Business & Service Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540456 | Internet Business Models | Vorlesung (V) | 2 | Florian Hawlitschek, Christof Weinhardt |
| SS 2018 | 2540457 | | Übung (Ü) | 1 | Florian Hawlitschek |

**Learning Control / Examinations**

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015). 50% of the final grade is based on the written exam and 50% is based on assignments from the exercises. Successful completion of the exercises is a prerequisite for admission to the written exam. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

**Conditions**

None

**Recommendations**

None

## V Event excerpt: Internet Business Models (SS 2018)

**Aim**

The student

- is able to list the most important features of web application lifecycles,
- analyses, designs and implements web applications,
- evaluates and argues internet business models with special requirements and features,
- is able to estimate the practicability of business models.

**Content**

The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.

**Workload**

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

**Literature**

Will be announced within the course.

## T Course: Business Planning [T-WIWI-102865]

**Responsibility:** Orestis Terzidis
**Contained in:** [M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2545005 | | Seminar (S) | 2 | Ralph Henn, Orestis Terzidis |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
None

**Recommendations**
None

## V Event excerpt: (SS 2018)

### Aim
Students will learn methods on how to turn patents as well as business ideas into a solid business model and furthermore to develop them into a concrete Business Plan.

### Literature
Osterwalter, Alexander, Pigneur, Yves (2010): Business Model Generation
McKinsey & Company (2010): Planen, gründen, wachsen.

## T   Course: Business Process Modelling [T-WIWI-102697]

**Responsibility:** Andreas Oberweis
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2511210 | Business Process Modelling | Vorlesung (V) | 2 | Andreas Drescher, Andreas Oberweis |
| WS 18/19 | 2511211 | | Übung (Ü) | 1 | Andreas Drescher, Agnes Koschmider |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Conditions**
None

## V   Event excerpt: Business Process Modelling (WS 18/19)

**Aim**
Students

- describe goals of business process modeling and aplly different modeling languages,
- choose the appropriate modeling language according to a given context,
- use suitable tools for modeling business processes,
- apply methods for analysing and assessing process modells to evaluate specific quality characteristics of the process model.

**Content**
The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

**Workload**
Lecture 30h
Exercise 15h


Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h


Total: 150h

**Literature**

- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karl: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.

Further Literature will be given in the lecture.

## T   Course: Business Strategies of Banks [T-WIWI-102626]

**Responsibility:** Wolfgang Müller
**Contained in:** [M-WIWI-101480] Finance 3
              [M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2530299 | Business Strategies of Banks | Vorlesung (V) | 2 | Wolfgang Müller |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Recommendations**
None

## V   Event excerpt: Business Strategies of Banks (WS 18/19)

**Aim**
Students are are in a position to discuss the principles of commercial banking. They are familiar with fundamental concepts of bank management and are able to apply them.

**Content**
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.

The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
**Elective literature:**

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer

## T  Course: Case Studies in Sales and Pricing [T-WIWI-102834]

**Responsibility:** Martin Klarmann
**Contained in:** [M-WIWI-101487] Sales Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | deutsch/englisch | Jedes Wintersemester | Prüfungsleistung anderer Art | 3 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2572182 | Case Studies in Sales and Pricing | Block (B) | 1 | Assistenten, Martin Klarmann |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a group presentation with a subsequent round of questions totalling 30 minutes.

**Conditions**
None

**Recommendations**
None

**Remarks**
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing &amp;amp; Sales (marketing.iism.kit.edu).
Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).
Please note that only one of the 1.5-ECTS courses can be attended in this module.

## V  Event excerpt: Case Studies in Sales and Pricing (WS 18/19)

**Aim**
Students

- are able to work on a case study in the field of sales and pricing on their own
- are able to apply quantitative calculations on a case study in the field of sales and pricing
- are able to collect information and data beyond the case study description and make use of them for solving their tasks
- are able to apply theories from related lectures to a practical example
- are able to present their results in a a structured and concise manner
- are able to organize their teamwork and collaborate in teams

**Content**
Students work in groups on case studies from the field of sales and pricing. The case studies contain quantitative calculations in the context of sales and pricing as well as tasks which are to be solved by logical reasoning. When solving the case studies, theoretical sales and pricing content is applied to practical problems. Finally, the results are presented by the group and discussed.

**Workload**
Total work load for 1.5 ECTS: ca. 45 hours

**Literature**
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

## T Course: Case Studies Seminar: Innovation Management [T-WIWI-102852]

**Responsibility:** Marion Weissenberger-Eibl
**Contained in:** [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2545105 | Case studies seminar: Innovation management | Seminar (S) | 2 | Marion Weissenberger-Eibl |

**Learning Control / Examinations**

Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**

None

**Recommendations**

Prior attendance of the course *Innovation Management* [2545015] is recommended.

## V Event excerpt: Case studies seminar: Innovation management (WS 18/19)

**Aim**

The students

- look critically into current research topics in the field of Innovation Managament
- do literature search based on a given topic, identify relevant literature and evaluate this literature,
- give presentations in a scientific context in front of an auditorium to present the results of the research,
- train their presentation skills,
- present results of the research in a seminar thesis as a scientific publication.

**Content**

The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the automotive industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course.

A short introduction to presentation techniques is planned to help students prepare the seminar papers.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

## T Course: CATIA CAD Training Course [T-MACH-102185]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 2 | deutsch | Jedes Semester | Studienleistung | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2123358 | CATIA CAD training course | Praktikum (P) | 3 | Mitarbeiter, Jivka Ovtcharova |
| WS 18/19 | 2123358 | CATIA CAD training course | Praktikum (P) | 2 | Mitarbeiter, Jivka Ovtcharova |

**Learning Control / Examinations**
Practical examination on CAD computer, duration: 60 min.

**Conditions**
None

**Recommendations**
Dealing with technical drawings is required.

**Remarks**
For the practical course attendance is compulsory.

## V Event excerpt: CATIA CAD training course (WS 18/19)

**Aim**
Students are able to:

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

**Content**
The participant will learn the following knowledge:

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

**Workload**
Regular attendance: 35 hours,
self-study: 12 hours

**Literature**
practical course skript

## T  Course: Challenges in Supply Chain Management [T-WIWI-102872]

**Responsibility:** Esther Mohr
**Contained in:** [M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550494 | Challenges in Supply Chain Management | Vorlesung (V) | 3 | Esther Mohr |

**Learning Control / Examinations**
The assessment consists of a written paper and an oral exam of ca. 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

**Conditions**
None

**Recommendations**
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

**Remarks**
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course. The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

## V  Event excerpt: Challenges in Supply Chain Management (SS 2018)

**Aim**
The student

- analyzes and evaluates current developments and approaches in the design and planning of supply chain strategis, especially with respect to future challenges in this area,
- explains and utilizes theoretical concepts and methods for the design and strategy of supply chains,
- - classifies and accounts for trend-setting theories in the SCM context such as Behavioral Supply Chain Management or Supply Chain Analytics.

**Content**
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / "Internet of Everything in production", supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

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

**Literature**
To be defined depending on the topic.

## T  Course: Characteristics of Transportation Systems [T-BGU-106609]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232806 | | Vorlesung (V) | 2 | Peter Vortisch |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T   Course: Combustion Engines I [T-MACH-102194]

**Responsibility:** Thomas Koch, Heiko Kubach
**Contained in:** [M-MACH-101275] Combustion Engines I

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2133113 | Combustion Engines I | Vorlesung / Übung (VÜ) | 4 | Thomas Koch |

**Learning Control / Examinations**
oral examination, Duration: 25 min., no auxiliary means

**Conditions**
none

## V   Event excerpt: Combustion Engines I (WS 18/19)

**Aim**
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.

**Content**
Introduction, History, Concepts
Working Principle and Termodynamics
Characteristic Parameters
Air Path
Fuel Path
Energy Conversion
Fuels
Emissions
Exhaust Gas Aftertreatment

**Workload**
regular attendance: 32 hours
self-study: 88 hours

# T  Course: Combustion Engines II [T-MACH-104609]

**Responsibility:**  Rainer Koch, Heiko Kubach
**Contained in:**  [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

## Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2134151 | Combustion Engines II | Vorlesung  /  Übung (VÜ) | 3 | Thomas Koch |

**Learning Control / Examinations**
oral examination, duration: 25 minutes, no auxiliary means

**Conditions**
none

**Recommendations**
Fundamentals of Combustion Engines I helpful

# V  Event excerpt: Combustion Engines II (SS 2018)

**Aim**
The students deepen and complement their knowledgement from the lecture combustion engines A. they can name and explain construction elements, development tools and latest development trends. They are be able to analyse and evaluate powertrain concepts which are subject of the lecture.

**Content**
Emissions
Fuels
Drive Train Dynamics
Engine Parts
Boosting
Alternative Powertrain Concepts


Special Engine Concepts


Power Transmission

**Workload**
regular attendance: 31,5 hours
self-study: 90 hours

# T Course: Communication Systems and Protocols [T-ETIT-101938]

**Responsibility:** Jürgen Becker
**Contained in:** [M-MACH-101295] Optoelectronics and Optical Communication

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

## Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2311616 | Communication Systems and Protocols | Vorlesung (V) | 2 | Jens Becker, Jürgen Becker |
| SS 2018 | 2311618 | | Übung (Ü) | 1 | Anantharajaiah Nidhi |

**Conditions**

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

**Responsibility:** Kay Mitusch
**Contained in:** [M-WIWI-101406] Network Economics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2561204 | Competition in Networks | Vorlesung (V) | 2 | Kay Mitusch |
| WS 18/19 | 2561205 | | Übung (Ü) | 1 | Christina Wisotzky |

### Learning Control / Examinations

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.

### Recommendations

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

## V Event excerpt: Competition in Networks (WS 18/19)

### Aim
**Bachelor**
The Students

- will use their basic knowledge of microeconomic in a problem-oriented way and learn to apply theoretical instruments to practical issues.

- will have a vivid idea of economics characteristics and basic questions of network industries as telecom, utilities and transport sectors

- understand the special characteristics of network industries regarding the cost situation and competitive conditions

**Master**
The Students

- will know the basic understanding of network industries concerning competition, competitive distortion, state intervention, pricing and financing

- will know the special characteristics of network industries like telecom, utilities, IT and transport sectors

- will be able to apply and adjust abstract concepts and formal methods to these fields

### Content

Anknüpfend an die Mikroökonomie im Grundstudium (VWL 1) wird zunächst das "partialökonomische Modell" dargestellt, welches der adäquate Analyserahmen für die Industrieökonomik und viele wirtschaftspolitische Anwendungen ist. Sodann wird der für die Netzwerkökonomie zentrale Begriff der Kostensubadditivität (bzw. natürliches Monopol) dargestellt und in seinen Implikationen diskutiert. Weitere Themen: vertikale Beziehungen in Netzsektoren, Verkehrsmodellierung, Preise in Stromnetzen und Prinzipien der Infrastrukturfinanzierung nach Ramsey und Shapley.

### Workload

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

### Literature

Will be announced in the lecture.

## T  Course: Computational Economics [T-WIWI-102680]

**Responsibility:** Pradyumn Kumar Shukla
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2590458 | Computational Economics | Vorlesung (V) | 2 | Pradyumn Kumar Shukla |
| WS 18/19 | 2590459 | | Übung (Ü) | 1 | Pradyumn Kumar Shukla |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The bonus only applies to the first and second exam of the semester in which it was obtained.

**Conditions**
None

**Remarks**
The credits have been changed to 5 starting summer term 2016.

## V  Event excerpt: Computational Economics (WS 18/19)

**Aim**
The student

- understands the methods of Computational Economics and applies them on practical issues,
- evaluates agent models considering bounded rational behaviour and learning algorithms,
- analyses agent models based on mathematical basics,
- knows the benefits and disadvantages of the different models and how to use them,
- examines and argues the results of a simulation with adequate statistical methods,
- is able to support the chosen solutions with arguments and can explain them.

**Content**
Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

**Literature**

- R. Axelrod: "Advancing the art of simulation in social sciences". R. Conte u.a., Simulating Social Phenomena, Springer, S. 21-40, 1997.

- R. Axtel: "Why agents? On the varied motivations for agent computing in the social sciences". CSED Working Paper No. 17, The Brookings Institution, 2000.
- K. Judd: "Numerical Methods in Economics". MIT Press, 1998, Kapitel 6-7.
- A. M. Law and W. D. Kelton: "Simulation Modeling and Analysis", McGraw-Hill, 2000.
- R. Sargent: "Simulation model verification and validation". Winter Simulation Conference, 1991.
- L. Tesfation: "Notes on Learning", Technical Report, 2004.
- L. Tesfatsion: "Agent-based computational economics". ISU Technical Report, 2003.

**Elective literature:**

- Amman, H., Kendrick, D., Rust, J.: "Handbook of Computational Economics". Volume 1, Elsevier North-Holland, 1996.
- Tesfatsion, L., Judd, K.L.: "Handbook of Computational Economics". Volume 2: Agent-Based Computational Economics, Elsevier North-Holland, 2006.
- Marimon, R., Scott, A.: "Computational Methods for the Study of Dynamic Economies". Oxford University Press, 1999.
- Gilbert, N., Troitzsch, K.: "Simulation for the Social Scientist". Open University Press, 1999.

## T  Course: Computational FinTech with Python and C++ [T-WIWI-106496]

**Responsibility:**
**Contained in:**     [M-WIWI-103261] Disruptive FinTech Innovations

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 1.5 | englisch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2530373 | Computational FinTech with Python and C++ | Praktikum (P) | 1,5 | Elmar Jakobs, Maxim Ulrich |
| WS 18/19 | 2500003 | Computational FinTech with Python and C++ | Praktikum (P) | 1,5 | Maxim Ulrich |

**Learning Control / Examinations**
The grade is based on a larger or several smaller programming exercises.

**Conditions**
There are two conditions for taking this course:

1. This course is only open for registered students of the module "Disruptive FinTech Innovations".
2. Registered students do also attend in the same semester the lecture "Engineering FinTech Solutions" and the seminar "Automated Financial Advisory".

**Modeled Conditions**
The following conditions must be met:

1. The course [T-WIWI-106193] *Engineering FinTech Solutions* must have been started.
2. The course [T-WIWI-106495] *Automated Financial Advisory*  must have been started.

## V  Event excerpt: Computational FinTech with Python and C++ (WS 18/19)

**Aim**
Implementation of different programming specific concepts and skills.

**Content**
At the beginning of the semester, each student receives a personalized set of programming tasks .

**Workload**
Roughly 45 hours.

## V  Event excerpt: Computational FinTech with Python and C++ (SS 2018)

**Aim**
Implementation of different programming specific concepts and skills.

**Content**
At the beginning of the semester, each student receives a personalized set of programming tasks .

**Workload**
Roughly 45 hours.

## T Course: Computational Risk and Asset Management I [T-WIWI-107032]

**Responsibility:**  Maxim Ulrich
**Contained in:**  [M-WIWI-103247] Intelligent Risk and Investment Advisory

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

No exam in winter semester 2018/2019.

The grade consists of an exam and seven problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

**Conditions**

None.

**Recommendations**

None

## T Course: Computational Risk and Asset Management II [T-WIWI-106494]

**Responsibility:** Maxim Ulrich
**Contained in:** [M-WIWI-103247] Intelligent Risk and Investment Advisory

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
No exam in winter term 2018/2019.
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and 6 problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

**Conditions**
None.

**Recommendations**
It is recommend that students have studied the material of „Computational Risk and Asset Management I".

**Remarks**
New course starting winter term 2017/2018.

## T  Course: Computer Aided Data Analysis [T-GEISTSOZ-104565]

**Responsibility:** Gerd Nollmann
**Contained in:** [M-GEISTSOZ-101169] Sociology

| ECTS | Exam type | Version |
|------|-----------|---------|
| 0 | Studienleistung | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 5011009 | | Kurs (Ku) | 2 | Gerd Nollmann |

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

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2411604 | Computer Contract Law | Vorlesung (V) | 2 | Michael Bartsch, Philipp Harnischmacher |

## V Event excerpt: Computer Contract Law (WS 18/19)

**Aim**

Ziel der Vorlesung ist es, den Studenten aufbauend auf bereits vorhandenen Kenntnissen zum Schutz von Software als Immaterialgut vertiefte Einblicke in die Vertragsgestaltung in der Praxis zu verschaffen. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den technischen Merkmalen des Vertragsgegenstandes und dem rechtlichen Regelungsrahmen erkennen. Die Entwurfsarbeiten sollen aufbauend auf Vorbereitungen seitens der Studenten in den Vorlesungsstunden gemeinsam erfolgen. Lernziel ist es, später selbst Verträge erstellen zu können.

**Content**

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

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

**Literature**

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

**Elective Literature**

tba in the transparencies

## T  Course: Construction Equipment [T-BGU-101845]

**Responsibility:** Sascha Gentes
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6243701 | | Vorlesung (V) | 2 | Günther Dörfler, Sascha Gentes |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Control of Linear Multivariable Systems [T-ETIT-100666]

**Responsibility:** Sören Hohmann
**Contained in:** [M-ETIT-101157] Control Engineering II

| ECTS | Language | Recurrence | Exam type | Version |
|---|---|---|---|---|
| 6 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2303177 | Control of Linear Multivariable Systems | Vorlesung (V) | 3 | Mathias Kluwe |
| WS 18/19 | 2303179 | | Übung (Ü) | 1 | Florian Köpf |

### Conditions

## T Course: Control Technology [T-MACH-105185]

**Responsibility:** Christoph Gönnheimer
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|-----------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2150683 | Control Technology | Vorlesung (V) | 2 | Christoph Gönnheimer |

**Learning Control / Examinations**
Oral Exam (20 min)

**Conditions**
none

## V Event excerpt: Control Technology (SS 2018)

**Aim**
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.

**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
- Process control systems
- Field bus
- Trends in the area of control technology

**Workload**
regular attendance: 21 hours
self-study: 99 hours

## T Course: Convex Analysis [T-WIWI-102856]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

**Conditions**
None

**Recommendations**
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

**Remarks**
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

## T  Course: Copyright [T-INFO-101308]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 24121 | Copyright | Vorlesung (V) | 2 | Thomas Dreier |

## V  Event excerpt: Copyright (WS 18/19)

**Aim**

Der/die Studierende hat vertiefte Kenntnisse auf dem Gebiet des Urheberrechts. Er/sie erkennt die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen, den informations- und kommunikationstechnischen Rahmenbedingungen und dem rechtlichen Regelungsrahmen. Er/sie kennt die Regelungen des nationalen, europäischen und internationalen Urheberrechts und kann sie auf praktische Sachverhalte anwenden.

**Content**

Die Vorlesung befasst sich mit den urheberrechtlich geschützten Werken, den Rechten der Urheber, dem Rechtsverkehr, den urheberrechtlichen Schrankenbestimmungen, der Dauer, den verwandten Schutzrechten, der Rechtsdurchsetzung und der kollektiven Rechtewahrnehmung. Gegenstand der Vorlesung ist nicht allein das deutsche, sondern auch das europäische und das internationale Urheberrecht. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen, den informations- und kommunikationstechnischen Rahmenbedingungen und dem rechtlichen Regelungsrahmen erkennen. Sie sollen die Regelungen des nationalen, europäischen und internationalen Urheberrechts kennen lernen und auf praktische Sachverhalte anwenden können.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt 90 h, davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

**Literature**

Schulze, Gernot: "Meine Rechte als Urheber", Verlag C.H.Beck, aktuelle Auflage
**Weiterführende Literatur**
Ergänzende Literatur wird in den Vorlesungsfolien angegeben.

## T   Course: Corporate Compliance [T-INFO-101288]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101242] Governance, Risk & Compliance

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2400087 | Corporate Compliance | Vorlesung (V) | 2 | Andreas Herzig |

## V   Event excerpt: Corporate Compliance (WS 18/19)

**Aim**

Der/die Studierende hat vertiefte Kenntnisse hinsichtlich der Thematik "Governance, Risk & Compliance" sowohl im Hinblick auf die regulatorischen als auch im Hinblick auf die betriebswirtschaftlichen Rahmenbedingungen sowie ein profundes Verständnis für die Notwendigkeit dieser Systeme. Er/sie kennt die nationalen, europäischen und internationalen Regularien und kann sie anwenden. Der/die Studierende ist in der Lage, praxisrelevante Sachverhalte selbstständig zu analysieren, zu bewerten und in den Kontext einzuordnen.

**Content**

Die Vorlesung beinhaltet die theoretische wie anwendungsorientierte Einbettung der Thematik in den Kontext der regulatorischen Rahmenbedingungen auf nationaler, internationaler sowie auf EU-Ebene. Ein umfassender Überblick wird durch die Betrachtung der Haftungsaspekte, der Prüfungsstandards, des Compliance-Management-Systems, des Risikomanagementsystems, Assessment-Methodiken, des Umgangs mit Verstößen sowie der Berücksichtigung der Thematik bei Vorstand und Aufsichtsratssitzungen erzielt. Zusätzlich werden praxisrelevante Ansätze und "Best-Practice"-Leitfäden vorgestellt, sowie Beispiele der Wirtschafts- und Unternehmenskriminalität erläutert. Die Studenten sollen die genannten GRC-Systeme modellieren, bewerten und auf ihre Wirksamkeit hin prüfen können.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden, davon 30 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie15 h für die Klausurvorbereitung

## T  Course: Corporate Financial Policy [T-WIWI-102622]

**Responsibility:** Martin Ruckes
**Contained in:** [M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530214 | Corporate Financial Policy | Vorlesung (V) | 2 | Martin Ruckes |
| SS 2018 | 2530215 | | Übung (Ü) | 2 | Daniel Hoang, Martin Ruckes |

**Learning Control / Examinations**
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

**Conditions**
None

## V  Event excerpt: Corporate Financial Policy (SS 2018)

**Aim**
Students

- are in a position to explain the importance of informational frictions for the financing of firms,
- are able to evaluate financing contracts with respect to their incentive effects,
- are able to analyse financing contracts with respect to their information they provide to outsiders,
- are in a position to derive optimal financing contracts in prototypical situations,
- are able to discuss the financial determinants of corporate distribution policy.

**Content**
Topics:

- Corporate financing: Some stylized facts
- Financing capacity
- Determination of outside financing
- Liquidity management: Maturity choice
- Cash flows with hidden characteristics
- Cash flows and product markets: Strategic financial structure choice
- Investor activism
- Takeovers

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

**Literature**
**Elective Literature**
Tirole, J. (2006): The Theory of Corporate Finance. Princeton University Press.

## T   Course: Corporate Risk Management [T-WIWI-109050]

**Responsibility:**   Martin Ruckes
**Contained in:**   [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|-----------|-----------|---------|
| 3 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2530214 | Corporate Risk Management | Vorlesung / Übung (VÜ) | 2 | Daniel Hoang, Martin Ruckes |

**Learning Control / Examinations**
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.

**Conditions**
None

**Recommendations**
None

**Remarks**
The course is offered as a block course in the winter term.

## V   Event excerpt: Corporate Risk Management (WS 18/19)

**Aim**
Students

- are able to explain the importance of risk management for the success of firms,
- are able to identify suitable risk measures for companies,
- can derive measures for the risk reduction of firms
- and are able to develop suitable concepts for the organizational structure of risk management in firms.

**Content**

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

**Workload**
The total workload of this course is approximately 90.0 hours. For further information, see German version.

**Literature**

- Friberg, Richard. *Managing Risk and Uncertainty: A Strategic Approach*. Cambridge, MA: Managing Risk and Uncertainty, 2015.
- Stulz, René M. *Risk Management & Derivatives.* Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The New Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006

## T  Course: Country Manager Simulation [T-WIWI-106137]

**Responsibility:** Sven Feurer
**Contained in:** [M-WIWI-101487] Sales Management
[M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | englisch | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2572172 | Country Manager Simulation | Block (B) | | Sven Feurer |

**Learning Control / Examinations**
Alternative exam assessment (30 minutes presentation) according to § 4 paragraph 2 Nr. 3 of the examination regulation SPO 2015.

**Remarks**
The course language is English. In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
Please note that only one of the 1.5-ECTS courses can be chosen in this Module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

## V  Event excerpt: Country Manager Simulation (WS 18/19)

**Aim**
Students...

- ... understand what makes marketing and sales special in an international context (role of culture, international buyer behavior, strategic market entry decisions, international marketing mix management)
- ... are able to analyze relevant country, customer and competitor information and derive a suitable market entry strategy
- ... understand important concepts of international sales and are able to apply these in the realm of the simulation
- ... are capable of re-evaluating and adapting their strategy on the basis of changes in the market environment
- ... are able to critically evaluate the success of the chosen strategy and present the results in front of the class

**Content**
Understanding Culture
Understanding International Buyer Behavior
Market Entry Decisions
International Marketing and Sales Management (adaptation vs. differentiation)

**Workload**
Total workload for 1.5 ECTS: ca. 45 hours

**Literature**
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

## T  Course: Credit Risk [T-WIWI-102645]

**Responsibility:**  Marliese Uhrig-Homburg
**Contained in:**  [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2530565 | Credit Risk | Vorlesung / Übung (VÜ) | 3 | Michael Hofmann, Marliese Uhrig-Homburg |

**Learning Control / Examinations**
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date.

**Conditions**
None

**Recommendations**
See German version.

**Remarks**
See German version.

## V  Event excerpt: Credit Risk (WS 18/19)

**Aim**
The objective of this course is to become familiar with the credit markets and the credit risk indicators like ratings, default probabilities and credit spreads. The students learn about the components of credit risk (e.g. default time and default rate) and quantify these in different theoretical models to price credit derivatives.

**Content**
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

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

**Literature**

- Lando, D., Credit risk modeling: Theory and Applications, Princeton Univ. Press, (2004).
- Uhrig-Homburg, M., Fremdkapitalkosten, Bonitätsrisiken und optimale Kapitalstruktur, Beiträge zur betriebswirtschaftlichen Forschung 92, Gabler Verlag, (2001).

**Elective literature:**

- Bluhm, C., Overbeck, L., Wagner, C. , Introduction to Credit Risk Modelling, 2nd Edition, Chapman & Hall, CRC Financial Mathematics Series, (2010).
- Duffie, D., Singleton, K.J., Credit Risk: Pricing, Measurement and Management, Princeton Series of Finance, Prentice Hall, (2003).

## T    Course: Critical Information Infrastructures [T-WIWI-109248]

**Responsibility:** Ali Sunyaev
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch/englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511400 | | Vorlesung (V) | 2 | Ali Sunyaev |
| WS 18/19 | 2511401 | | Übung (Ü) | 1 | Ali Sunyaev |

**Learning Control / Examinations**
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

**Conditions**
None.

**Remarks**
New lecture from winter semester 2018/2019.

## V    Event excerpt:   (WS 18/19)

**Aim**
Students know concepts and technologies relevant for the design and reliable operation of critical information infrastructures and can leverage them to develop solutions for real-world challenges.

**T** **Course: Current Issues in Innovation Management [T-WIWI-102873]**

**Responsibility:** Marion Weissenberger-Eibl
**Contained in:** [M-WIWI-101507] Innovation Management

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Unregelmäßig | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**
Non exam assessment (following §4(2) 3 of the examination regulation).

**Conditions**
None

**Recommendations**
None

**Remarks**
Please note that the seminars we offer vary from semester to semester. Information about the currently offered seminars can be found in the Wiwi-Portal and on the iTM Website.

## T Course: Current Issues in the Insurance Industry [T-WIWI-102637]

**Responsibility:** Wolf-Rüdiger Heilmann
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 2 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The exam is offered latest in summer term 2016.
The assessment consists of a 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.

**Conditions**
None

**Recommendations**
For the understanding of this course knowledge of *Private and Social Insurance* [2530050] is required.

**Remarks**
Block course. For organizational reasons, please register with the secretay of the chair: thomas.mueller3@kit.edu.

## T  Course: Current Topics on BioMEMS [T-MACH-102176]

**Responsibility:**  Andreas Guber
**Contained in:**  [M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2143873 | Actual topics of BioMEMS | Seminar (S) | 2 | Andreas Guber |
| WS 18/19 | 2143873 | Actual topics of BioMEMS | Seminar (S) | 2 | Andreas Guber |

**Learning Control / Examinations**
active participation and own presentation (30 Min.)

**Conditions**
none

## V  Event excerpt: Actual topics of BioMEMS (WS 18/19)

**Aim**
Knwolede in the actual activities in bio-medical and biological technologies under the view of micro technology. The student gets an overview on actual examples of new applications in BioMEMS.
After successfull participation of this seminar the student is able to prepare a new topic in BioMEMS and to present it to an audience.

**Workload**
Active participation on the seminary and preparation of an own presentation of a topic in BioMEMS.
Lecture time: 21 h
Preparation: 40 h
Preparation of own preparation: 60 h

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

**Responsibility:** Rheza Nakhaeizadeh
**Contained in:** [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2520375 | | Vorlesung (V) | 2/4 | Rheza Nakhaeizadeh |

### Learning Control / Examinations

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

### Conditions

None

## V | Event excerpt: (SS 2018)

**Aim**
**After completing of the course the students:**

- know the definition of Data Mining
- are familiar with the CRISP-DM
- are Familiar with at least six important Data Mining Tasks
- can recognize whether a given problem can be formulated as a data mining problem
- are familiar with the most important Data Mining Algorithms like Decision Tree, K-Means, Artificial Neural Networks, Association Rules, Regression Analysis
- are familiar with evaluation of DM-algorithms
- will be able to use a DM-Tool

**Content**
Part one: Data Mining
Why Data Mining?

- What is Data Mining?
- History of Data Mining
- Conferences and Journals on Data Mining
- Potential Applications
- Data Mining Process:
- Business Understanding
- Data Understanding
- Data Preparation
- Modeling
- Evaluation
- Deployment
- Interdisciplinary aspects of Data Mining
- Data Mining tasks

- Data Mining Algorithms (Decision Trees, Association Rules,
- Regression, Clustering, Neural Networks)
- Fuzzy Mining
- OLAP and Data Warehouse
- Data Mining Tools
- Trends in Data Mining

Part two: Examples of application of Data Mining

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

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.

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

- Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
- David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000
- Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.
- Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367
- Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.
- Ian witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070, 2005.

## T  Course: Data Protection by Design [T-INFO-108405]

**Responsibility:** Oliver Raabe
**Contained in:** [M-INFO-101242] Governance, Risk & Compliance

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2400065 | Data protection by design | Vorlesung (V) | 2 | Oliver Raabe |
| WS 18/19 | 2400052 | Data protection by design | Vorlesung (V) | 2 | Oliver Raabe |

## V  Event excerpt: Data protection by design (SS 2018)

**Aim**

Die Studierenden sollen nach der Vorlesung insbesondere die Inhalte und Systematik der technikrechtlichen Regelungen der DSGVO verstehen und auf neue Fallgestaltungen in IKT-Systemen anwenden können.

**Content**

Ab 2018 gilt in der EU einheitlich die Datenschutzgrundverordnung (DSGVO). Diese Regelungen wird für den Bereich der elektronischen Kommunikation durch eine ePrivacy-Verordnung (Regulation on Privacy and Electronic Communications) ergänzt. Im Rahmen der Vorlesung soll das grundrechtlichen Herkommen der Regelungen und das Verständnis für die Systematik der Verordnungen erabreitet werden. Im Mittelpunkt steht aus der Perpsektive von neuen Sachgestaltungen der IKT in verteilten Systemen insbesondere der technikrechtliche Datenschutz und der Risikobegriff der DSGVO. Die Studierenden werden zudem vertieft mit der Methodik rechtswissenschaftlicher Argumentation im Technikrecht vertraut.

**Workload**

ca. 90 h, davon 22,5 h Präsenzzeit

## V  Event excerpt: Data protection by design (WS 18/19)

**Aim**

Die Studierenden sollen nach der Vorlesung insbesondere die Inhalte und Systematik der technikrechtlichen Regelungen der DSGVO verstehen und auf neue Fallgestaltungen in IKT-Systemen anwenden können.

**Content**

Ab 2018 gilt in der EU einheitlich die Datenschutzgrundverordnung (DSGVO). Diese Regelungen wird für den Bereich der elektronischen Kommunikation durch eine ePrivacy-Verordnung (Regulation on Privacy and Electronic Communications) ergänzt. Im Rahmen der Vorlesung soll das grundrechtlichen Herkommen der Regelungen und das Verständnis für die Systematik der Verordnungen erabreitet werden. Im Mittelpunkt steht aus der Perpsektive von neuen Sachgestaltungen der IKT in verteilten Systemen insbesondere der technikrechtliche Datenschutz und der Risikobegriff der DSGVO. Die Studierenden werden zudem vertieft mit der Methodik rechtswissenschaftlicher Argumentation im Technikrecht vertraut.

**Workload**

ca. 90 h, davon 22,5 h Präsenzzeit

## T  Course: Data Protection Law [T-INFO-101303]

**Responsibility:** Nikolaus Marsch
**Contained in:** [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-101217] Public Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 24018 | | Vorlesung (V) | 2 | Nikolaus Marsch |

## V  Event excerpt:  (WS 18/19)

**Aim**

Die Studierenden sollen nach der Vorlesung die unions- und verfassungsrechtlichen Hintergründe, die grundlegenden Strukturprinzipien des Datenschutzrechts und die diese Prinzipien konkretisierenden Regelungen des BDSG, des TKG und des TMG kennen. Sie sollen in der Lage sein, einfache Fälle aus dem Datenschutzrecht zu lösen.

**Content**

Auf der Grundlage der verfassungs- und unionsrechtlichen Hintergründe wird primär das Bundesdatenschutzgesetz behandet. Hier werden die Regelungsgrundsätze (wie Verbotsprinzip, Erforderlichkeit und Zweckbindung), die personenbezogenenen Daten als Regelungsobjekt, die Rechte der Betroffenen sowie die Zulässigkeit der verschiedenen Datenbearbeitungsvorgänge dargelegt. Auch organisatorische Vorschriften, insb. der Datenschutzbeauftragte, werden angesprochen. Zudem befasst sich die Vorlesung mit den bereichsspezifischen Regelungen zum Telekommunikationsdatenschutz sowie zum Datenschutz bei Telemediendiensten.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden (3.0 Credits).

- Präsenzzeit: Besuch der Vorlesung 15 x 90 min = 22 h 30 min
- Vor-/Nachbereitung der Vorlesung 15 x 120 min = 30 h 00 min
- Skript 2 x wiederholen & 2 x 10 h = 20 h 00 min
- Prüfung vorbereiten = 17 h 30 min
- Summe 90 h 00 min

**Literature**

Wird in der Veranstaltung bekannt gegeben.

**Weiterführende Literatur**

Wird in der Veranstaltung bekannt gegeben.

## T  Course: Database Systems and XML [T-WIWI-102661]

**Responsibility:** Andreas Oberweis
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511202 | Database Systems and XML | Vorlesung (V) | 2 | Andreas Oberweis, Gunther Schiefer |
| WS 18/19 | 2511203 | | Übung (Ü) | 1 | Andreas Fritsch, Andreas Oberweis, Gunther Schiefer |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Conditions**
None

## V  Event excerpt: Database Systems and XML (WS 18/19)

**Aim**
Students

- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

**Content**
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

**Workload**
Lecture 30h
Exercise 15h


Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h


Total: 150h

**Literature**

- M. Klettke, H. Meyer: XML & Datenbanken: Konzepte, Sprachen und Systeme. dpunkt.verlag 2003
- H. Schöning: XML und Datenbanken: Konzepte und Systeme. Carl Hanser Verlag 2003
- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- R. Elmasri, S. B. Navathe: Grundlagen der Datenbanksysteme. 2009
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Further literature will be given individually.

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

**Responsibility:** Marliese Uhrig-Homburg
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101482] Finance 1
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530550 | Derivatives | Vorlesung (V) | 2 | Marliese Uhrig-Homburg |
| SS 2018 | 2530551 | | Übung (Ü) | 1 | Stefan Fiesel, Marliese Uhrig-Homburg |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Recommendations**
None

## V   Event excerpt: Derivatives (SS 2018)

**Aim**
The objective of the Derivatives lecture is to become familiar with financial markets, especially derivatives markets. Traded securities and frequently used trading strategies will be introduced. Furthermore the pricing of derivatives will be derived and their use in risk management will be discussed.

**Content**
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

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

**Literature**

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

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

## T  Course: Design Thinking [T-WIWI-102866]

**Responsibility:**  Orestis Terzidis
**Contained in:**  [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2545008 | Design Thinking (Track 1) | Seminar (S) | 2 | Heiko Haller, Julia Jochem, Orestis Terzidis |

**Learning Control / Examinations**
Alternative exam assessments (§4(2), 3 SPO).

**Conditions**
None

**Recommendations**
None

**Remarks**
The seminar content will be published on the website of the institute.

## T  Course: Developing Business Models for the Semantic Web [T-WIWI-102851]

**Responsibility:** Rudi Studer
**Contained in:** [M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
None

**Recommendations**
As a recommendation to attending the seminar, basic knowledge about semantic technologies and concepts should be available. This may be acquired by attending one of the following lectures – Wissensmanagement, Semantic Web Technologies 1, Semantic Web Technologies 2 or by studying related literature. Furthermore the topic entrepreneurship should be of interest.

## T   Course: Digital Health [T-WIWI-109246]

**Responsibility:** Ali Sunyaev
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch/englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511402 | | Vorlesung (V) | 2 | Theresa Kromat, Ali Sunyaev |

**Learning Control / Examinations**
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

**Conditions**
None.

**Remarks**
New lecture from winter semester 2018/2019.

## V   Event excerpt:   (WS 18/19)

**Aim**
Students are able to: (1) know theoretical foundations of various topics in digital health; (2) know current topics in research on digital health; (3) combine theoretical and practical contents of this lecture.

**Workload**
4 ECTS = approx. 120 h.

## T  Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

**Responsibility:** Anja Konhäuser
**Contained in:** [M-WIWI-101487] Sales Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | englisch | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2572176 | Digital Marketing and Sales in B2B | Sonstige (sonst.) | 1 | Anja Konhäuser |

**Learning Control / Examinations**
Alternative exam assessment according to § 4 paragraph 2  Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

**Conditions**
None.

**Remarks**
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu).
Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).
Please note that only one of the 1.5-ECTS courses can be attended in this module.

## V  Event excerpt: Digital Marketing and Sales in B2B (WS 18/19)

**Aim**

- Understand digital marketing and sales approaches for the B2B sector
- Recognise important elements and understand how-to-setup of digital strategies
- Become familiar with the effectiveness and usage of different digital marketing channels
- Understand the effect of digital sales on sales management, customer support and value chain
- Be able to measure and interpret digital KPIs
- Calculate the Return on Investment (RoI) for digital marketing by combining online data with company performance data

**Content**
Learning Sessions:
The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.
Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g. product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).
Presentation Sessions:

After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

**Workload**
time of presentness = 15 hrs.
private study = 30 hrs.

**Literature**
-

## T  Course: Digital Service Design  [T-WIWI-105773]

**Responsibility:** Alexander Mädche
**Contained in:** [M-WIWI-104080] Designing Interactive Information Systems
[M-WIWI-102806] Service Innovation, Design & Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2540420 | Digital Service Design | Vorlesung (V) | 2 | Xuanhui Liu, Alexander Mädche |

**Learning Control / Examinations**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and the Digital Service Design challenge (40%). The exam and the Digital Service Design challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Digital Service Design challenge.

**Conditions**
None

**Recommendations**
None

**Remarks**
The course is held in English.

## V  Event excerpt: Digital Service Design (WS 18/19)

**Aim**
The students

- get a deeper understanding of design in general and specifically understand what digital service design comprises
- can conceptualize and operationalize usability, user experience, service experience, and customer experience
- understand the underlying mechanisms for a successful interplay between individuals, teams, and the organization within the entire digital service lifecycle
- learn the most important digital service design practices & tools
- apply digital service design practices & tools in a real-world scenario

**Content**

- Definition and key concepts of digital service design and related terms
- Introduction to the business and design perspective of a service design project
- The digital service design process from strategy through planning and prototyping to launching the digital service.
- Practice-oriented capstone project focusing on the design of a real-world digital service

**Literature**
Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.
Williams, Kevin, Samir Chatterjee, and Matti Rossi. 2008. "Design of Emerging Digital Services: A Taxonomy." European Journal of Information Systems 17(5): 505–17
Hill, T.P. 1977. "On Goods and Services." The review of income and wealth 23(4): 315–38.

Werder K, Zobel B, Maedche A (2016) PDISC – Towards a Method for Software Product DISCovery. In: Maglyas A, Lamprecht A-L (eds) Softw. Bus. 7th Int. Conf. ICSOB 2016, Ljubljana, Slov. June 13-14, 2016, Proc. Springer International Publishing, Cham, pp 47–62

Pichler R (2016) Strategize: Product Strategy and Product Roadmap Practices for the Digital Age. Pichler Consulting

Liu, X., Werder, K., & Maedche, A. (2016). A Taxonomy of Digital Service Design Techniques. In *Proceedings of the 2016 International Conference on Information Systems*

## T  Course: Digital Transformation and Business Models [T-WIWI-108875]

**Responsibility:** Daniel Jeffrey Koch
**Contained in:** [M-WIWI-101507] Innovation Management

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**

Non exam assessment (following §4(2) 3 of the examination regulation).
The final grade is composed 75% of the grade of the written paper and 25% of the presentation.

**Conditions**

None

**Recommendations**

Prior attendance of the course Innovation Management [2545015] is recommended.

## T  Course: Digital Transformation of Organizations [T-WIWI-106201]

**Responsibility:** Alexander Mädche
**Contained in:** [M-WIWI-102754] Service Economics and Management
[M-WIWI-104068] Information Systems in Organizations
[M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-101410] Business & Service Engineering
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540556 | | Vorlesung (V) | 2 | Dominik Augenstein, Alexander Mädche |

**Learning Control / Examinations**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

Students receive one aggregated grade consisting of a written exam (60%) and case study deliverable (40%). The exam and the case study need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the case study.

**Conditions**

None

**Remarks**

The course will be held in English.

## V  Event excerpt:  (SS 2018)

**Aim**

The students will:

- Get an overview on basic concepts and definitions of information systems and understand key characteristics of IS as a foundation for digitization of business processes, products and services

- Understand important characteristics of software products on which IS are built on

- Learn important concepts and theories in order to successfully execute a digital transformation process

**Content**

- Definition and key concepts of Information Systems

- Introduction of different types of application systems (organizational process & information-centric systems, customer-centric systems, supplier-centric systems and people-centric systems) and their characteristics

- The digital transformation process: The pre-implementation, implementation and post-implementation phase covering facets such as business/IT alignment, packaged software selection, IS implementation projects, as well as adoption & use of IS

- Practice-oriented case study focusing on real-world IS scenarios

**Literature**

Daft, R. L. (2009). Organization theory and design. Cengage learning.

Laudon, K. C. and Laudon, J. P. (2014). Management Information Systems: Managing the Digital Firm, 13th Edition, Pearson.

Sambamurthy, V and Zmud, R. Z. (2012). Guiding the Digital Transformation of Organizations. Legerity Digital Press, ISBN 978-0-9857955-0-4.

## T Course: Digitalization of Products, Services & Production [T-MACH-108491]

**Responsibility:**
**Contained in:**   [M-MACH-101281] Virtual Engineering B
                    [M-MACH-101283] Virtual Engineering A

| ECTS | Language | Recurrence | Version |
|------|----------|------------|---------|
| 4 | deutsch | Jedes Semester | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2122310 | Digitalization of Products, Services & Production | Seminar (S) | 2 | Bernd Pätzold |
| WS 18/19 | 2122310 | Digitalization of Products, Services & Production | Seminar (S) | 2 | Bernd Pätzold |

**Learning Control / Examinations**
Assessment of another type. Two presentations in team work and two written compositions. Grading: each composition 1/6 and each presentation 2/3.

**Conditions**
none

## V Event excerpt: Digitalization of Products, Services & Production (WS 18/19)

**Aim**
- Students are able to describe the fundamental challenges and objectives of the progressive digitalization of products, service and production. In context of these challenges, students can name and explain the essential terms.
- Students can illustrate the key drivers and fundamental technologies behind the digitalization of products, services and processes.
- Students can describe the challenges of the ongoing digitalization and the corresponding changes in business processes and distinguish between them in regards to time and place. Furthermore, students are able to assign the IT-Architecture and systems to the corresponding process steps.
- Students can highlight the requirement for future information management in networks of product development and production institutions and can clarify how to validated and safeguard the corresponding IT processes.
- Students are able to analyze the challenges of digitalization and present potential solution approaches via self-created scenarios for future developments.

**Content**

- Digitalization of products, services and production in the context of Industry 4.0 .
- Key drivers for ongoing digitalization and their impact on future product development and manufacturing.
- Methods and procedures to design the according transformation process.
- Intensive group discussions of use-case scenarios using practical examples from the industry.

**Workload**
Präsenszeit: 24 Stunden
Selbststudium: 96 stunden

## T  Course: Disassembly Process Engineering [T-BGU-101850]

**Responsibility:** Sascha Gentes
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6243803 | | Vorlesung / Übung (VÜ) | 2 | Sascha Gentes |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-102805] Service Operations
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550488 | | Vorlesung (V) | 3 | Sven Spieckermann |

**Learning Control / Examinations**
The assessment consists of a written paper and an oral exam of about 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

**Conditions**
None

**Recommendations**
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

**Remarks**
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The course is planned to be held every summer term.
The planned lectures and courses for the next three years are announced online.

## V Event excerpt: (SS 2018)

**Aim**
The student

- knows basic concepts of discrete event simulation models,
- applies computer-based simulation systems,
- structures and implements simulation studies according to specific process models,
- has an in-depthr knowledge for logistics issues and discovers the importance of statistical methods in modeling and evaluation of simulation models,
- explains coupled systems of simulation and meta-heuristics, and characterizes simulation programs.

**Content**
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

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

**Literature**

- Banks J., Carson II J. S., Nelson B. L., Nicol D. M. (2010) Discrete-event system simulation, 5.Aufl., Pearson, Upper Saddle River.

- Eley, M. (2012): Simulation in der Logistik - Einführung in die Erstellung ereignisdiskreter Modelle unter Verwendung des Werkzeuges "Plant Simulation", Springer, Berlin und Heidelberg
- Kosturiak, J. und M. Gregor (1995): Simulation von Produktionssystemen. Springer, Wien und New York.
- Law, A. M. (2015): Simulation Modeling and Analysis. 5th Edition, McGraw-Hill, New York usw.
- Liebl, F. (1995): Simulation. 2. Auflage, Oldenbourg, München.
- Noche, B. und S. Wenzel (1991): Marktspiegel Simulationstechnik. In: Produktion und Logistik. TÜV Rheinland, Köln.
- Pidd, M. (2004): Computer Simulation in Management Science. 5th Edition, Wiley, Chichester.
- Robinson S (2004) Simulation: the practice of model development and use. John Wiley & Sons, Chichester
- VDI (2014): Simulation von Logistik-, Materialfluß- und Produktionssystemen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

## T  Course: Dynamic Macroeconomics [T-WIWI-109194]

**Responsibility:** Johannes Brumm
**Contained in:** [M-WIWI-101478] Innovation and Growth
[M-WIWI-101496] Growth and Agglomeration
[M-WIWI-101497] Agglomeration and Innovation

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2560402 | Dynamic Macroeconomics | Vorlesung (V) | 2 | Johannes Brumm |
| WS 18/19 | 2560403 | Übung zu Dynamic Macroeconomics | Übung (Ü) | 1 | Christopher Krause |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Conditions**
None.

## V  Event excerpt: Dynamic Macroeconomics (WS 18/19)

**Aim**
Students

- gain insight into state-of-the-art macroeconomic theory
- are acquainted with workhorse models of dynamic economic modeling
- are prepared to apply algorithms and numerical methods to studying (macro)economic problems
- practice coding skills and learn basic principles of scientific computing

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.

**Literature**
Literature and lecture notes are provided during the course.

## T  Course: Efficient Algorithms [T-WIWI-102655]

**Responsibility:** Pradyumn Kumar Shukla
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 5 | deutsch | Einmalig | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2511100 | Efficient Algorithms | Vorlesung (V) | 2 | Pradyumn Kumar Shukla |
| SS 2018 | 2511101 | | Übung (Ü) | 1 | Pradyumn Kumar Shukla |

**Learning Control / Examinations**
The examination will be offered only in summer term 2018.
The assessment consists of assignments or of a bonus exam (wrt §4 (2), 3 SPO), and a written exam (60 min.) in the week after the end of the lecturing periodwrt (§4 (2), 1 SPO).
If the mark obtained in the written exam is in between 1.3 and 4.0, a successful completion of the assignments or the bonus exam will improve the mark by one level (i.e. by 0.3 or 0.4).
Deviations from this type of assessment are announced at the beginning of this course.

**Conditions**
None

## V  Event excerpt: Efficient Algorithms (SS 2018)

### Aim
The student will learn how to use methods and concepts of efficient algorithms and how to demonstrate adequate innovative capabilities with respect to the used methods.
This course emphasizes the teaching of advanced concepts for the design and application of algorithms, data structures, and computer infrastructures in relation to their applicability in the real world. Based on a fundamental understanding of the covered concepts and methods, students should know how to select appropriate concepts and methods for problem settings in their professional life, and, if necessary, to extend and apply them in an adequate form. The students should be enabled to find adequate arguments for justifying their chosen problem solutions.

### Content
In a problem oriented way the course presents systematic approaches to the design and analysis of efficient algorithms using standard tasks of information processing as generic examples. Special emphasis is put on the influence of data structures and computer architectures on the performance and cost of algorithms.In particular, the course emphasizes the design and analysis of algorithms on parallel computers and in hardware, which is increasingly important considering the growing presence of multicore architectures.

### Workload
The total workload for this course is approximately 150.0 hours. For further information see German version.

### Literature
Akl, S.G.: The Design and Analysis of Parallel Algorithms. Prentice-Hall, Englewood Cliffs, New Jersey,1989.
Borodin, Munro: The Computational Complexity of Algebraic and Numeric Problems (Elsevier 1975)
Cormen, Leiserson, Rivest: Introduction to Algorithms (MIT Press)
Sedgewick: Algorithms (Addison-Wesley) (many different versions available)
**Elective literature:**
will be announced in class

## T Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

**Responsibility:** Patrick Jochem, Russell McKenna
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2581006 | Efficient Energy Systems and Electric Mobility | Vorlesung (V) | 2 | Patrick Jochem, Russell McKenna |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Recommendations**
None

## V Event excerpt: Efficient Energy Systems and Electric Mobility (SS 2018)

**Aim**

- Understand the concept of energy efficiency as applied to specific systems

- Obtain an overview of the current trends in energy efficiency

- Be able to determine and evaluate alternative methods of energy efficiency improvement

- Overview of technical and economical stylized facts on electric mobility

- Judging economical, ecological and social impacts through electric mobility

**Content**
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.
The energy efficiency part of the lecture provides an introduction to the concept of energy efficiency, the means of affecting it and the relevant framework conditions. Further insights into economy-wide measurements of energy efficiency, and associated difficulties, are given with recourse to several practical examples. The problems associated with market failures in this area are also highlighted, including the Rebound Effect. Finally and by way of an outlook, perspectives for energy efficiency in diverse economic sectors are examined.
The electric mobility part of the lecture examines all relevant issues associated with an increased penetration of electric vehicles including their technology, their impact on the electricity system (power plants and grid), their environmental impact as well as their optimal integration in the future private electricity demand (i.e. smart grids and V2G). Besides technical aspects the user acceptance and behavioral aspects are also discussed.

**Workload**
The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**
Will be anounced in the lecture.

**T** **Course: eFinance: Information Engineering and Management for Securities Trading [T-WIWI-102600]**

**Responsibility:** Christof Weinhardt
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2
[M-WIWI-101446] Market Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2540454 | eFinance: Information Engineering and Management for Securities Trading | Vorlesung (V) | 2 | Florian Glaser, Benedikt Notheisen, Christof Weinhardt |
| WS 18/19 | 2540455 | | Übung (Ü) | 1 | Florian Glaser, Benedikt Notheisen |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4(2), 3 SPO 2007 respectively §4(3) SPO 2015). 70% of the final grade is based on the written exam and 30% is based on assignments from the exercises. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

**Conditions**
None

**Recommendations**
None

**V** **Event excerpt: eFinance: Information Engineering and Management for Securities Trading (WS 18/19)**

**Aim**
The students

- are able to understand the theoretical and pracitical aspects of securitites trading,
- are able to handle the relevant electronic tools for the evaluation of financial data,
- are able to identify the incentives of the traders for participation in different market plattforms,
- are able to analyse capital marketplaces concerning their efficiency, weaknesses and technical configuration,
- are able to apply theoretical methods of econometrics,
- are able to understand, criticize and present articles with a finance-scientific background,
- learn to elaborate solutions in a team.

**Content**
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

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

**Literature**

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

**Elective literature:**

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

## T    Course: Elements and Systems of Technical Logistics [T-MACH-102159]

**Responsibility:**   Georg Fischer, Martin Mittwollen
**Contained in:**   [M-MACH-101263] Introduction to Logistics
                  [M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2117096 | Elements and systems of Technical Logistics (VÜ) | Vorlesung / Übung | 3 | Georg Fischer, Martin Mittwollen |

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**Learning Control / Examinations**
The assessment consists of an oral exam (20min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

**Recommendations**
Knowledge out of Basics of Technical Logistics (T-MACH-102163) preconditioned

## V    Event excerpt: Elements and systems of Technical Logistics (WS 18/19)

**Aim**
Students are able to:

- Describe elements and systems of technical logistics,
- Model and calculate structures and functions of special conveying machines,
- Describe interdependence of material flow systems and technique quantitatively and qualitatively
- Equip material flow systems with appropriate machines.

**Content**

- material flow systems and their (conveying) technical components

- mechanical behaviour of conveyors;

- structure and function of conveyor machines; elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)

- sample applications and calculations in addition to the lectures inside practical lectures

**Workload**
presence: 36h
rework: 84h

**Literature**
recommendations during lectures

## T  Course: Elements and Systems of Technical Logistics - Project [T-MACH-108946]

**Responsibility:**  Georg Fischer, Martin Mittwollen
**Contained in:**  [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|------|----------|------------|---------|
| 2 | deutsch | Jedes Wintersemester | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2117097 | Elements and systems of Technical Logistics Projekt (PRO) - project | | | Georg Fischer, Martin Mittwollen |

**Learning Control / Examinations**
Presentation of performed project and defense (30min) according to  $4 (2), No. 3 of the examination regulation

**Conditions**
T-MACH-102159 (Elements and Systems of Technical Logistics) must have been started

**Modeled Conditions**
The following conditions must be met:

- The course [T-MACH-102159] *Elements and Systems of Technical Logistics* must have been started.

**Recommendations**
Knowledge out of Basics of Technical Logistics (T-MACH-102163) preconditioned

**Replaces**
T-MACH-102178

## T  Course: Emerging Trends in Criticial Information Infrastructures [T-WIWI-109250]

**Responsibility:** Ali Sunyaev
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4 | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2513400 | | Seminar (S) | 2 | Sebastian Lins, Ali Sunyaev, Scott Thiebes |

**Learning Control / Examinations**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of a final thesis.

**Conditions**
None.

**Remarks**
The course is usually held as a block course.

## V  Event excerpt:  (WS 18/19)

**Aim**
Students (1) independently analyze current questions in the field of information systems; (2) work on the respective scientific question with recognized scientific methods and write a seminar thesis on it; (3) can combine already learned theoretical and practical lecture contents of the respective question.

## T | Course: Emissions into the Environment [T-WIWI-102634]

**Responsibility:** Ute Karl
**Contained in:** [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581962 | Emissions into the Environment | Vorlesung (V) | 2 | Ute Karl |

**Recommendations**
None

## V | Event excerpt: Emissions into the Environment (WS 18/19)

**Aim**
The student should identify problems of industrial pollution control.
The student knows solutions to these problems and their ways of application.

**Content**
The course will provide an overview of sources of air pollution, waste and municipal waste; methods to monitor and to reduce/manage pollutant flows; regulatory framework on national and international level.
A Air pollution control

- Indtroduction and definitions
- Sources an dpoluutants
- Regulatory framework
- Emission monitoring
- Air pollution control measures

B Waste management and Recycling

- Introduction and regulatory framework
- Statistics and logistics
- Recycling and disposal
- Waste treatment

C Waste water treatment

- Municipal waste water treatment systems
- Sewage sludge disposal

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**
Will be announced in thecourse.

## T  Course: Employment Law I [T-INFO-101329]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101216] Private Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 24167 | Employment Law I | Vorlesung (V) | 2 | Alexander Hoff |

## V  Event excerpt: Employment Law I (WS 18/19)

**Aim**

Ziel der Vorlesung ist eine vertiefte Einführung in das Individualarbeitsrecht. Die Studenten sollen die Bedeutung des Arbeitsrechts als Teil der Rechtsordnung in einer sozialen Marktwirtschaft erkennen. Sie sollen in die Lage versetzt werden, arbeitsvertragliche Regelungen einzuordnen und bewerten zu können. Sie sollen arbeitsrechtliche Konflikte beurteilen und Fälle lösen können.

**Content**

Ziel der Vorlesung ist eine vertiefte Einführung in das Individualarbeitsrecht. Die Studenten sollen die Bedeutung des Arbeitsrechts als Teil der Rechtsordnung in einer sozialen Marktwirtschaft erkennen. Sie sollen in die Lage versetzt werden, arbeitsvertragliche Regelungen einzuordnen und bewerten zu können. Sie sollen arbeitsrechtliche Konflikte beurteilen und Fälle lösen können.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

## T Course: Employment Law II [T-INFO-101330]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101216] Private Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 24668 | Employment Law II | Vorlesung (V) | 2 | Alexander Hoff |

## V Event excerpt: Employment Law II (SS 2018)

**Aim**

Aufbauend auf den in *Arbeitsrecht I* erworbenen Kenntnissen sollen die Studenten einen vertieften Einblick in das Arbeitsrecht erhalten.

**Content**

Aufbauend auf den in *Arbeitsrecht I* erworbenen Kenntnissen sollen die Studenten einen vertieften Einblick in das Arbeitsrecht erhalten.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

**Literature**

Literaturempfehlung wird in der Vorlesung bekanntgegeben.

## T  Course: Energy and Environment [T-WIWI-102650]

**Responsibility:** Ute Karl
**Contained in:** [M-WIWI-101468] Environmental Economics
[M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2581003 | Energy and Environment | Vorlesung (V) | 2 | Ute Karl |
| SS 2018 | 2581004 | | Übung (Ü) | 1 | Katrin Seddig |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Conditions**
None.

## V  Event excerpt: Energy and Environment (SS 2018)

**Aim**
The student should identify environmental problems of energy from fossil fuels. The student can identify appropriate technologies for pollution control. The student knows methods for assessing environmental problems and their ways of application.

**Content**
The focus of the lecture is put on environmental impacts of fossil fuel conversion and related assessment methods. The list of topics is given below.

- Fundamentals of energy conversion
- Air pollutant formation from fossil fuel combustion
- Control of air pollutant emissions from fossil-fuelled power plants.
- Measures to improve conversion efficiency of fossil fuelled power plants.
- External effects of energy supply (Life Cycle Assessment of selected energy systems)
- Integrated Assessment models supporting the European Thematic Strategy on Air
- Cost-effectiveness analyses and cost-benefit analyses of air pollution control measures
- Monetary evaluation of external effects of energy supply (external costs)

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

**Literature**
Thr references for further reading are included in the lecture documents (see ILIAS)

## T   Course: Energy and Process Technology I [T-MACH-102211]

**Responsibility:** Hans-Jörg Bauer, Corina Schwitzke, Amin Velji, Heiner Wirbser
**Contained in:** [M-MACH-101296] Energy and Process Technology I

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 9 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2157961 | Energy and Process Technology I | Vorlesung / Übung (VÜ) | 6 | Hans-Jörg Bauer, Mitarbeiter, Corina Schwitzke, Uwe Wagner, Heiner Wirbser |

**Learning Control / Examinations**
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
none

## V   Event excerpt: Energy and Process Technology I (WS 18/19)

**Aim**
The students are able to:

- describe and calculate the basic physical-technical processes
- apply the mathematical and thermodynamical description
- reflect on and explain the diagrams and schematics
- comment on diagrams
- explain the functionality of gas and steam turbines and their components
- name the applications of thermal turbomachinery and their role in the field of electricity generation and propulsion technology

**Content**
The last thrid of the lecture deals with the topic **Thermal Turbomachinery**. The basic principles, the functionality and the scope of application of gas and steam tubrines for the generation of electrical power and propulsion technology are addressed.

## T | Course: Energy and Process Technology II [T-MACH-102212]

**Responsibility:** Corina Schwitzke, Heiner Wirbser
**Contained in:** [M-MACH-101297] Energy and Process Technology II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 9 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2170832 | Energy and Process Technology II | Vorlesung / Übung (VÜ) | 6 | Corina Schwitzke, Heiner Wirbser |

**Learning Control / Examinations**
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
none

## V | Event excerpt: Energy and Process Technology II (SS 2018)

**Aim**
The students are able to:

- discuss and evaluate energy resources and reserves and their utility
- review the use of energy carriers for electrical power generation
- explain the concepts and properties of power-heat cogeneration, renewable energy conversion and fuel cells and their fields of application
- comment on and compare centralized and decentralized supply concepts
- calculate the potentials, riskis and economic feasibility of different strategies aiming at the protection of resources and the reduction of $CO_2$ emissions
- name and judge on the options for solar energy utilization
- discuss the potential of geothermal energy and its utilization

**Content**
**Thermal Turbomaschinery** - In the first part of the lecture deals with energy systems. Questions regarding global energy resources and their use, especially for the generation and provision of electrical energy, are addressed. Common fossile and nuclear power plants for the centralized supply with electrical power as well as concepts of power-heat cogeneration for the decentralized electrical power supply by means of block-unit heat and power plants, etc. are discussed. Moreover, the characteristics and the potential of renewable energy conversion concepts, such as wind and hydro-power, photovoltaics, solar heat, geothermal energy and fuel cells are compare and evaluated. The focus is on the description of the potentials, the risks and the economic feasibility of the different strategies aimed to protect resources and reduce $CO_2$ emissions.

## T   Course: Energy Conversion and Increased Efficiency in Internal Combustion Engines [T-MACH-105564]

**Responsibility:** Thomas Koch, Heiko Kubach
**Contained in:** [M-MACH-101275] Combustion Engines I

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2133121 | Energy Conversion and Increased Efficiency in Internal Combustion Engines | Vorlesung (V) | 2 | Thomas Koch |

**Learning Control / Examinations**
oral exam, 25 minutes, no auxillary means

**Conditions**
none

## V   Event excerpt: Energy Conversion and Increased Efficiency in Internal Combustion Engines (WS 18/19)

**Aim**

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

**Content**
1. Introduction
2. Thermodynamics of combustion engines
3. Fundamentals
4. gas exchange
5. Flow field
6. Wall heat losses
7. Combustion in gasoline engines
8. APR und DVA
9. Combustion in Diesel engines
10. Emissions
11. Waste heat recovery
12. Measures to increase efficiency

**Workload**

regular attendance: 24 hours, self-study: 96 hours

## T  Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

**Responsibility:** Meike Braun, Frank Schönung
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2117500 | Energy efficient intralogistic systems | Vorlesung (V) | 2 | Meike Braun, Frank Schönung |

**Learning Control / Examinations**
Oral, 30 min. examination dates after the end of each lesson period.

**Conditions**
none

**Recommendations**
The content of course "Basics of Technical Logistics" should be known.

**Remarks**
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.

## V  Event excerpt: Energy efficient intralogistic systems (WS 18/19)

**Aim**
Students are able to:

- Describe and choose basic measures to enhance energy efficency,
- Specify this measures considering material handling processes like

  - steady conveyors,
  - unsteady conveyors,
  - as well as the necessary drives,

- Model based on this material handling systems and calculate and measure their energy efficiency and
- Choose ressource efficient material handling systems.

**Content**
The main focuses of the course are:

- green supply chain
- processes in Intralogistic systems
- evaluation of energy consumption of conveyors
- modeling of conveying systems
- methods for energy savings
- approaches for energy efficiency increasing of continuous and discontinuous conveyors
- dimensioning energy efficient drives
- new approaches for resource efficient conveying systems.

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
None.

## T  Course: Energy Market Engineering [T-WIWI-107501]

**Responsibility:** Christof Weinhardt
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets
[M-WIWI-101411] Information Engineering
[M-WIWI-101446] Market Engineering
[M-WIWI-103720] eEnergy: Markets, Services and Systems

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540464 | Energy Market Engineering | Vorlesung (V) | 2 | Philipp Staudt, Christof Weinhardt |
| SS 2018 | 2540465 | | Übung (Ü) | 1 | Esther Marie Mengelkamp, Philipp Staudt |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Conditions**
None

**Recommendations**
None

**Remarks**
Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".
The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

## V  Event excerpt: Energy Market Engineering (SS 2018)

**Aim**
The student

- know the scientifically discussed design options for energy markets.
- can evaluate and discuss advantages and disadvantages of different energy market design options.
- can jusge which design is ideal in which environment.
- is able to understand and employscientific methods to evaluate energy market designs

**Content**
This lecture discusses different design options for electricity markets. We will focus on different approaches of nodal and zonal pricing as well as single price mechanisms and capacity markets. After a short recap of German and European market designs, the different design options will be discussed scientifically and with the help of examples. Furthermore, we will evaluate alternative market design options like microgrids. Besides the fundamental functioning of those markets, we will introduce and discuss methodological knowledge to evaluate market design options.

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

**Literature**

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.

- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

## T  Course: Energy Networks and Regulation [T-WIWI-107503]

**Responsibility:**  Christof Weinhardt
**Contained in:**  [M-WIWI-101446] Market Engineering
[M-WIWI-103720] eEnergy: Markets, Services and Systems

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2540494 | Energy Networks and Regulation | Vorlesung (V) | 2 | Stefan Rogat |
| WS 18/19 | 2540495 | | Übung (Ü) | 1 | Stefan Rogat |

**Learning Control / Examinations**
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation.
The exam is offered every semester. Re-examinations are offered on every ordinary examination date.

**Conditions**
None

**Recommendations**
None

**Remarks**
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

## V  Event excerpt: Energy Networks and Regulation (WS 18/19)

**Aim**
The student,

- understands the business model of a network operator and knows its central tasks in the energy supply system,
- provides a holistic overview of the interrelationships in the network economy,
- understands the regulatory and business interactions,
- is particularly familiar with the current model of incentive regulation with its essential components and understands its implications for the decisions of a network operator
- is able to analyse and assess controversial issues from the perspective of different stakeholders.

**Content**
The lecture "Energy Networks and Regulation" provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator's abilities to deal with the massive challenges lying ahead ("Energiewende", redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO.
- Objectives of regulation: Fair price calculation and high standard access conditions.
- The functioning of incentive regulation
- Amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

**Workload**

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

**Literature**

Averch, H.; Johnson, L.L (1962). Behavior of the firm under regulatory constraint, in: American Economic Review, 52 (5), S. 1052 – 1069.

Bundesnetzagentur (2006): Bericht der Bundesnetzagentur nach § 112a EnWG zur Einführung der Anreizregulierung nach § 21a EnWG, http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/ Unternehmen_Institutionen/Netzentgelte/Anreizregulierung/BerichtEinfuehrgAnreizregulierung.pdf? __blob=publicationFile&v=3.

Bundesnetzagentur (2015): Evaluierungsbericht nach § 33 Anreizregulierungsverordnung, https://www. bmwi.de/Redaktion/DE/Downloads/A/anreizregulierungsverordnung-evaluierungsbericht.pdf?__blob= publicationFile&v=1.

Filippini, M.; Wild, J.; Luchsinger, C. (2001) : Regulierung der Verteilnetzpreise zu Beginn der Marktöffnung. Erfahrungen in Norwegen und Schweden, Bundesamt für Energie, Bern, http://www.iaea.org/inis/collection/ NCLCollectionStore/_Public/34/066/34066585.pdf.

Gómez, T. (2013): Monopoly Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 151 – 198, Springer-Verlag, London.

Gómez, T. (2013): Electricity Distribution, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 199 – 250, Springer- Verlag, London.

Pérez-Arriaga, I.J. (2013): Challenges in Power Sector Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 647 – 678, Springer-Verlag, London.

Rivier, M.; Pérez-Arriaga, I.J.; Olmos, L. (2013): Electricity Transmission, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 251 – 340, Springer-Verlag, London.

## T  Course: Energy Systems Analysis [T-WIWI-102830]

**Responsibility:** Valentin Bertsch
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2581002 | Energy Systems Analysis | Vorlesung (V) | 2 | Armin Ardone |

**Learning Control / Examinations**
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

**Conditions**
None

**Recommendations**
None

**Remarks**
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

## V  Event excerpt: Energy Systems Analysis (WS 18/19)

**Aim**
The student
- has the ability to understand and critically reflect the methods of energy system analysis, the possibilities of its application in the energy industry and the limits and weaknesses of this approach
- can use select methods of the energy system analysis by her-/himself

**Content**
1. Overview and classification of energy systems modelling approaches
2. Usage of scenario techniques for energy systems analysis
3. Unit commitment of power plants
4. Interdependencies in energy economics
5. Scenario-based decision making in the energy sector
6. Visualisation and GIS techniques for decision support in the energy sector

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

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

- Möst, D. und Fichtner, W.: **Einführung zur Energiesystemanalyse**, in: Möst, D., Fichtner, W. und Grunwald, A. (Hrsg.): Energiesystemanalyse, Universitätsverlag Karlsruhe, 2009
- Möst, D.; Fichtner, W.; Grunwald, A. (Hrsg.): **Energiesystemanalyse** - Tagungsband des Workshops "Energiesystemanalyse" vom 27. November 2008 am KIT Zentrum Energie, Karlsruhe, Universitätsverlag Karlsruhe, 2009 [PDF: http://digbib.ubka.uni-karlsruhe.de/volltexte/documents/928852]

## T  Course: Energy Trade and Risk Management [T-WIWI-102691]

**Responsibility:** Clemens Cremer, Wolf Fichtner, Dogan Keles
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2581020 | Energy Trade and Risk Management | Vorlesung (V) | 3 | Clemens Cremer, Dogan Keles |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Energy Trade and Risk Management (SS 2018)

**Aim**
The student

- has acquired a broad understanding of the different energy commodity markets (power, emissions, gas, oil, hard coal)
- knows the major products traded on the relevant energy commodity markets
- has a deep understanding of pricing mechanisms on these markets
- knows the major evaluation methods from financial mathematics being able to be used for evaluating energy commodity products
- knows the key risk evaluation methods of energy commodity trading (VaR, CVaR, . . . ).

**Content**

1. Introduction to Markets, Mechanisms, Interactions
2. Basics of Risk Management
3. Oil Markets
4. Gas Markets
5. Coal Markets
6. Emission Markets
7. Simulation Game
8. Power Markets
9. Risk Management in Utilities

**Workload**
The total workload for this course is approximately 120.0 hours. For further information see German version.

**Literature**
**Elective literature:**
Burger, M., Graeber, B., Schindlmayr, G. (2007): *Managing energy risk: An integrated view on power and other energy markets*, Wiley&Sons, Chichester, England
EEX (2010): *Einführung in den Börsenhandel an der EEX auf Xetra und Eurex*, www.eex.de
Erdmann, G., Zweifel, P. (2008), Energieökonomik, Theorie und Anwendungen, Springer, ISBN: 978-3-540-71698-3

Hull, J.C. (2006): *Options, Futures and other Derivatives*, 6. Edition, Pearson Prentice Hall, New Jersey, USA

Borchert, J., Schlemm, R., Korth, S. (2006): *Stromhandel: Institutionen, Marktmodelle, Pricing und Risikomanagement (Gebundene Ausgabe)*, Schäffer-Poeschel Verlag

www.riskglossary.com

## T   Course: Engine Measurement Techniques [T-MACH-105169]

**Responsibility:** Sören Bernhardt
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2134137 | Engine measurement techniques | Vorlesung (V) | 2 | Sören Bernhardt |

**Learning Control / Examinations**
oral examination, Duration: 0,5 hours, no auxiliary means

**Conditions**
The course *Combustion Engines A / Combustion Engines I* has to be completed beforehand.

**Modeled Conditions**
The following conditions must be met:

- The course [T-MACH-102194] *Combustion Engines I* must have been passed.

## V   Event excerpt: Engine measurement techniques (SS 2018)

**Aim**
The students are able to explain the principles of modern measuring devices and are able to determin the right device for a certain measuring problem. The are able to analyse and evaluate the results.

**Content**
Students get to know state-of-the-art measurement techniques for combustion engines. In particular basic techniques for measuring engine operating parameters such as torque, speed, power and temperature.

Possible measurement errors and abberations are discussed.

Furthermore techniques for measuring exhaust emissions, air/fuel ratio, fuel consumption as well as pressure indication for thermodynamic analysis are covered.

**Workload**
regular attendance: 21 hours
self-study: 100 hours

**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 Course: Engineering FinTech Solutions [T-WIWI-106193]

**Responsibility:** Maxim Ulrich
**Contained in:** [M-WIWI-103247] Intelligent Risk and Investment Advisory
[M-WIWI-103261] Disruptive FinTech Innovations

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530357 | Engineering FinTech Solutions | Vorlesung (V) | 2 | Maxim Ulrich |
| WS 18/19 | 2530357 | Engineering FinTech Solutions | Vorlesung (V) | 2 | Maxim Ulrich |

**Learning Control / Examinations**
The grade consists of a written part and an oral exam. In the written part, students solve an academic problem from the field of risk and asset management. This part counts for 30% of the grade. An oral exam at the end of the semester accounts for 70% of the final grade and gives the student a chance to present and defend his solution.

**Conditions**
There are two conditions for taking this course:

1. This course is only open for registered students of the module "Intelligent Risk and Investment Advisory" and "Disruptive FinTech Solutions".
2. Registered students have completed a Bachelor thesis with a grade of 1.3 or better on a topic that has had a significant exposure to IT- or software engineering content. Alternatively, students who completed at least one of the following lectures with a grade of 1.7 or better are also eligible to participate: Computational Risk and Asset Management, Bayesian Risk Analytics and Machine Learning.

**Recommendations**
None

**Remarks**
New course starting summer term 2017.

## V Event excerpt: Engineering FinTech Solutions (WS 18/19)

**Aim**
Students develop modern IT-technologies to solve financial problems.

**Content**
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.

**Literature**
Literature will be distributed during the first lecture.

**T** **Course: Engineering Hydrology [T-BGU-108943]**

| | |
|---|---|
| **Responsibility:** | Uwe Ehret |
| **Contained in:** | [M-WIWI-101642] Natural Hazards and Risk Management 1 |
| | [M-WIWI-101644] Natural Hazards and Risk Management 2 |

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 3 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

See German version.

**Conditions**

None

## T   Course: Enterprise Architecture Management [T-WIWI-102668]

**Responsibility:** Thomas Wolf
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511600 | Enterprise Architecture Management | Vorlesung (V) | 2 | Thomas Wolf |
| WS 18/19 | 2511601 | | Übung (Ü) | 1 | Thomas Wolf |

**Learning Control / Examinations**
The assessment of this course is a written (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

**Conditions**
None

## V   Event excerpt: Enterprise Architecture Management (WS 18/19)

**Aim**
Students understand the connection between enterprise strategy, business processes and business objects and IT architecture; they know methods to depict these connections and how they can be developed based on each other.

**Content**
The following topics will be covered: components of enterprise architecture, enterprise strategy including methods to develop strategies, business process (re)engineering, methods to implement changes within enterprises (management of change)

**Literature**

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995
- Doppler, K., Lauterburg, Ch.: Change Management. Campus Verlag 1997
- Jacobson, I.: The Object Advantage, Business Process Reengineering with Object Technology. Addison-Wesley Publishing Company, Wokingham England 1994
- Keller, G., Teufel, Th.: SAP R/3 prozessorientiert anwenden. Addison Wesley 1998
- Österle, H.: Business Engineering Bd. 1 und 2. Springer Verlag, Berlin 1995

**T** **Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]**

| | |
|---|---|
| **Responsibility:** | Carsten Linz, Orestis Terzidis |
| **Contained in:** | [M-WIWI-101507] Innovation Management |
| | [M-WIWI-101488] Entrepreneurship (EnTechnon) |

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 3 | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**

Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**

None

**Recommendations**

None

## T  Course: Entrepreneurship [T-WIWI-102864]

**Responsibility:**  Orestis Terzidis
**Contained in:**  [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | englisch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2545001 | Entrepreneurship | Vorlesung (V) | 2 | Mitarbeiter, Orestis Terzidis |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Entrepreneurship (SS 2018)

**Aim**
Students are generally introduced to the topic of entrepreneurship. After successful completion of the lecture they should have an overview of the sub-areas of entrepreneurship and have to be able to understand basic concepts of entrepreneurship.

**Content**
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of financial planning.
Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship
Ries, Eric (2011): The Lean Startup
Osterwalder, Alexander (2010): Business Model Generation

## T  Course: Entrepreneurship Research [T-WIWI-102894]

**Responsibility:** Orestis Terzidis
**Contained in:** [M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Exam type | Version |
|:----:|:--------:|:----------:|:---------:|:-------:|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2545002 | Entrepreneurship Research | Seminar (S) | 2 | Abilio Avila Albez, Benedict Heblich , Orestis Terzidis |

**Learning Control / Examinations**
The performance review is done via a so called other methods of performance review (term paper) (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

**Conditions**
None

**Recommendations**
None

**Remarks**
The topics will be prepared in groups. The presentation of the results is done during a a block period seminar at the end of the semester. Students have to be present all day long during the seminar.

## V  Event excerpt: Entrepreneurship Research (SS 2018)

**Aim**
The students will work on a specific topic of Entrepreneurship Research. In their term paper, the chosen topic needs to be presented to scientific standards in written format on 15-20 pages. The results of the term paper will be presented during a block period seminar at the end of the semester (20 min presentation, 10 min discussion).
By writing the term paper, basic skills of autonomous scientific work, such as looking for literature, argumentation + discussion, citation and using qualitative, quantitative and simulative methods get trained. The term paper is therefore a preparation for the master thesis. For this reason the seminar is mainly for students that intend to write their master thesis at the Chair of Entrepreneurship and Technology Management.

**Content**
Content of the seminar is most recently discussed topics in the field of entrepreneurship. Topics and dates will be communicated online via the seminar portal.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Will be announced during/prior to the seminar as this varies from topic to topic.

## T  Course: Environmental and Ressource Policy [T-WIWI-102616]

**Responsibility:** Rainer Walz
**Contained in:** [M-WIWI-101468] Environmental Economics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2560548 | Environmental and Ressource Policy | Vorlesung / Übung (VÜ) | 2 | Rainer Walz |

### Recommendations

It is recommended to already have knowledge in the area of industrial organization and economic policy. This knowledge may be acquired in the courses *Introduction to Industrial Organization* [2520371] and *Economic Policy* [2560280].

## V  Event excerpt: Environmental and Ressource Policy (SS 2018)

**Aim**

See German version.

**Content**

Im ersten Teil der Lehrveranstaltung werden die Themenfelder Akteure und Politische Ökonomie der Umweltpolitik sowie Effektivität, Effizienz und Innovationswirkungen der Politikinstrumente behandelt. Daran schließt sich ein Überblick über Stand und Entwicklungstendenzen der Umweltpolitik an. In einzelnen Fallstudien werden aktuelle Probleme der deutschen und internationalen Umweltpolitik behandelt und das Zusammenspiel von Umwelt-, Innovations- und Industriepolitik thematisiert.

**Workload**

The total workload for this course is approximately 120 hours. For further information see German version.

**Literature**
**Elective literature:**

Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg
OECD: Environmental Performance Review Germany, Paris

## T  Course: Environmental Communication [T-BGU-101676]

**Responsibility:** Charlotte Kämpf
**Contained in:** [M-WIWI-101642] Natural Hazards and Risk Management 1
[M-WIWI-101644] Natural Hazards and Risk Management 2

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4 | Jedes Semester | Prüfungsleistung anderer Art | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6224905 | | Seminar (S) | 2 | Charlotte Kämpf |
| WS 18/19 | 6224905 | | Seminar (S) | 2 | Charlotte Kämpf |

**Learning Control / Examinations**
Non exam assessment (following §4(2), 3 of the examination regulation).

**Conditions**
Examination Prerequisite Environmental Communication must be passend.

**Modeled Conditions**
The following conditions must be met:

- The course [T-BGU-106620] *Examination Prerequisite Environmental Communication* must have been passed.

**Recommendations**
None

**Remarks**

## T  Course: Environmental Economics and Sustainability [T-WIWI-102615]

**Responsibility:** Rainer Walz
**Contained in:** [M-WIWI-101468] Environmental Economics

| ECTS | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|
| 5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2521547 | | Vorlesung / Übung (VÜ) | 2 | Rainer Walz |

**Learning Control / Examinations**
See German version

**Conditions**
None

**Recommendations**
It is recommended to already have knowledge in the area of macro- and microeconomics. This knowledge may be acquired in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014].

## T  Course: Environmental Law [T-INFO-101348]

**Responsibility:** Matthias Bäcker
**Contained in:** [M-WIWI-101468] Environmental Economics
[M-INFO-101217] Public Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 24140 | | Vorlesung (V) | 2 | Nikolaus Marsch |

## V  Event excerpt:  (WS 18/19)

**Aim**

Das Umweltrecht ist eine vielseitige Materie, die Unternehmensführung vielseitig beeinflusst. Studenten sollen ein Gespür für die vielen Facetten des Umweltrechts und seiner Instrumente erhalten. Neben klassischen rechtlichen Instrumenten wie Genehmigung sollen sie daher auch ökonomisch geprägte Instrumente wie Informationsgewinnung und -verbreitung oder Handel mit Zertifikaten kennenlernen.

Vor diesem Hintergrund liegt der Schwerpunkt der Veranstaltung im Immissionsschutz- und Abfallrecht. Des weiteren wird das Wasserrecht, das Bodenschutzrecht und das Naturschutzrecht behandelt. Studenten sollen in der Lage sein, einfache Fälle mit Bezug zum Umweltrecht zu behandeln.

**Content**

Die Vorlesung beginnt mit einer Einführung in die besondere Problematik, der das Umweltrecht gerecht zu werden versucht. Es werden verschiedene Instrumente, abgeleitet aus der Lehre von den Gemeinschaftsgütern, vorgestellt. Daran schließen sich Einheiten zum Immissionsschutz-, Abfall-, Wasser-, Bodenschutz- und Naturschutzrecht an.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).

**Literature**

Wird in der Veranstaltung bekannt gegeben.
**Weiterführende Literatur**
Wird in der Veranstaltung bekannt gegeben.

## T   Course: European and International Law [T-INFO-101312]

**Responsibility:** Ulf Brühann
**Contained in:** [M-INFO-101217] Public Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 24666 | | Vorlesung (V) | 2 | Ulf Brühann |

## V   Event excerpt:   (SS 2018)

### Aim

Die Europäisierung des nationalen Rechts macht eine Auseinandersetzung mit dem Europarecht für jeden, der juristische Grundkenntnisse erwerben will, unabdingbar. Kaum eine nationale Handlung ist ohne die Berücksichtigung gemeinschaftsrechtliche Vorgaben denkbar. Der Einfluss des internationalen Rechts ist dagegen von noch geringerer Bedeutung. Vor diesem Hintergrund setzt sich die Vorlesung vorrangig mit dem Europarecht auseinander und vermittelt dem Studenten die notwendigen europarechtlichen Kenntnisse, um die Überformung des nationalen Rechts durch gemeinschaftsrechtliche Vorgaben zu verstehen. Der Student soll anschließend in der Lage sein, europarechtliche Fragestellungen problemorientiert zu lösen. Da der Rechtsstoff teilweise im Diskurs mit den Studierenden erarbeitet werden soll, ist die Anschaffung einer Gesetzessammlung unabdingbar (z.B. Beck-Texte "Europarecht").

### Content

Die Vorlesung setzt sich vorrangig mit dem Europarecht auseinander: Dazu gehört im Ausgangspunkt eine Analyse der Geschichte von der EWG zur EG und EU, der Akteure (Parlament, Kommission, Rat, Gerichtshof der Europäischen Gemeinschaften), der Rechtsquellen (Verordnung, Richtlinie, Entscheidung, Stellungnahme, Empfehlung) und des Gesetzgebungsverfahrens. Einen weiteren Schwerpunkt der Vorlesung bilden sodann die Grundfreiheiten, die einen freien innergemeinschaftlichen Fluss der Waren (etwa von Bier, das nicht dem deutschen Reinheitsgebot entspricht), Personen (wie dem Fußballspieler Bosman), Dienstleistungen (wie unternehmerischen Tätigkeiten) sowie von Zahlungsmitteln ermöglichen. Zudem werden auch die Grundrechte der EG und die Wettbewerbsregeln behandelt. Dies geschieht jeweils vor dem Hintergrund konkreter Rechtsfälle. Ferner werden die Grundrechte der Europäischen Menschenrechtskonvention (EMRK) vorgestellt. Abschließend wird ein knapper Überblick über das Völkerrecht
insbesondere der Welthandelsorganisation (WTO) gegeben.

### Workload

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

### Literature

Literatur wird in der Vorlesung angegeben.
### Weiterführende Literatur
Erweiterte Literaturangaben werden in der Vorlesung bekannt gegeben.

## T Course: Examination Prerequisite Environmental Communication [T-BGU-106620]

**Responsibility:** Charlotte Kämpf
**Contained in:** [M-WIWI-101642] Natural Hazards and Risk Management 1
[M-WIWI-101644] Natural Hazards and Risk Management 2

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 0 | Jedes Sommersemester | Studienleistung | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6224905 | | Seminar (S) | 2 | Charlotte Kämpf |
| WS 18/19 | 6224905 | | Seminar (S) | 2 | Charlotte Kämpf |

**Learning Control / Examinations**
2 literature annotations, appr. 150 words each, and
short presentation, appr. 10 min.

**Conditions**
none

**Recommendations**
none

**Remarks**

## T Course: Exchanges [T-WIWI-102625]

**Responsibility:** Jörg Franke
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530296 | Exchanges | Vorlesung (V) | 1 | Jörg Franke |

**Learning Control / Examinations**
The examination will be offered latest until winter term 2018/2019 (repeaters only).

**Conditions**
None

**Recommendations**
None

## V Event excerpt: Exchanges (SS 2018)

**Aim**
Students are in a position to discuss and evaluate current developments regarding the organisation of exchanges and securities trading.

**Content**

- Organisation of exchanges: Changing Zeitgeist - Corporates instead of cooparative structures
- Market models: order driven vs. market maker - Liquidity provision for less frequently traded securities
- Trading systems: The end of an era? - No more need for running traders?
- Clearing: Diversity instead of uniformity - Safety for all?
- Settlement: Increasing importance - Does efficient settlement assure the "value added" of exchanges in the long run?

**Workload**
The total workload for this course is approximately 45.0 hours. For further information see German version.

**Literature**
**Elective literature:**
Educational material will be offered within the lecture.

## T — Course: Experimental Economics [T-WIWI-102614]

**Responsibility:** Jella Pfeiffer, Christof Weinhardt
**Contained in:** [M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101505] Experimental Economics
[M-WIWI-101446] Market Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2540489 | Experimental Economics | Vorlesung (V) | 2 | Verena Dorner, Michael Knierim, Christian Peukert, Jella Pfeiffer |
| WS 18/19 | 2540493 | | Übung (Ü) | 1 | Michael Knierim |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Conditions**
None

## V — Event excerpt: Experimental Economics (WS 18/19)

**Aim**
The students should learn

- how to gain scientific experience and knowledge (philosophy of science),
- how Game Theory and Experimental Economics influenced each other in scientific research,
- about the methods as well as the strengths and weaknesses of Experimental Economics,
- some examples of experimental research, such as markets and auctions, coordination games, bargaining, decision making under risk,
- how to evaluate data.

**Content**
Experimental Economics have become a separate field in Economics. Nearly all fields of the economic discipline use economic experiments to verify theoretical results. Besides being used for empricial validation, this method is applied in political and strategic consulting. The lecture gives an introduction to experimental methods in economics and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

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

**Literature**

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2nd ed., 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

**T** **Course: Extraordinary additional course in the module Cross-Functional Management Accounting [T-WIWI-108651]**

**Responsibility:** Marcus Wouters
**Contained in:** [M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Semester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment depends on which extraordinary course becomes part of the module "Cross-Functional Management Accounting".
.

**Conditions**
None

**Remarks**
The pupose of this placeholder is to make it possible zu include an extraordinary course in the module "Cross-Functional Management Accounting". Proposals for specific courses have to be approved in advance by the module coordinator.

## T Course: Fabrication Processes in Microsystem Technology [T-MACH-102166]

**Responsibility:** Klaus Bade
**Contained in:** [M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Semester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2143882 | Fabrication Processes in Microsystem Technology | Vorlesung (V) | 2 | Klaus Bade |
| WS 18/19 | 2143882 | Fabrication Processes in Microsystem Technology | Vorlesung (V) | 2 | Klaus Bade |

**Learning Control / Examinations**
Oral examination, 20 minutes

**Conditions**
none

## V Event excerpt: Fabrication Processes in Microsystem Technology (WS 18/19)

**Aim**
The student

- collects advanced knowledge
- understands process conditions and process layout
- gains interdisciplinary knowledge (chemistry, manufacturing, physics)

**Content**
The lecture offers an advanced understanding of manufacturing processes in microsystem technology. Basic aspects of microtechnological processing will be introduced. With examples from semiconductor microfabrication and microsystem technology the base processing steps for conditioning and finishing, patterning, removal are imparted. Nano-patterning is covered is also included and the micro-nano interface is discussed. By the help of typical processing steps elementary mechanisms, process execution, and equipment are explained. Additionally quality control, process control and environmental topics are included

**Workload**
Präsenszeit: 24 Stunden
Vor- /Nachbereitung: 24 Stunden
Prüfung und Prüfungsvorbereitung: 30 Stunden

**Literature**
M. Madou
Fundamentals of Microfabrication
CRC Press, Boca Raton, 1997
W. Menz, J. Mohr, O. Paul
Mikrosystemtechnik für Ingenieure
Dritte Auflage, Wiley-VCH, Weinheim 2005
L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
2nd Edition, ACS, Washington DC, 1994

## T | Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2550486 | Facility Location and Strategic Supply Chain Management | Vorlesung (V) | 2 | Stefan Nickel |
| WS 18/19 | 2550487 | | Übung (Ü) | 1 | Hannah Bakker |

**Learning Control / Examinations**
The assessment consists of a written exam (120 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.

**Conditions**
Prerequisite for admission to examination is the succesful completion of the online assessments.

**Recommendations**
None

**Remarks**
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

## V | Event excerpt: Facility Location and Strategic Supply Chain Management (WS 18/19)

**Aim**
The student

- knows and describes basic quantitative methods in location planning in the context of strategic Supply Chain Planning,
- applies several criteria for the evaluation of the locations of facilities in the context of classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models),
- implements the considered models in practical problems.

**Content**
Since the classical work "Theory of the Location of Industries" of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.
Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

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

**Literature**
**Elective literature:**

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

## T  Course: Financial Analysis [T-WIWI-102900]

**Responsibility:** Torsten Luedecke
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch/englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530205 | | Vorlesung (V) | 2 | Torsten Luedecke |
| SS 2018 | 2530206 | | Übung (Ü) | 2 | Torsten Luedecke |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Recommendations**
Basic knowledge in corporate finance, accounting, and valuation is required.

## V  Event excerpt:  (SS 2018)

**Aim**
Students are able to

- understand the key financial statements according to international standards,
- use financial ratios and financial analysis for different purposes,
- evaluate the financial performance of the firm,
- determine the value of the firm by using residual income and cash flow figures, respectively,
- assess the quality of financial statements.

**Content**
Topics:

- Introduction to Financial Analysis
- Financial Reporting Standards
- Major Financial Statements and Other Information
- Recognition and Measurement Issues
- Analysis of Financial Statements
- Financial Reporting Quality

**Literature**

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

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

**Responsibility:** Melanie Schienle
**Contained in:** [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2520022 | | Vorlesung (V) | 2 | Melanie Schienle |
| SS 2018 | 2520023 | | Übung (Ü) | 2 | Chong Liang, Melanie Schienle |

**Learning Control / Examinations**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

**Remarks**
The course takes place each second summer term: 2018/2020. . . .

## V  Event excerpt:  (SS 2018)

**Aim**
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

**Workload**
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours

## T Course: Financial Intermediation [T-WIWI-102623]

**Responsibility:** Martin Ruckes
**Contained in:** [M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2530232 | Financial Intermediation | Vorlesung (V) | 2 | Martin Ruckes |
| WS 18/19 | 2530233 | | Übung (Ü) | 1 | Andreas Benz, Daniel Hoang, Martin Ruckes |

**Learning Control / Examinations**
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

**Conditions**
None

**Recommendations**
None

## V Event excerpt: Financial Intermediation (WS 18/19)

**Aim**
Students

- are in a position to describe the arguments for the existence of financial intermediaries,
- are able of discuss and analyze both static and dynamic aspects of contractual relationships between banks and borrowers,
- are able to discuss the macroeconomic role of the banking system,
- are in a position to explain the fundamental principles of the prudential regulation of banks and are able to recognize and evaluate the implications of specific regulations.

**Content**

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Stability of the financial system
- The macroeconomic role of financial intermediation
- Principles of the prudential regulation of banks

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

**Literature**
**Elective literature:**

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6th edition, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2nd edition, MIT Press.

## T  Course: Fixed Income Securities [T-WIWI-102644]

**Responsibility:** Marliese Uhrig-Homburg
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
Please note that the lecture is not held in winter semester 18/19.
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO2015 and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3.The examination is offered every semester and can be repeated at every regular examination date.

**Conditions**
None

**Recommendations**
Knowledge from the course "Derivatives" is very helpful.

**Remarks**
See German version.

## T Course: Freight Transport [T-BGU-106611]

**Responsibility:** Bastian Chlond
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Semester | Prüfungsleistung schriftlich | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232809 | | Vorlesung / Übung (VÜ) | 2 | Bastian Chlond |

**Learning Control / Examinations**
written exam, 60 min.

**Conditions**
none

**Recommendations**
none

**Remarks**

## T  Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

**Responsibility:**  Bernhard Ulrich Kehrwald, Heiko Kubach
**Contained in:**  [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2133108 | Fuels and Lubricants for Combustion Engines | Vorlesung (V) | 2 | Bernhard Ulrich Kehrwald |

**Learning Control / Examinations**
oral examination, Duration: ca. 25 min., no auxiliary means

**Conditions**
none

## V  Event excerpt: Fuels and Lubricants for Combustion Engines (WS 18/19)

**Aim**
The students can name and explain composition and meaning of fuels, lubricants and coolants as important components in the system of todays Otto and Diesel engines as well as definition and chemical composition of fuels and lubricants, the meanig of crude oil as basic primary product, production processes, major properties, standards and specifications, testing methods.
They can point out future worldwide trends in the field of conventional and alternative fuels regarding emission standards and energy conservation

**Content**
Introduction and basics


Fuels for Gasoline and Diesel engines


Hydrogen


Lubricants for Gasoline and Diesel engines


Coolants for combustion engines

**Workload**
regular attendance: 24 hours
self-study: 96 hours

**Literature**
Lecturer notes

## T  Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

**Responsibility:** Olaf Deutschmann, Jan-Dierk Grunwaldt, Heiko Kubach, Egbert Lox
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2134138 | Fundamentals of catalytic exhaust gas aftertreatment | Vorlesung (V) | 2 | Olaf Deutschmann, Jan-Dierk Grunwaldt, Egbert Lox |

**Learning Control / Examinations**
oral examination, Duration: 25 min., no auxiliary means

**Conditions**
none

## V  Event excerpt: Fundamentals of catalytic exhaust gas aftertreatment (SS 2018)

**Aim**
The students can name and explain the scientific fundamentals of the catalytic exhaust gas aftertreatment, as well as the technical, political and economical parameters of its application in engines for passenger cars and HD vehicles.

The students are able to point out and explain which emissions are formed in combustion engines, why these emissions are helth-related critical and which measures the legislator has established to reduce the emissions.

**Content**
1. kind and source of emissions
2. emission legislation
3. principal of catalytic exhaust gas aftertreatment (EGA)
4. EGA at stoichiometric gasoline engines
5. EGA at gasoline engines with lean mixtures
6. EGA at diesel engines
7. economical basic conditions for catalytic EGA

**Workload**
regular attendance: 36 hours
self-study: 84 hours

**Literature**
Lecture notes available in the lectures

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** **Course: Gas Engines [T-MACH-102197]**

**Responsibility:** Rainer Golloch
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 4 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

**Learning Control / Examinations**
Oral examination, duration 25 min., no auxillary means

**Conditions**

## T Course: Gear Cutting Technology [T-MACH-102148]

**Responsibility:** Markus Klaiber
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2149655 | Gear Cutting Technology | Vorlesung (V) | 2 | Markus Klaiber |

**Learning Control / Examinations**
Oral Exam (20 min)

**Conditions**
none

## V Event excerpt: Gear Cutting Technology (WS 18/19)

**Aim**

- 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.

**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.

**Workload**
regular attendance: 21 hours
self-study: 99 hours

## T  Course: Global Optimization I [T-WIWI-102726]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550134 | | Vorlesung (V) | 2 | Oliver Stein |
| SS 2018 | 2550135 | | Übung (Ü) | 1 | Robert Mohr, Christoph Neumann, Oliver Stein |

**Learning Control / Examinations**
Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO) and possibly of a compulsory prerequisite.
The exam is offered in the lecture of semester and the following semester.
The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

**Conditions**
None

**Modeled Conditions**
The following conditions must be met:

- The course [T-WIWI-103638] *Global optimization I and II* must not have been started.

**Recommendations**
None

**Remarks**
Part I and II of the lecture are held consecutively in the *same*semester.

## V  Event excerpt:  (SS 2018)

**Aim**
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.

**Content**
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization

- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

## T   Course: Global optimization I and II [T-WIWI-103638]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 9 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2550134 | | Vorlesung (V) | 2 | Oliver Stein |
| SS 2018 | 2550136 | | Vorlesung (V) | 2 | Oliver Stein |

**Learning Control / Examinations**
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The examination is held in the semester of the lecture and in the following semester.

**Conditions**
None

**Modeled Conditions**
The following conditions must be met:

1. The course [T-WIWI-102726] *Global Optimization I* must not have been started.
2. The course [T-WIWI-102727] *Global Optimization II* must not have been started.

**Recommendations**
None

**Remarks**
Part I and II of the lecture are held consecutively in the *same* semester.

## V   Event excerpt:   (SS 2018)

**Aim**
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.

**Content**
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

## V Event excerpt: (SS 2018)

**Aim**

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.

**Content**

In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture.

Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via $\alpha$BB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

## T | Course: Global Optimization II [T-WIWI-102727]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550135 | | Übung (Ü) | 1 | Robert Mohr, Christoph Neumann, Oliver Stein |
| SS 2018 | 2550136 | | Vorlesung (V) | 2 | Oliver Stein |

**Learning Control / Examinations**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The examination is held in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

**Conditions**
None

**Modeled Conditions**
The following conditions must be met:

- The course [T-WIWI-103638] *Global optimization I and II* must not have been started.

**Remarks**
Part I and II of the lecture are held consecutively in the *same*semester.

## V | Event excerpt: (SS 2018)

**Aim**
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.

**Content**
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
The global solution of convex optimization problems is subject of part I of the lecture.
Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via $\alpha$BB method

- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

## T Course: Global Production and Logistics - Part 1: Global Production [T-MACH-105158]

**Responsibility:** Gisela Lanza
**Contained in:** [M-MACH-101282] Global Production and Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2149610 | Global Production and Logistics - Part 1: Global Production | Vorlesung (V) | 2 | Gisela Lanza |

**Learning Control / Examinations**
Written Exam (60 min)

**Conditions**
"T-MACH-108848 - Globale Produktion und Logistik - Teil 1: Globale Produktion" must not be commenced.

## V Event excerpt: Global Production and Logistics - Part 1: Global Production (WS 18/19)

**Aim**
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.

**Content**
Target of the lecture is to depict the challenges and fields of action of global operating companies and to give an overview of central aspects in global production networks as well as establishing a deepening knowledge of established methods and procedures for design and scale. Within the course methods for site selection, procedures for site specific adjustment of product construction and product technology as well as planning approaches to establish a new production site are imparted. The course is rounded off by showing the characteristics of the departments sale, procurement as well as research and development under global aspects. Moreover, the implementation of Industry 4.0 applications is discussed in the context of global production.
The topics are:

- Basic conditions and influencing factors of global production (historical development, targets, chances and threats)
- Global sales
- Site selection
- Site specific producion adjustment

- Establishing of new production sites
- Global procurement
- Design and management of global production networks
- Global research and development

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Lecture Notes
recommended secondary literature:
Abele, E. et al: Global Production – A Handbook for Strategy and Implementation, Springer 2008 (english)

## T  Course: Global Production and Logistics - Part 2: Global Logistics [T-MACH-105159]

**Responsibility:**  Kai Furmans
**Contained in:**  [M-MACH-101282] Global Production and Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2149600 | Global Production and Logistics - Part 2: Global Logistics | Vorlesung (V) | 2 | Kai Furmans |

**Learning Control / Examinations**
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

**Conditions**
none

**Recommendations**
We recommend attending the course "Logistics - organization, design and control of logistic systems " (2118078) beforehand.

## V  Event excerpt: Global Production and Logistics - Part 2: Global Logistics (SS 2018)

**Aim**
Students are able to:

- assign basic problems of planning and operation of global supply chains and plan them with apropriate methods,
- describe requirements and characteristics of global trade and transport, and
- evaluate characteristics of the design from logistic chains regarding their suitability.

**Content**
Characteristics of global trade

- Incoterms
- Customs clearance, documents and export control

Global transport and shipping

- Maritime transport, esp. container handling
- Air transport

Modeling of supply chains

- SCOR model
- Value stream analysis

Location planning in cross-border-networks

- Application of the Warehouse Location Problem
- Transport Planning

Inventory Management in global supply chains

- Stock keeping policies

Inventory management considering lead time and shipping costs

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
**Elective literature:**

- Arnold/Isermann/Kuhn/Tempelmeier. HandbuchLogistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren,Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, OldenbourgVerlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Neumann-Morlock. Operations-Research,Hanser-Verlag, 1993
- Tempelmeier. Bestandsmanagement in SupplyChains, Books on Demand 2006
- Schönsleben. IntegralesLogistikmanagement, Springer, 1998

## T  Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the lecture and the following lecture.

**Conditions**
None

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

**Remarks**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

## T  Course: Heat Economy [T-WIWI-102695]

**Responsibility:**  Wolf Fichtner
**Contained in:**  [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2581001 | Heat Economy | Vorlesung (V) | 2 | Wolf Fichtner |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Conditions**
None.

**Recommendations**
None

**Remarks**
See German version.

## V  Event excerpt: Heat Economy (SS 2018)

**Aim**
The student gains detailed knowledge about heat generating technologies and their areas of application, in particular in the area of combined heat and power. The student is able to deal with technical and economic questions in this field.

**Content**
1. Introduction: Heat economy
2. CHP technologies (incl. calculation of profitability)
3. Heat systems (incl. calculation of profitability)
4. Distribution of heat
5. Demand for space heating and thermal insulation measures
6. Heat storage
7. Legal framework conditions
8. Laboratory experiment: compression heat pump

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

## T  Course: High-Voltage Technology I [T-ETIT-101913]

**Responsibility:** Rainer Badent
**Contained in:** [M-ETIT-101163] High-Voltage Technology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2307360 | | Vorlesung (V) | 2 | Rainer Badent |
| WS 18/19 | 2307362 | | Übung (Ü) | 1 | Tobias Maier |

**Conditions**

## T Course: High-Voltage Technology II [T-ETIT-101914]

**Responsibility:** Rainer Badent
**Contained in:** [M-ETIT-101163] High-Voltage Technology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2307361 | High-Voltage Technology II | Vorlesung (V) | 2 | Rainer Badent |
| SS 2018 | 2307363 | | Übung (Ü) | 1 | Wolf Schulze |

**Conditions**

## T  Course: High-Voltage Test Technique [T-ETIT-101915]

**Responsibility:** Rainer Badent
**Contained in:** [M-ETIT-101164] Generation and transmission of renewable power

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2307392 | | Vorlesung (V) | 2 | Rainer Badent |
| WS 18/19 | 2307394 | | Übung (Ü) | 1 | Max Heinrich Görtz |

**Conditions**

## T Course: Human Factors in Security and Privacy [T-WIWI-109270]

**Responsibility:** Melanie Volkamer
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511554 | | Vorlesung (V) | 2 | Melanie Volkamer |
| WS 18/19 | 2511555 | | Übung (Ü) | 1 | Melanie Volkamer |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

**Conditions**
Successful participation in the exercises.

**Remarks**
New course starting winter term 2018/2019.

## V Event excerpt:  (WS 18/19)

**Aim**
Students . . .

- know why many existing security and privacy mechanisms are not usable and why many awareness/education/training approaches are not effective
- can explain for concrete examples why these are not usable / not effective including why people are likely to face problems with these
- can explain what mental models are, why they are important and how they can be identified
- know how to conduct a cognitive walkthrough to identify problems with existing mechanisms and approaches
- know how to conduct semi-structured interviews
- know how user studies in the security context differ from those conducted in other contexts
- can explain the process of human centered security / privacy by design
- know the advantages and disadvantages of various graphical password schemes
- know concepts such as just in time and place security interventions

**Content**
This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. This includes the importance of mental models. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is also applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study.

**Literature**

- Usable Security: History, Themes, and Challenges (Synthesis Lectures on Information Security, Privacy, and Trust): Simson Garfinkel und Heather Richter Lipford. 2014

- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
- Melanie Volkamer, Karen Renaud: Mental Models - General Introduction and Review of Their Application to Human-Centred Security. In Number Theory and Cryptography (2013): 255-280: https://link.springer.com/chapter/10.1007/978-3-642-42001-6_18
- Paul Gerber, Marco Ghiglierie, Birgit Henhapl, Oksana Kulyk, Karola Marky, Peter Mayer, Benjamin Reinheimer, Melanie Volkamer: Human Factors in Security. In: Reuter C. (eds) Sicherheitskritische Mensch-Computer-Interaktion. Springer (2018) https://link.springer.com/chapter/10.1007/978-3-658-19523-6_5
- Bruce Schneier: Psychology of Security (2018): https://www.schneier.com/essays/archives/2008/01/the_psychology_of_se.html
- Ross Anderson: security /usability and psychology. In Security Engineering. http://www.cl.cam.ac.uk/~rja14/Papers/SEv2-c02.pdf
- Andrew Odlyzko: Economics, Psychology and Sociology of Security: http://www.dtc.umn.edu/~odlyzko/doc/econ.psych.security.pdf

## T  Course: Incentives in Organizations [T-WIWI-105781]

**Responsibility:** Petra Nieken
**Contained in:**  [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101505] Experimental Economics
[M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2573003 | Incentives in Organizations | Vorlesung (V) | 2 | Petra Nieken |
| SS 2018 | 2573004 | Übung zu Incentives in Organizations | Übung (Ü) | 1 | Mitarbeiter, Petra Nieken |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
In case of a small number of registrations, we might offer an oral exam instead of a written exam.

**Conditions**
None

**Recommendations**
Knowledge of microeconomics, game theory, and statistics is assumed.

**Remarks**
The course is carried out routinely in summer.

## V  Event excerpt: Incentives in Organizations (SS 2018)

**Aim**
The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics. He / she is able to use both, standard economic models and behavioral models.
- understands how econometric methods can be used to analyze performance and compensation data. Is able to read and interpret results from regressions and derive economic relevance from those results.
- knows incentives schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical datafor companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

**Content**
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

**Workload**
The total workload for this course is approximately 135 hours.
Lecture 32h

Preparation of lecture 52h
Exam preparation 51h

**Literature**
Literature (mandatory): Slides, case studies, and selected research papers announced in the lecture
Literature (additional):
Brickley / Smith / Zimmerman: Managerial Economics and Organizantional Architecture
Camerer: Behavioral Game Theory
Lazear / Gibbs: Personnel Economics in Practice
Wooldridge: Introduction to Econometrics
Wooldridge: Econometric Analysis of Cross Section and Panel Data

## T  Course: Industrial Services [T-WIWI-102822]

**Responsibility:** Hansjörg Fromm
**Contained in:** [M-WIWI-101506] Service Analytics
[M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2595505 | Industrial Services | Vorlesung (V) | 2 | Hansjörg Fromm |
| WS 18/19 | 2595506 | | Übung (Ü) | 1 | Jannis Walk |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Industrial Services (WS 18/19)

**Aim**
Participants understand the interrelation between Front-Office (Customer view, e.g. material availability, technician skills, maintenance quality, repair time) and Back-Office (Provider view, e.g. distribution planning, inventory optimization, technician work schedule, call center). They learn about forecasting algorithms for sporadic demands, which are typical in spare part supply, and they apply common inventory optimization models for stock planning. They also become familiar with full-cost service contracts, as well as with the latest product related services that have been enabled only in recent years by modern IT and mobile technology.

**Content**
Services are becoming ever more important in business. Today, the gross income share of services in Germany exceeds 70%. Following this trend, many companies that previously focused solely on the sale of goods, strive to an extension of their business model: In order to realize new competitive advantages in domestic and international markets, they enrich their material goods with customer-specific services. This transformation to a provider of integrated solutions is called "Servitization" (Neely 2009). For this reason, so-called industrial services to companies of increasing importance. They benefit from the increasingly detailed data collected (on "Big Data"), e.g. concerning user profiles, failure statistics, usage history, accrued expenses, etc. Only these data allow in principle to end products and spare parts are delivered faster, cheaper and more targeted and technicians can be used more efficiently with the correct skills. This requires, however, also suitable methods of optimization, prognosis or predictive modeling. When used properly, such methods can minimize logistics costs, increase availability, prevent potential failures and improve repair planning. This is also enabled by latest "Technology Enabled Services" along with corresponding data transfer and analysis ("Internet of Things", automatic error detection, remote diagnostics, centralized collection of consumption data, etc.). The change from goods manufacturer to a provider of integrated solutions requires new services, transformation of business models as well as intelligent new contract types, which are addressed in the course as well.
**More specifically, the lessons of this lecture will include**:

- Servitization – The Manufacturer's Transformationto Integrated Solution Provider
- Service Levels – Definitions, Agreements, Measurements and Service Level Engineering
- The "Services Supply Chain"
- Spare Parts Planning – Forecasting, Assortment Planning, Order Quantities and Safety Stocks
- Distribution Network Planning – Network Types, Models, Optimization

- Service Technician Planning
- Condition Monitoring, Predictive Maintenance, Diagnose Systems
- Call Center Services
- Full Service Contracts
- IT-enabled Value-Add Services – Industrial Service Innovation

**Workload**

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

**Literature**

Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (Vol. 3, p. 30). New York: Wiley.

Pintelon, L., & Van Puyvelde, F. (2013). *Asset Management. The Maintenance Perspective*. Acco.

Chopra, S., & Meindl, P. (2007). Supply chain management. Strategy, planning & operation. In *Das summa summarum des management* (pp. 265-275). Gabler.

Koole, G. (2007). Call Center Mathematics: A scientific method for understanding and improving contact centers. *Departement of Mathematics, Vrije Universiteit, Amsterdam*.

Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services. *International journal of service industry management*, *14*(2), 160-172.

## T  Course: Information Engineering [T-MACH-102209]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Semester | Prüfungsleistung anderer Art | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2122014 | Information Engineering | Seminar (S) | 2 | Mitarbeiter, Jivka Ovtcharova |

**Learning Control / Examinations**
Alternative exam assessment (written composition and speech)

**Conditions**
None

## T Course: Information Management for public Mobility Services [T-BGU-106608]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232813 | | Block (B) | 2 | Peter Vortisch |

**Learning Control / Examinations**
lecture accompanying exercises, appr. 5 pieces

**Conditions**
none

**Recommendations**
none

**Remarks**

## T Course: Information Service Engineering [T-WIWI-106423]

**Responsibility:** Harald Sack
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2511606 | | Vorlesung (V) | 2 | Harald Sack |
| SS 2018 | 2511607 | | Übung (Ü) | 1 | Harald Sack |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

**Conditions**
None

**Remarks**
New course starting summer term 2017.

## V Event excerpt: (SS 2018)

**Aim**

- The students know the fundamentals and measures of information theory and are able to apply those in the context of Information Service Engineering.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students have fundamental skills of information retrieval and are enabled to conduct and to evaluate simple information retrieval tasks.
- The students apply their skills of natural language processing, Linked Data engineering, and Information Retrieval to conduct and evaluate simple knowledge mining tasks.
- The students know the fundamentals of recommender systems as well as of semantic and exploratory search.

**Content**
- Information, Natural Language and the Web
- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques & Challenges
- Evaluation, Precision and Recall
- Regular Expressions and Automata
- Tokenization
- Language Model and N-Grams
- Part-of-Speech Tagging

- Linked Data Engineering

- Knowledge Representations and Ontologies
- What's in an URI?
- Resource Description Framework (RDF)
- Creating new Models with RDFS
- Querying RDF(S) with SPARQL
- More Expressivity with Web Ontology Language (OWL)
- The Web of Data
- Vocabularies and Ontologies in the Web of Data
- Wikipedia, DBpedia, and Wikidata

- Information Retrieval

- Information Retrieval Models
- Retrieval Evaluation
- Web Information Retrieval
- Document Crawling, Text Processing, and Indexing
- Query Processing and Result Representation
- Question Answering

- Knowledge Mining

- From Data to Knowledge
- Data Mining
- Machine Learning Basics for Knowledge Mining
- Mining Knowledge from Wikipedia
- Named Entity Resolution

- Exploratory Search and Recommender Systems

- Semantic Search and Entity Centric Search
- Collaborative Filtering and Content Based Recommendations
- From Search to Intelligent Browsing
- Linked Data Based Exploratory Search
- Fact Ranking

**Literature**

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- S. Hitzler, S. Rudolph, Foundations of Semantic Web Technologies, Chapman / Hall, 2009.
- R. Baeza-Yates, B. Ribeiro-Neto, Modern Information Retrieval, 2nd ed., Addison Wesley, 2010.#

## T  Course: Information Systems and Supply Chain Management [T-MACH-102128]

**Responsibility:** Christoph Kilger
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101280] Logistics in Value Chain Networks
[M-MACH-101282] Global Production and Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2118094 | Information Systems in Logistics and Supply Chain Management | Vorlesung (V) | 2 | Christoph Kilger |

**Learning Control / Examinations**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

## V  Event excerpt: Information Systems in Logistics and Supply Chain Management (SS 2018)

**Aim**
Students are able to:

- Describe requirements of logistical processes regarding IT systems,
- Choose information systems to support logistical processes and use them according to the requirements of a supply chain.

**Content**
1) Overview of logistics systems and processes
2) Basic concepts of information systems and information technology
3) Introduction to IS in logistics: Overview and applications
4) Detailed discussion of selected SAP modules for logistics support

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Stadtler, Kilger: Supply Chain Management and Advanced Planning, Springer, 4. Auflage 2008

## T   Course: Innovation Management: Concepts, Strategies and Methods [T-WIWI-102893]

**Responsibility:** Marion Weissenberger-Eibl
**Contained in:** [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2545100 | Innovation Management: Concepts, Strategies and Methods | Vorlesung (V) | 2 | Marion Weissenberger-Eibl |

**Learning Control / Examinations**
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.

**Conditions**
None

**Recommendations**
None

## V   Event excerpt: Innovation Management: Concepts, Strategies and Methods (SS 2018)

**Aim**
Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

**Content**
The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the un-derstanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application.
The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particu-larly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addi-tion to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of inte-grated knowledge.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
A detailed bibliography is provided with the lecture notes.

## T  Course: Innovationtheory and -Policy [T-WIWI-102840]

**Responsibility:** Ingrid Ott
**Contained in:** [M-WIWI-101514] Innovation Economics
[M-WIWI-101478] Innovation and Growth
[M-WIWI-101497] Agglomeration and Innovation

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2560236 | Innovationtheory and -policy | Vorlesung (V) | | Ingrid Ott |
| SS 2018 | 2560237 | | Übung (Ü) | | Levent Eraydin, Ingrid Ott |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

**Conditions**
None

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

## V  Event excerpt: Innovationtheory and -policy (SS 2018)

**Aim**
Students shall be given the ability to

- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- understand the relationships between market structure and the development of innovation
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

**Content**

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

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

**Literature**
Excerpt:

- Aghion, P., Howitt, P. (2009), The Economics of Growth, MIT Press, Cambridge MA.
- de la Fuente, A. (2000), Mathematical Methods and Models for Economists. Cambridge University Press, Cambridge, UK.
- Klodt, H. (1995), Grundlagen der Forschungs- und Technologiepolitik. Vahlen, München.
- Linde, R. (2000), Allokation, Wettbewerb, Verteilung - Theorie, UNIBUCH Verlag, Lüneburg.
- Ruttan, V. W. (2001), Technology, Growth, and Development. Oxford University Press, Oxford.
- Scotchmer, S. (2004), Incentives and Innovation, MIT Press.
- Tirole, Jean (1988), The Theory of Industrial Organization, MIT Press, Cambridge MA.

**T** **Course: Insurance Marketing [T-WIWI-102601]**

**Responsibility:** Edmund Schwake
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

**Learning Control / Examinations**
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

**Conditions**
None

**Recommendations**
None

## T Course: Insurance Production [T-WIWI-102648]

**Responsibility:** Ute Werner
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung mündlich | 1 |

### Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).
T-WIWI-102648 Insurance Production will be offered latest until summer term 2017 (beginners only).

### Conditions
None

### Recommendations
None

### Remarks
This course is offered on demand. For further information, see: http://insurance.fbv.kit.edu

## T Course: Insurance Risk Management [T-WIWI-102636]

**Responsibility:** Harald Maser
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 2.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment consists of a written or an oral exam (according to Section 4 (2), 1 or 2 of the examination regulation). T-WIWI-102636 Insurance Risk Management will be offered as a seminar starting summer term 2017. The examination will be offered latest until summer term 2017 (beginners only).

**Conditions**
None

**Recommendations**
None

**Remarks**
Block course. For organizational reasons, please register with the secretary of the chair: thomas.mueller3@kit.edu.

## T  Course: Integrated Product Development [T-MACH-105401]

**Responsibility:** Albert Albers, Albers Assistenten
**Contained in:** [M-MACH-102626] Integrated Product Development

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 16 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2145156 | Integrated Product Development | Vorlesung (V) | 4 | Albert Albers |
| WS 18/19 | 2145157 | Workshop Product Development | Übung (Ü) | 4 | Albert Albers, Mitarbeiter |
| WS 18/19 | 2145300 | Project Work in Product Development | Sonstige (sonst.) | 2 | Albert Albers |

**Learning Control / Examinations**
oral examination (60 minutes)

**Conditions**
none

**Remarks**
Due to organizational reasons, the number of participants is limited. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK hompage from april to july. The selection itself is made by Prof. Albers in personal interviews.

## V  Event excerpt: Project Work in Product Development (WS 18/19)

**Aim**
The center of "Integrated Product Development" constitutes itself in the development of a technical product within independent working student teams on the basis of the market situation up to virtual and real prototypes. Thereby the integrate treatment of the product development process is of importance. The project teams hereby represent development departments of medium sized companies, in which the presented methods and tools are field - experienced applied and ideas are transformed into concrete product models.
For the preparation of this development project the basics of 3D-CAD-modelling (Pro/ENGINEER) as well as different tools and methods of creative designing, of sketching and solution finding are mediated in workshops. Special events impart an insight of presentation techniques and the meaning of technical design.

**Content**
The project work begins with the early stages of product development, i.e. the identification of market trends and needs. Based on this information the students develop scenarios for future markets and create product profiles, which describe the customers and their demands without anticipating possible product solutions. After having passed several following milestones for ideas, concepts and designs, virtual prototypes and function prototypes are presented to an audience.
The project work is supported by coaching through skilled faculty staff. Additionally weekly tutorials, respectively workshops are given. For doing the project the teams gain access to team workspaces featuring IT-infrastructure and relevant software, such as office, CAD or FEA. Further on the teams learn how team cooperation and knowledge management can be supported in design project by using a wiki system.

**Workload**
regular attendance: 21 h
self-study: 99 h

## V  Event excerpt: Integrated Product Development (WS 18/19)

**Aim**
The Students are able to ...

- analyze and evaluate product development processes based on examples and their own experiences.
- plan, control and evaluate the working process systematically.
- choose and use suitable methods of product development, system analysis and innovation management under consideration of the particular situation.
- prove their results.
- develop complex technical solutions in a team and to present them to qualified persons as well as non-qualified persons
- to design overall product development processes under consideration of market-, customer- and company- aspects

## Content

organizational integration: integrated product engineering model, core team management and simultaneous engineering
informational integration: innovation management, cost management, quality management and knowledge management
personal integration: team coaching and leadership management
invited lectures

## Workload

regular attendance: 84 h
self-study: 288 h

## Literature

Klaus Ehrlenspiel - Integrierte Produktentwicklung. Denkabläufe, Methodeneinsatz, Zusammenarbeit, Hanser Verlag, 2009

**T**  **Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-109054]**

**Responsibility:**   Gisela Lanza
**Contained in:**   [M-MACH-101272] Integrated Production Planning

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 9 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2150660 | Integrated Production Planning in the Age of Industry 4.0 | Vorlesung / Übung (VÜ) | 6 | Gisela Lanza |

**Learning Control / Examinations**
Written Exam (120 min)

**Conditions**
"T-MACH-108849 - Integrierte Produktionsplanung im Zeitalter von Industrie 4.0" as well as "T-MACH-102106 Integrierte Produktionsplanung" must not be commenced.

**V**  **Event excerpt: Integrated Production Planning in the Age of Industry 4.0 (SS 2018)**

**Aim**
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**
Integrated production planning in the age of industry 4.0 will be taught in the context of this engineering science lecture. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the lecture:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (production planning and control, fine layout, IT systems in an industry 4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The lecture contents are rounded off by numerous current practical examples with a strong industry 4.0 reference. Within the exercises the lecture contents are deepened and applied to specific problems and tasks.

**Workload**
**MACH:**
regular attendance: 63 hours
self-study: 177 hours
**WING:**
regular attendance: 63 hours
self-study: 207 hours

**Literature**
Lecture Notes

**T** **Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]**

**Responsibility:** Karl-Hubert Schlichtenmayer
**Contained in:** [M-MACH-101284] Specialization in Production Engineering
[M-MACH-101282] Global Production and Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2150601 | Integrative Strategies in Production and Development of High Performance Cars | Vorlesung (V) | 2 | Karl-Hubert Schlichtenmayer |

**Learning Control / Examinations**
Written Exam (60 min)

**Conditions**
none

**V** **Event excerpt: Integrative Strategies in Production and Development of High Performance Cars (SS 2018)**

**Aim**
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.

**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

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Lecture Slides

## T  Course: Intelligent CRM Architectures [T-WIWI-103549]

**Responsibility:** Andreas Geyer-Schulz
**Contained in:** [M-WIWI-101470] Data Science: Advanced CRM

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2540525 | Intelligent CRM Architectures | Vorlesung (V) | 2 | Andreas Geyer-Schulz |
| WS 18/19 | 2540526 | Übung zu Intelligent CRM Architectures | Übung (Ü) | 1 | Fabian Ball |

**Learning Control / Examinations**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.

Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

**Conditions**

None

**Recommendations**

It is recommended to additionally review the Bachelor-level lecture "Customer Relationship Management" from the module "CRM and Servicemanagement".

## V  Event excerpt: Intelligent CRM Architectures (WS 18/19)

**Aim**

Students have special knowledge of software architectures and of the methods which are used in their development (Systems analysis, formal methods for the specification of interfaces and algebraic semantic, UML, and, last but not least, the mapping of conceptual architectures to IT architectures.

Students know important architectural patterns and they can – based on their CRM knowledge – combine these patterns for innovative CRM applications.

**Content**

The lecture is structured in three parts:

In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

**Workload**

The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

**Sum: 135h 00m**

**Literature**

- P. Clements *et al.*, *Documenting Software Architectures. Views and Beyond*. Upper Saddle River: Addison-Wesley, 2011.
- M. Fowler, *Patterns of Enterprise Application Architecture*. Amsterdam: Addison-Wesley Longman, 2002.
- S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 3rd ed. Harlow Essex England: Pearson New International Edition, 2014.
- V. N. Vapnik, *The Nature of Statistical Learning Theory*. New York: Springer, 1995.

## T  Course: Interactive Information Systems [T-WIWI-108461]

**Responsibility:** Alexander Mädche, Stefan Morana
**Contained in:** [M-WIWI-104080] Designing Interactive Information Systems
[M-WIWI-104068] Information Systems in Organizations

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung anderer Art | 3 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540558 | Interactive Information Systems | Vorlesung (V) | 2 | Alexander Mädche, Stefan Morana |

**Learning Control / Examinations**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (70%) and research paper (30%). The exam and the research paper need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the research paper.

**Conditions**
None

**Remarks**
This course replaces T-WIWI-106342 "Interactive Systems" starting summer term 2018.
The course is held in english.

## V  Event excerpt: Interactive Information Systems (SS 2018)

**Aim**
The students
· know what interactive systems are and how they can be conceptualized
· explore the theoretical grounding of interactive systems leveraging theories from reference disciplines such as psychology
· know key concepts and design principles of specific classes of interactive systems (e.g. assistance, behavior change systems)
· get hands-on experience by analyzing existing interactive systems and suggesting enrichments based on the lecture contents.

**Content**
· Basics
· Theoretical foundations
· Key concepts and design principles for specific interactive systems classes
· Capstone project

**Literature**
The lecture bases to a large extend on
· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.
Additional literature will be provided in the lecture.

## T  Course: International Finance [T-WIWI-102646]

**Responsibility:**   Marliese Uhrig-Homburg
**Contained in:**   [M-WIWI-101480] Finance 3
  [M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530570 | International Finance | Vorlesung (V) | 2 | Marliese Uhrig-Homburg, Ulrich Walter |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Recommendations**
None

**Remarks**
See German version.

## V  Event excerpt: International Finance (SS 2018)

**Aim**
The objective of this course is to become familiar with the basics of investment decisions on international markets and to manage foreign exchange risks.

**Content**
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor second that, of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore current exchange rate theories are discussed.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
**Elective literature:**

- Eiteman, D. et al., Multinational Business Finance, 13. edition, 2012.
- Solnik, B. and D. McLeavey, Global Investments, 6. edition, 2008.

## T  Course: International Management in Engineering and Production [T-WIWI-102882]

**Responsibility:** Henning Sasse
**Contained in:** [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581956 | International Management in Engineering and Production | Vorlesung (V) | 2 | Henning Sasse |

**Learning Control / Examinations**
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: International Management in Engineering and Production (WS 18/19)

**Aim**
Students are taught advanced knowledge in the field of international production and the internationalization strategies of manufacturing companies. They acquire a basic understanding of international production companies and learn about the relevant business and economic models and schools of thought on the subject. Different approaches of the design of internationalization strategies and production networks are presented and relevant location factors for their particular design are investigated. Students learn about the risks of internationalization and methods of risk minimization. Issues of supply chain management are discussed in the context of different approaches to the discrete manufacturing and the process industry. The course concludes with selected case studies from the process and discrete manufacturing industry.

**Content**

- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**
Will be announced in the course.

## T  Course: Internet Law [T-INFO-101307]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 24354 | Internet Law | Vorlesung (V) | 2 | Thomas Dreier |

### Modeled Conditions

The following conditions must be met:

- The course [T-INFO-108462] *Selected legal issues of Internet law* must not have been started.

## V  Event excerpt: Internet Law (WS 18/19)

### Aim

Die Studierenden erhalten anhand praktischer relevanter Fragestellungen und Einzelfällen eine Orientierung für die Rechtsfragen, die sich durch den Einsatz von Digitalisierung und Vernetzung stellen.

### Content

Jeder der teilnehmenden Praxisvertreter erhält die Möglichkeit, ein praktisch relevantes Thema eigener Wahl je nach Umfang in ein bis drei Doppelstunden vorzustellen und mit den Studenten zu erarbeiten. Über die didaktische Vorgehensweise (Vortrag, Diskussion, Case study, Studentenreferat o.Ä.) entscheidet jeder Praxisteilnehmer selbst, damit eine möglichst themenadäquate Behandlung gewährleistet ist.

### Workload

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden, davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

## T  Course: Introduction to Microsystem Technology I [T-MACH-105182]

**Responsibility:** Vlad Badilita, Mazin Jouda, Jan Gerrit Korvink
**Contained in:** [M-MACH-101293] Microsystem Technology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|-----------|-----------|---------|
| 3 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2141861 | Introduction to Microsystem Technology I | Vorlesung (V) | 2 | Vlad Badilita, Jan Gerrit Korvink |

**Learning Control / Examinations**
written examination for implementation in a major field, 30 min oral exam for elective subject

**Conditions**
none

## V  Event excerpt: Introduction to Microsystem Technology I (WS 18/19)

**Aim**
The lecture gives an introduction into the basics of microsystems technology. In analogy to processes employed in fabrication of microelectronics circuits the core technologies as well as materials for producing microstructures and components are presented. Finally, various techniques for Silicon micromachining are explained and illustrated with examples for micro-components and micro-systems.

**Content**
- Introduction in Nano- and Microtechnologies
- Silicon and processes for fabricating microelectronics circuits
- Basic physics background and crystal structure
- Materials for micromachining
- Processing technologies for microfabrication
- Silicon micromachining
- Examples

**Workload**
Literature: 20 h
Lessions: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

**Literature**
M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

## T Course: Introduction to Microsystem Technology II [T-MACH-105183]

**Responsibility:** Mazin Jouda, Jan Gerrit Korvink
**Contained in:** [M-MACH-101293] Microsystem Technology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142874 | Introduction to Microsystem Technology II | Vorlesung (V) | 2 | Vlad Badilita, Jan Gerrit Korvink |

**Learning Control / Examinations**
written examination for major field, oral exam (30 min) for elective field

**Conditions**
none

## V Event excerpt: Introduction to Microsystem Technology II (SS 2018)

**Aim**
The lecture gives an introduction into the basics of microsystems technology. In the first part, methods for lithographic pattern transfer are summarized. Then specific techniques such as the LIGA process, micro-machining, and laser-patterning are explained and examples are given. Finally assembly and packaging methods are presented leading into a discussion of entire microsystems.

**Content**
- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

**Workload**
Literature: 20 h
Lessions: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

**Literature**
M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

## T Course: Introduction to Stochastic Optimization [T-WIWI-106546]

**Responsibility:** Steffen Rebennack
**Contained in:** [M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550470 | | Vorlesung (V) | | Steffen Rebennack |
| SS 2018 | 2550471 | | Übung (Ü) | | Assistenten, Steffen Rebennack |

**Learning Control / Examinations**
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.

**Conditions**
None.

## T Course: IoT platform for engineering [T-MACH-106743]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2123352 | IoT platform for engineering | Vorlesung (V) | | Thomas Maier, Jivka Ovtcharova |
| WS 18/19 | 2123352 | IoT platform for engineering | Projekt / Seminar (PJ/S) | | Thomas Maier, Jivka Ovtcharova |

**Learning Control / Examinations**
Assessment of another type (graded), procedure see webpage. Number of participants limited to 20 people. There is a participant selection process.

## T  Course: IT-Fundamentals of Logistics [T-MACH-105187]

**Responsibility:**  Frank Thomas
**Contained in:**  [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2118183 | IT-Fundamentals of Logistics | Vorlesung (V) | 2 | Frank Thomas |

**Learning Control / Examinations**
The assessment consists of an oral exam (30min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

**Remarks**
1) Detailed script can be downloaded online (www.tup.com), updated and enhanced annually.
2) CD-ROM with chapters and exercises at the end of the semester available from the lecturer, also updated and enhanced annually.

## V  Event excerpt: IT-Fundamentals of Logistics (SS 2018)

**Aim**
The students . . .

- can describe the business process models from goods-inbound to goods-outbound based on sound basic knowledge, and derive the corresponding analysis models.
- will learn through the modularisation of the business process elements to think in reusable, adaptive IT components.
- will accomplish excellent work as a highly-motivated employee together in interdisciplinary teams (responses from the industry).

**Content**
The rapid development of information technology influences business processes drastically.
A strategic IT-orientation for an enterprise without a critical appreciation of worldwide IT-development (where the half-life value of IT for logistic systems knowledge is less than 3 years) is dangerous. The pressure of costs is always in focus. For this purpose the contents of this course, as well as the detailed script will be continuously revised, and the influences on business processes will be shown in practical examples.
**Focuses:**

- **System architecture in Material Flow Control Systems (MFCS)**

A guiding principle for a new system architecture for MFC systems is the consideration of making new standardized, functional groups available for re-usability.

- **Design and application of innovative Material Flow Control Systems (MFCS)**

The most important task of the MFCS is the commissioning of conveying systems with driving commands in a way that optimally utilizes the facility and serves the logistics processes on schedule.

- **Identification of goods – Application in Logistics**

Along with business processes, coded information is the link between the flow of information and the flow of materials, and contributes to error prevention in the communication between people and machines.

- **Data communication in Intra-logistics**

Information describes the content of a message that is of value to the recipient.
The recipient can be both a human and a machine.

- **Business processes for Intra-logistics – Software follows function!**

If the business processes from Goods Incoming to Goods Outgoing are adapted with reusable building blocks then capabilities become visible. Against this background the consideration becomes apparent, how, through an innovative software architecture,
a reusable building-block based framework can be made.
Therefore applies: Software follows function. And only if all project requirements are documented in the planing phase, and supported together in an inter-disciplinary team - consisting of logistics planners, the customers (users) and the implementation leader (IL).

- **Software development in accordance with industrial standards**

Today's development of object-oriented software, and the increasing penetration of industrial software production with this technology, makes it possible to create system designs that already offer these opportunities in their facility - both for a high degree of reuse and for easier adaptability.
In software development, object-oriented methods are used to improve the productivity, maintainability and software quality. An important aspect of object-orientation is: the objects used are primarily intended to depict the real world.

**Workload**
regular attendance: 21 hours
self-study: 99 hours

## T Course: Joint Entrepreneurship Summer School [T-WIWI-109064]

**Responsibility:** Orestis Terzidis
**Contained in:** [M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 6 | Unregelmäßig | Prüfungsleistung anderer Art | 1 |

### Learning Control / Examinations

The learning control of the program (Summer School) consists of two parts:

A) **Investor Pitch**:

Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.

B) **Written elaboration:**

The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyzes and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.

The grade consists of 50% presentation performance and 50% written preparation.

### Conditions

The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

### Recommendations

We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

### Remarks

The working language during the Summer School is English. A one-week stay in China is part of the Summer School.

## T  Course: Knowledge Discovery [T-WIWI-102666]

**Responsibility:**  York Sure-Vetter
**Contained in:**  [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511302 | Knowledge Discovery | Vorlesung (V) | 2 | Achim Rettinger, York Sure-Vetter |
| WS 18/19 | 2511303 | Exercises to Knowledge Discovery | Übung (Ü) | 1 | Achim Rettinger, York Sure-Vetter, Steffen Thoma, Tobias Weller |

**Learning Control / Examinations**
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation.
Students can be awarded a bonus on their final grade if they successfully complete special assignments.

**Conditions**
None

## V  Event excerpt: Knowledge Discovery (WS 18/19)

**Aim**
Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

**Content**
Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empircial evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others feauturevector-based learning, text mining and social network analysis.

**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**

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

**T** **Course: Laboratory Production Metrology [T-MACH-108878]**

**Responsibility:** Benjamin Häfner
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Recurrence | Version |
|------|------------|---------|
| 4 | Jedes Sommersemester | 1 |

**Learning Control / Examinations**
Alternative test achievement:
Group presentation

**Conditions**

## T Course: Laboratory Work Water Chemistry [T-CIWVT-103351]

**Responsibility:** Gudrun Abbt-Braun, Harald Horn
**Contained in:** [M-CIWVT-101121] Water Chemistry and Water Technology I

| ECTS | Exam type | Version |
|:---:|:---:|:---:|
| 4 | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 22664 | | Praktikum (P) | 2 | Gudrun Abbt-Braun, Harald Horn, und Mitarbeiter |

**Conditions**

## T Course: Large-scale Optimization [T-WIWI-106549]

**Responsibility:** Steffen Rebennack
**Contained in:** [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550475 | | Vorlesung (V) | 2 | Steffen Rebennack |
| SS 2018 | 2550476 | | Übung (Ü) | 1 | Steffen Rebennack |

**Learning Control / Examinations**
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.

**Conditions**
None.

# T  Course: Laser Physics [T-ETIT-100741]

**Responsibility:** Christian Koos
**Contained in:** [M-MACH-101295] Optoelectronics and Optical Communication
[M-MACH-101292] Microoptics

| ECTS | Language | Exam type | Version |
|------|----------|-----------|---------|
| 4 | englisch | Prüfungsleistung mündlich | 1 |

## Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2301480 | | Vorlesung (V) | 2 | Marc Eichhorn |
| WS 18/19 | 2301481 | | Übung (Ü) | 1 | Marc Eichhorn |

**Conditions**

## T  Course: Law of Contracts [T-INFO-101316]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-101216] Private Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 24671 | Law of Contracts | Vorlesung (V) | 2 | Alexander Hoff |

## V  Event excerpt: Law of Contracts (SS 2018)

**Aim**

Der/die Studierende kennt sich aus in den Grundfragen der Vertragsgestaltung. Er/sie kennt typische Vertragsgestaltungen. Der/die Studierende kann einfach gelagerte Problemfälle lösen und einfache Vertragsentwürfe formulieren. Er/sie hat ein Problembewusstsein entwickelt, welche Schwierigkeiten auftreten können bei der Gestaltung komplexerer Sachverhalte. Er/sie ist in der Lage, auch im internationalen Kontext Bezüge herzustellen.

**Content**

Die Vorlesung befasst sich mit den Grundfragen der Vertragsgestaltung im Wirtschaftsrecht. Anhand ausgewählter Beispiele aus der Praxis wird ein Überblick über typische Vertragsgestaltungen vermittelt. Insbesondere werden die GmbH, die OHG, die KG, Die EWIV, der Verein und die Aktiengesellschaft behandelt. Dabei werden auch internationale und rechtsvergleichende Bezüge hergestellt.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

**Literature**

Wird in der Vorlesung bekannt gegeben.

# T   Course: Lean Construction [T-BGU-108000]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Semester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241901 | | Vorlesung / Übung (VÜ) | 4 | Shervin Haghsheno, Mitarbeiter/innen |

**Learning Control / Examinations**
written exam, 70 min.

**Conditions**
none

**Recommendations**
none

**Remarks**

## T   Course: Learning Factory "Global Production" [T-MACH-105783]

**Responsibility:**   Gisela Lanza
**Contained in:**   [M-MACH-101284] Specialization in Production Engineering
                    [M-MACH-101282] Global Production and Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2149612 | | Seminar / Praktikum (S/P) | 2 | Gisela Lanza |

**Learning Control / Examinations**
oral exam (45 min group examination with 3 students)

**Conditions**
Successful completion of one of the following courses:

- Integrated Production Planning [T-MACH-102106]
- Global Production and Logistics – Part 1: Global Production [T-MACH-105158]
- Quality Management [T-MACH-102107]

**Modeled Conditions**
1 of 2 conditions must be met:

1. The course [T-MACH-105158] *Global Production and Logistics - Part 1: Global Production* must have been passed.

2. The course [T-MACH-102107] *Quality Management* must have been passed.

**Recommendations**
Participation in the following courses:

- Integrated Production Planning [T-MACH-102106]
- Global Production and Logistics – Part 1: Global Production [T-MACH-105158]
- Quality Management [T-MACH-102107]

**Remarks**
For organizational reasons the number of participants for the course is limited to 20. Hence a selection process will take place. Applications are made via the homepage of wbk.

## V   Event excerpt:   (WS 18/19)

**Aim**
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.

**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

**Workload**

e-Learning: ~ 24 h
regular attendance: ~ 36 h
self-study: ~ 60 h

## T  Course: Liberalised Power Markets [T-WIWI-107043]

**Responsibility:** Wolf Fichtner
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets
[M-WIWI-102808] Digital Service Systems in Industry

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581998 | Liberalised Power Markets | Vorlesung (V) | 2 | Wolf Fichtner |

**Learning Control / Examinations**
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

**Conditions**
See German version.

**Recommendations**
None

## V  Event excerpt: Liberalised Power Markets (WS 18/19)

**Aim**
The student has detailed knowledge concerning the new challenges of liberalised energy markets. He has the ability to:

- Understand the new economic reality of liberalised energy markets
- Obtain a deeper understanding of the different submarkets of the power market
- Identify problems of the liberalised energy markets

**Content**
1. The European liberalisation process
1.1 The concept of a competitive market
1.2 The regulated market
1.3 Deregulation in Europe
2. Pricing and investments in a liberalised power market
2.1 Merit order
2.2 Prices and investments
2.3 Market flaws and market failure
2.4 Regulation in liberalised markets
2.5 Additional regulation mechanisms
3. The power market and the corresponding submarkets
3.1 List of submarkets
3.2 Types of submarkets
3.3 Market rules
4. Risk management
4.1 Uncertainties in a liberalised market
4.2 Investment decisions under uncertainty
4.3 Estimating future electricity prices
4.4 Portfolio management
5. Market power
5.1 Defining market power
5.2 Indicators of market power
5.3 Reducing market power
6. Market structures in the value chain of the power sector

**Workload**

The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**
**Elective literature:**

Power System Economics; Steven Stoft, IEEE Press/Wiley-Interscience Press, 0-471-15040-1

## T  Course: Life Cycle Assessment [T-WIWI-103133]

**Responsibility:** Heiko Keller
**Contained in:** [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581995 | Life Cycle Assessment | Vorlesung (V) | 2 | Heiko Keller |

**Learning Control / Examinations**
The assessment consists of an oral exam (30 min.) or a written exam (60 min.).

**Conditions**
None.

**Recommendations**
None

## V  Event excerpt: Life Cycle Assessment (WS 18/19)

**Aim**
The students

- understand why it is essential for the future viability of companies and other stakeholders in society to assess products and services based on their whole life cycles.

- know the basics and methodology of life cycle assessment.

- are able to apply life cycle assessment in basic decision contexts.
- are aware for contexts that require further in-depth knowledge in sustainability assessment.

**Content**
Our society has reached a historically unique material prosperity. At the same time, environmental burdens and resource consumption are continuously reaching new peaks - not only regarding greenhouse gas emissions and oil production rates. It is obvious that the material and energy intensity of products and services has to decrease if we want to keep our current level of material prosperity on the long run. Enormous efficiency gains, as they have been reached e.g. for labour productivity, however, require that environmental burdens and resource consumption per unit of product are in the first place known, transparent and can thus be optimised. This data and its calculation are increasingly requested and sooner or later will have to become as essential for management as e.g. unit labour costs.

Life cycle assessment is a methodology in sustainability assessment that provides this information and deduces optimisation potentials and decision support for companies, politics, consumers etc. To this end, material and energy flows are compiled along the whole life cycle of a product from extraction of raw materials, via production and use of a product until its disposal. Subsequently, environmental impacts of these flows are analysed.

This lecture describes structure and individual steps of life cycle assessments in detail. Furthermore, it explains its application in decision support. In interactive phases, participants recapitulate the theoretical basis by own calculations. As an outlook, further instruments in sustainability assessment are introduced that analyse other sustainability aspects.

**Workload**

Total effort required will account for approximately 105h (3.5 credits).

**Literature**

will be announced in the course

## T Course: Logistics - Organisation, Design and Control of Logistic Systems [T-MACH-102089]

**Responsibility:** Kai Furmans
**Contained in:** [M-MACH-101280] Logistics in Value Chain Networks

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 6 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2118078 | Logistics - Organisation, Design, and Control of Logistic Systems | Vorlesung (V) | 3 | Kai Furmans |

**Learning Control / Examinations**
The assessment consists of a 90 minutes written examination (according to §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
Requied are lectures on "Linear Algebra" and "Stochastic".

## V Event excerpt: Logistics - Organisation, Design, and Control of Logistic Systems (SS 2018)

**Aim**
Students are able to:

- Describe logistical tasks,
- Design logistical systems suitable to the respective task,
- Dimension stocastical stock models,
- Determine essential influencing parameters on the bullwhip effect and
- Use optimizing solution methods.

**Content**
Introduction

- historical overview
- lines of development

Structure of logistics systems
Distribution logistics

- location planning
- Vehicle Routing Planning
- distribution centers

Inventory management

- demand forecasting
- Inventory management policies
- Bullwhip effect

Production logistics

- layout planning

- material handling
- flow control

Supply Managament

- information flow
- transportation organization
- controlling and development of a logistics system
- co-operation mechanisms
- Lean SCM
- SCOR model

Identification Technologies

**Workload**
180 hrs

**Literature**

- Arnold/Isermann/Kuhn/Tempelmeier. Handbuch Logistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, Oldenbourg Verlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Neumann-Morlock. Operations-Research, Hanser-Verlag, 1993
- Tempelmeier. Bestandsmanagement in Supply Chains, Books on Demand 2006
- Schönsleben. Integrales Logistikmanagement, Springer, 1998

## T Course: Long-Distance and Air Traffic [T-BGU-106301]

**Responsibility:** Bastian Chlond
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6232904 | | Vorlesung (V) | 2 | Bastian Chlond, KIT Dozenten |

**Learning Control / Examinations**
written exam, 60 min.

**Conditions**
none

**Recommendations**
none

**Remarks**

## T  Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

**Responsibility:** Johann Marius Zöllner
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|-----------|-----------|---------|
| 5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 24150 | Machine Learning 1 - Basic methods | Vorlesung (V) | 2 | Rüdiger Dillmann, Johann Marius Zöllner |

**Learning Control / Examinations**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

**Conditions**
None.

**Remarks**
New course starting winter term 2017/2018.

## V  Event excerpt: Machine Learning 1 - Basic methods (WS 18/19)

**Aim**

- Studierende erlangen Kenntnis der grundlegenden Methoden im Bereich des Maschinellen Lernens.
- Studierende können Methoden des Maschinellen Lernens einordnen, formal beschreiben und bewerten.
- Die Studierenden können ihr Wissen für die Auswahl geeigneter Modelle und Methoden für ausgewählte Probleme im Bereich des Maschinellen Lernens einsetzen.

**Content**

Das Themenfeld Wissensakquisition und Maschinelles Lernen ist ein stark expandierendes Wissensgebiet und Gegenstand zahlreicher Forschungs- und Entwicklungsvorhaben. Der Wissenserwerb kann dabei auf unterschiedliche Weise erfolgen. So kann ein System Nutzen aus bereits gemachten Erfahrungen ziehen, es kann trainiert werden, oder es zieht Schlüsse aus umfangreichem Hintergrundwissen.
Die Vorlesung behandelt sowohl symbolische Lernverfahren, wie induktives Lernen (Lernen aus Beispielen, Lernen durch Beobachtung), deduktives Lernen (Erklärungsbasiertes Lernen) und Lernen aus Analogien, als auch subsymbolische Techniken wie Neuronale Netze, Support Vektor-Maschinen, Genetische Algorithmen und Reinforcement Lernen. Die Vorlesung führt in die Grundprinzipien sowie Grundstrukturen lernender Systeme und der Lerntheorie ein und untersucht die bisher entwickelten Algorithmen. Der Aufbau sowie die Arbeitsweise lernender Systeme wird an einigen Beispielen, insbesondere aus den Gebieten Robotik, autonome mobile Systeme und Bildverarbeitung vorgestellt und erläutert.

**Workload**
Vorlesung mit 2 SWS, plus Nachbereitung durch die Studierenden.

## **T**  Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

**Responsibility:** Johann Marius Zöllner
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics
[M-WIWI-101637] Analytics and Statistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2511502 | Machine Learning 2 - Advanced methods | Vorlesung (V) | 2 | Johann Marius Zöllner |
| SS 2018 | 2511503 | Exercises for Machine Learning 2 - Advanced Methods | Übung (Ü) | 1 | Johann Marius Zöllner |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

**Conditions**
None.

**Remarks**
New course starting summer term 2017.

## **V**  Event excerpt: Machine Learning 2 - Advanced methods (SS 2018)

**Aim**

- Students understand extended concepts of machine learning and their possible applications.
- Students can classify, formally describe and evaluate methods of machine learning.
- In detail, methods of machine learning can be embedded and applied in complex decision and inference systems.
- Students can use their knowledge to select suitable models and methods of machine learning for existing problems in the field of machine intelligence.

**Content**
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.
The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.
The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

**Workload**
Vorlesung mit 2 SWS, plus Nachbereitung durch die Studierenden.

**Literature**
The slides are available as a PDF

**Related Literature**

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

**Further (specific) literature on individual topics will be given in the lecture.**

## T  Course: Machine Tools and Industrial Handling [T-MACH-102158]

**Responsibility:** Jürgen Fleischer
**Contained in:** [M-MACH-101286] Machine Tools and Industrial Handling

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 9 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2149902 | Machine Tools and Industrial Handling | Vorlesung / Übung (VÜ) | 6 | Jürgen Fleischer |

**Learning Control / Examinations**
Written exam (120 minutes)

**Conditions**
"T-MACH-109055 - Werkzeugmaschinen und Handhabungstechnik" must not be commenced.

## V  Event excerpt: Machine Tools and Industrial Handling (WS 18/19)

**Aim**
The students ...

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

**Content**
The lecture gives an overview of the construction, use and application of machine tools and industrial handling equipment. In the course of the lecture a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools is conveyed. First, the main components of the machine tools are systematically explained and their design principles as well as the integral machine tool design are discussed. Subsequently, the use and application of machine tools will be demonstrated using typical machine examples. Based on examples from current research and industrial applications, the latest developments are discussed, especially concerning the implementation of Industry 4.0.
The individual topics are:

- Frames and frame components
- Feed axes
- Spindles
- Peripheral equipment
- Control unit
- Metrological evaluation and machine testing
- Process monitoring
- Maintenance of machine tools
- Safety assessment of machine tools
- Machine examples

**Workload**
MACH:
regular attendance: 63 hours

self-study: 177 hours
WiIng:/TVWL
regular attendance: 63 hours
self-study: 207 hours

## T   Course: Management Accounting 1 [T-WIWI-102800]

**Responsibility:** Marcus Wouters
**Contained in:** [M-WIWI-101498] Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2579900 | Management Accounting 1 | Vorlesung (V) | 2 | Marcus Wouters |
| SS 2018 | 2579901 | | Übung (Ü) | 2 | N.N., Marcus Wouters |

**Learning Control / Examinations**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester in combination with a project that runs for several weeks during the semester.

**Conditions**
None

## V   Event excerpt: Management Accounting 1 (SS 2018)

**Aim**
Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

**Content**
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.
We will use international material written in English.
We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).
The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

**Literature**

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

## T  Course: Management Accounting 2 [T-WIWI-102801]

**Responsibility:** Marcus Wouters
**Contained in:** [M-WIWI-101498] Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2579902 | Management Accounting 2 | Vorlesung (V) | 2 | Marcus Wouters |
| WS 18/19 | 2579903 | | Übung (Ü) | 2 | Ana Mickovic, Marcus Wouters |

**Learning Control / Examinations**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester in combination with a project that runs for several weeks during the semester.

**Conditions**
None

**Recommendations**
It is recommended to take part in the course "Management Accounting 1" before this course.

## V  Event excerpt: Management Accounting 2 (WS 18/19)

**Aim**
Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

**Content**
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems and customer value propositions.
We will use international material written in English.
We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).
The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

**Literature**

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

## T  Course: Management of IT-Projects [T-WIWI-102667]

**Responsibility:**  Roland Schätzle
**Contained in:**  [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2511214 | Management of IT-Projects | Vorlesung (V) | 2 | Roland Schätzle |
| SS 2018 | 2511215 | | Übung (Ü) | 1 | Roland Schätzle |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) in the first week after lecture period according to Section 4(2), 1 of the examination regulation.

**Conditions**
None.

## V  Event excerpt: Management of IT-Projects (SS 2018)

**Aim**
Students

- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropiate to current project phases and project contexts,
- consider organisational and social impact factors.

**Content**
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
    - plan of the project structure
    - flow chart
    - project schedule
    - plan of resources
- effort estimation
- project infrastructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

**Workload**
Lecture 30h
Exercise 15h

Preparation of lecture 30h

Preparation of exercises 30h
Exam preparation 44h
Exam &1h


Total: 150h

**Literature**

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004
- Project Management Institute Standards Committee. A Guide to the Project Management Body of Knowledge (PMBoK guide). Project Management Institute. Four Campus Boulevard. Newton Square. PA 190733299. U.S.A.

Further literature is given in each lecture individually.

## T  Course: Managing New Technologies [T-WIWI-102612]

**Responsibility:** Thomas Reiß
**Contained in:** [M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2545003 | Managing New Technologies | Vorlesung (V) | 2 | Thomas Reiß |
| SS 2018 | 2545004 | Exercise: Managing New Technologies | Übung (Ü) | 1 | Thomas Reiß |

**Learning Control / Examinations**
Written exam 100% following §4, Abs. 2.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Managing New Technologies (SS 2018)

**Aim**
New technologies can contribute substantially to the international competitiveness of different industrial sectors. This course provides the necessary knowledge for understanding how industrial enterprises and policy-makers are dealing with the challenge to realise in time the potentials of new technologies and to use them most efficiently. Key tasks of the management of new technologies will be practised.

**Content**
The course provides an overview of the international development of a selected number of key technologies such as biotechnology, nanotechnology, neurotechnologies, converging technologies. Methods for monitoring new technologies including foresight approaches will be presented and the economic and social impacts of new technologies will be discussed.

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

**Literature**

- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

## T    Course: Manufacturing Technology [T-MACH-102105]

**Responsibility:**   Volker Schulze, Frederik Zanger
**Contained in:**   [M-MACH-101276] Manufacturing Technology

| ECTS | Language | Recurrence | Exam type | Version |
|---|---|---|---|---|
| 9 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 3 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2149657 | Manufacturing Technology | Vorlesung / Übung (VÜ) | 6 | Volker Schulze, Frederik Zanger |

**Learning Control / Examinations**
Written Exam (180 min)

**Conditions**
none

## V    Event excerpt: Manufacturing Technology (WS 18/19)

**Aim**
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.

**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.

**Workload**
regular attendance: 63 hours
self-study: 177 hours

**Literature**
Lecture Notes

## T  Course: Market Engineering: Information in Institutions [T-WIWI-102640]

**Responsibility:** Christof Weinhardt
**Contained in:** [M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101411] Information Engineering
[M-WIWI-102754] Service Economics and Management
[M-WIWI-101409] Electronic Markets
[M-WIWI-101446] Market Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540460 | Market Engineering: Information in Institutions | Vorlesung (V) | 2 | Tim Straub, Christof Weinhardt |
| SS 2018 | 2540461 | Übungen zu Market Engineering: Information in Institutions | Übung (Ü) | 1 | Simon Kloker, Esther Marie Mengelkamp, Tim Straub, Christof Weinhardt |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained.

**Conditions**
None

## V  Event excerpt: Market Engineering: Information in Institutions (SS 2018)

**Aim**
The students

- understand the role of an economist as an engineer to design markets,
- compare different markets and market mechanisms to evaluate their efficiency,
- apply game theoretic modelling and mechanism design as well as auction theory for interdisciplinary evaluation.

**Content**
The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

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

**Literature**

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.

- Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
- Smith, V. "Theory, Experiments and Economics", The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

## T  Course: Market Research [T-WIWI-107720]

**Responsibility:**
**Contained in:**  [M-WIWI-101647] Data Science: Evidence-based Marketing
[M-WIWI-101487] Sales Management
[M-WIWI-101490] Marketing Management
[M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2571150 | Market Research | Vorlesung (V) | 2 | Martin Klarmann |
| SS 2018 | 2571151 | Market Research Tutorial | Übung (Ü) | 1 | Maximilian Lüders |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
None

**Remarks**
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

## V  Event excerpt: Market Research (SS 2018)

**Aim**
Topics addressed in this course are for example:


Theoretical priciples of market research
Statistical foundations of market research
Measuring customer attitudes
Understanding of customer reactions
Strategical decision making

**Content**
Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making


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

**Literature**
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

## T  Course: Marketing Analytics [T-WIWI-103139]

**Responsibility:**   Martin Klarmann
**Contained in:**   [M-WIWI-101647] Data Science: Evidence-based Marketing

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 3 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2572170 | Marketing Analytics | Vorlesung (V) | 2 | Martin Klarmann |
| WS 18/19 | 2572171 | | Übung (Ü) | 1 | Ingo Halbauer |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation)

**Conditions**
None.

**Recommendations**
It is strongly recommended to complete the course Market Research prior to taking the Marketing Analytics course.

**Remarks**
For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu).
Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

## V  Event excerpt: Marketing Analytics (WS 18/19)

**Aim**
Students

- receive based on the course market research an overview of advanced empirical methods
- learn in the course of the lecture to handle advanced data collection and data analysis methods
- are based on the acquired knowledge able to interpret results and derive strategic implications

**Content**
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling, structural equation modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

**Workload**
Total workload for 4.5 ECTS: ca. 135 hours

**Literature**

- Hanssens, Dominique M., Parsons, Leonard J., Schultz, Randall L. (2003), Market response models: Econometric and time series analysis, 2nd ed, Boston.
- Gelman, Andrew, Hill, Jennifer (2006), Data analysis using regression and multilevel/hierarchical models, New York.
- Cameron, A. Colin, Trivedi, Pravin K. (2005), Microeconometrics: methods and applications, New York.
- Chapman, Christopher, Feit, Elea M. (2015), R for Marketing Research and Analytics, Cham.
- Ledolter, Johannes (2013), Data mining and business analytics with R, New York.

## T   Course: Marketing Strategy Business Game [T-WIWI-102835]

**Responsibility:**   Martin Klarmann
**Contained in:**   [M-WIWI-101490] Marketing Management
                [M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | deutsch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2571183 | Marketing Strategy Business Game | Block (B) | 1 | Assistenten, Martin Klarmann |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a group presentation and a subsequent round of questions totalling 20 minutes.

**Conditions**
None

**Recommendations**
None

**Remarks**
Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop.

Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

## V   Event excerpt: Marketing Strategy Business Game (SS 2018)

**Aim**
Students
- are able to operate the strategic marketing simulation software "Markstrat"
- are able to take strategic marketing decisions in groups
- know how to apply strategic marketing concepts to practical contexts (e.g. for market segmentation, product launches, coordination of the marketing mix, market research, choice of the distribution channel or competitive behavior)
- are capable to collect and to select information usefully with the aim of decision-making
- are able to react appropriately to predetermined market conditions
- know how to present their strategies in a clear and consistent way
- are able to talk about the success, problems, critical incidents, external influences and strategy changes during the experimental game and to reflect and present their learning success

**Content**
Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups' companies.

**Workload**
The total workload for this course is approximately 45.0 hours. For further information see German version.

**Literature**
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

## T  Course: Master Thesis [T-WIWI-103142]

**Responsibility:** Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
**Contained in:**   [M-WIWI-101659] Module Masterarbeit

| ECTS | Exam type | Version |
|------|-----------|---------|
| 30 | Abschlussarbeit | 1 |

**Learning Control / Examinations**
see module description

**Conditions**
see module description

## T  Course: Material Flow in Logistic Systems [T-MACH-102151]

**Responsibility:** Kai Furmans
**Contained in:** [M-MACH-101277] Material Flow in Logistic Systems
[M-MACH-101263] Introduction to Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 6 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2117051 | Material flow in logistic systems | Sonstige (sonst.) | 4 | Kai Furmans |

**Learning Control / Examinations**

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.

**Conditions**

**Recommendations**

Recommended elective subject: Probability Theory and Statistics

**Remarks**

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).

## V  Event excerpt: Material flow in logistic systems (WS 18/19)

**Aim**

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 inuencing the performance.
- Expand the boundaries of today's methods and system components conceptually if necessary.

**Content**

- Elements of material ow systems (conveyor elements, fork, join elements)
- Models of material ow 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

**Workload**
Regular attendance: 30 h
Self-study: 100 h
Group work: 50 h

**Literature**
**Arnold, Dieter; Furmans, Kai :** Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 2009

**T** **Course: Materials and Processes for Body Leightweight Construction in the Auto-motive Industry [T-MACH-105166]**

**Responsibility:** Stefan Kienzle, Dieter Steegmüller
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2149669 | Materials and Processes for Body Lightweight Construction in the Automo-tive Industry | Vorlesung (V) | 2 | Stefan Kienzle, Dieter Steegmüller |

**Learning Control / Examinations**
Oral Exam (20 min)

**Conditions**
none

**V** **Event excerpt: Materials and Processes for Body Lightweight Construction in the Automotive Industry (WS 18/19)**

**Aim**
The students. . .

- 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.
- are able to evaluate the different methods against lightweight applications on the basis of technical and economic aspects.

**Content**
The objective of the lecture is to build up an overview of the relevant materials and processes for the production of a lightweight body. This includes both the actual production and the joining for the body. The lecture covers the different lightweight approaches and possible fields of application in the automotive industry. The methods are discussed with practical examples from the automotive industry.
The following topics will be covered:

- lightweight designs
- aluminium and steel for lightweight construction
- fiber-reinforced plastics by the RTM and SMC process
- joining of steel and aluminium (clinching, riveting, welding)
- bonding
- coating
- finishing
- quality assurance
- virtual factory

**Workload**
regular attendance: 21 hours
self-study: 99 hours

## T  Course: Mathematical Models and Methods for Production Systems [T-MACH-105189]

**Responsibility:** Kai Furmans, Marion Rimmele
**Contained in:** [M-MACH-101278] Material Flow in Networked Logistic Systems

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 6 | englisch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2117059 | Mathematical models and methods for Production Systems | Vorlesung (V) | 4 | Kai Furmans, Marion Rimmele, Judith Stoll |

**Learning Control / Examinations**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

## V  Event excerpt: Mathematical models and methods for Production Systems (WS 18/19)

**Aim**
Students are able to:

- Describe material flow systems with analytical solvable stochastic models,
- Derive Approches for control systems (KANBAN) based on easy models of queueing theory,
- Execute practical exercised on workstations and
- Use simulation and exakt methods.

**Content**

- single server systems: M/M/1, M/G/1: priority rules, model of failures
- networks: open and closed approximations, exact solutions and approximations
- application to flexible manufacturing systems, AGV (automated guided vehicles) - systems
- modeling of control approaches like constant work in process (ConWIP) or kanban
- discrete-time modeling of queuing systems

**Workload**
regular attendance: 42 hours
self-study: 198 hours

**Literature**
Wolff: Stochastic Modeling and the Theory of Queues, Prentice Hall, 1989
Shanthikumar, Buzacott: Stochastic Models of Manufacturing Systems

## T Course: Metal Forming [T-MACH-105177]

**Responsibility:** Thomas Herlan
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2150681 | Metal Forming | Vorlesung (V) | 2 | Thomas Herlan |

**Learning Control / Examinations**
Oral Exam (20 min)

**Conditions**
none

## V Event excerpt: Metal Forming (SS 2018)

**Aim**
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.

**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

**Workload**
regular attendance: 21 hours
self-study: 99 hours

## T | Course: Methods and Models in Transportation Planning [T-BGU-101797]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6232701 | | Vorlesung / Übung (VÜ) | 2 | Mitarbeiter/innen, Peter Vortisch |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Methods in Economic Dynamics [T-WIWI-102906]

**Responsibility:** Ingrid Ott
**Contained in:** [M-WIWI-101514] Innovation Economics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | deutsch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2560240 | Methods in Economic Dynamics | Vorlesung (V) | | David Bälz, Ingrid Ott |

**Learning Control / Examinations**
Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

**Conditions**
None

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

## V  Event excerpt: Methods in Economic Dynamics (SS 2018)

**Aim**
Students shall be given the ability to:

- work with fundamental theoretical innovation models and to implement them in appropriate computer algebra systems
- query appropriate data sources and to analyse and visualise them using statistical methods

**Content**
The workshop offers the possibility to deepen the understanding about different aspects of theoretical modelling of innovation-based growth and induced economic effects. This includes the implementation of formal models in computer algebra systems as well as recording, processing and econometric analysis of related data from relational databases (concerning for example patents or trademarks). Moreover, methods of network theory are discussed.

**Workload**
The total workload for this course is approximately 45 hours.
Lecture: 15h
Preparation of lecture/exam: 30h

## T  Course: Microactuators [T-MACH-101910]

**Responsibility:** Manfred Kohl
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101290] BioMEMS
[M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2142881 | Microactuators | Vorlesung (V) | 2 | Manfred Kohl |

**Learning Control / Examinations**
oral exam

**Conditions**
none

## V  Event excerpt: Microactuators (SS 2018)

**Aim**
- Knowledge of the actuation principles including pros and cons
- Knowledge of important fabrication technologies
- Explanation of layout and function of the microactuators
- Calculation of important properties (time constants, forces, displacements, etc.)
- Development of a layout based on specifications

**Content**
- Basic knowledge in the material science of the actuation principles
- Layout and design optimization
- Fabrication technologies
- Selected developments
- Applications
The lecture includes amongst others the following topics:

- Microelectromechanical systems: linear actuators, microrelais, micromotors
- Medical technology and life sciences: Microvalves, micropumps, microfluidic systems
- Microrobotics: Microgrippers, polymer actuators (smart muscle)
- Information technology: Optical switches, mirror systems, read/write heads

**Workload**
lecture time 1.5 h/week
self preparation: 8.5 h/week

**Literature**
- Lecture notes
- 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 Course: Mixed Integer Programming I [T-WIWI-102719]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

## Learning Control / Examinations

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

The examination can also be combined with the examination of *Mixed Integer Programming II*[25140]. In this case, the duration of the written examination takes 120 minutes.

## Conditions

None

## Recommendations

It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

## Remarks

The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

## T  Course: Mixed Integer Programming II [T-WIWI-102720]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550140 | | Vorlesung (V) | 2 | Oliver Stein |
| SS 2018 | 2550141 | | Übung (Ü) | 1 | Christoph Neumann, Oliver Stein |

**Learning Control / Examinations**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

The examination can also be combined with the examination of *Mixed Integer Programming I* [2550138]. In this case, the duration of the written examination takes 120 minutes.

**Conditions**
None

**Recommendations**
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

**Remarks**
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

## V  Event excerpt:  (SS 2018)

**Aim**
The student

- knows and understands the fundamentals of convex and of nonconvex mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

**Content**
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, or the time minimal covering of a distance with a vehicle equipped with a gear shift. While optimal points can be defined straightforwardly, for their numerical identification an interplay of ideas from discrete and continuous optimization is necessary. Part I of the lecture deals with linear mixed integer programs.
Part II treats methods for the numerical solution of optimization problems which depend nonlinearly on continuous as well as discrete variables. It is structured as follows:

- Concepts of convex optimization
- Mixed integer convex programming (branch and bound methods)
- Mixed integer nonconvex programming
- Generalized Benders decomposition
- Outer approximation methods
- Heuristics

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

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

**Literature**
**Elective literature:**

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

## T Course: Mobility Services and new Forms of Mobility [T-BGU-103425]

**Responsibility:** Martin Kagerbauer
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232811 | | Vorlesung / Übung (VÜ) | 2 | Martin Kagerbauer |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T   Course: Model Based Application Methods [T-MACH-102199]

**Responsibility:** Frank Kirschbaum
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

**Learning Control / Examinations**
take-home exam, short presentation with oral examination

**Conditions**

## T  Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

**Responsibility:** Verena Dorner, Jella Pfeiffer, Christof Weinhardt
**Contained in:** [M-WIWI-101489] Strategy, Communication, and Data Analysis
[M-WIWI-101506] Service Analytics
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540470 | Modeling and Analyzing Consumer Behavior Vorlesung (V) with R | | 2 | Jella Pfeiffer |
| SS 2018 | 2540471 | | Übung (Ü) | 1 | Dominik Jung, Jella Pfeiffer |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Conditions**
None

**Recommendations**
None

**Remarks**
Limited number of slots
The course has been added summer term 2015.

## V  Event excerpt: Modeling and Analyzing Consumer Behavior with R (SS 2018)

**Aim**
The students

- have advanced knowledge in handling the statistics software R
- understands the approach of modelling and analysis consumer data
- masters methods for evaluation, analysis and visualization of data

**Content**
Students learn the fundamental methods, algorithms and concepts for analysing consumer data. The students deepen their knowledge in working on a case study and computer exercises, especially in the areas of e-commerce and behavioural economics. In addition, students learn to write applications in R and to organize and execute larger data mining and general data analytics projects. Furthermore, students learn methods for evaluating and visualizing data.
The event will focus on the following topics:
1. basic programming concepts in R
2. data mining with R using established process models such as CRISP-DM
3. text mining and analysis of online data with R
4. working on a case study from the area of Consumer and User Analytics
5. data visualization and evaluation with R

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

**Literature**

Field, A., Miles, J., Field, Z., Discovering Statistics Using R, SAGE 2014

Jones, O., Maillardet, R., Robinson, A., Scientific Programming and Simulation Using R, Chapmann & Hall / CRC Press 2009

Venables, W.N., Smith, D.M. and the R Core Team, "An Introduction to R", 2012 (Version 2.15.2), http://cran.r-project.org/doc/manuals/R-intro.pdf

Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)

## T  Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550490 | | Praktikum (P) | 3 | Stefan Nickel, Melanie Reuter-Oppermann |

**Learning Control / Examinations**
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the software laboratory and the following term.

**Conditions**
None.

**Recommendations**
Basic knowledge as conveyed in the module*Introduction toOperations Research*is assumed.
Successful completion of the courseModeling and OR-Software: Introduction.

**Remarks**
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

## V  Event excerpt:  (SS 2018)

**Aim**
The student

- is an expert in using computer systems to model and solve industry-related optimization problems,
- conducts an advanced approach to modeling and implementation software for OR models and is able to use them in practice,
- knows and explains the practical application possibilities of OR software in complex combinatorial and nonlinear optimization problems.

**Content**
The task of solving combinatorial and nonlinear optimization problems imposes much higher requirements on suggested solution approaches as in linear programming.
During the course of this software laboratory, students get to know important methods from combinatorial optimization, e.g. Branch & Cut- or Column Generation methods and are enabled to solve problems with the software system IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL. In addition, issues of nonlinear optimization, e.g. quadratic optimization, are addressed. As an important part of the software laboratory, students get the possibility to model combinatorial and nonlinear problems and implement solution approaches in the software system.
The software laboratory also introduces some of the most frequently used modelling and programming languages that are used in practice to solve optimization problems.

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

## T  Course: Modeling Strategic Decision Making [T-WIWI-102803]

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The course will not be offered anymore from winter term 2016/2017 on. The examination will be offered latest until summer term 2017 (repeaters only).
Written exam 100% following §4, Abs. 2.

**Conditions**
None

**Recommendations**
None

**T** **Course: Modelling, Measuring and Managing of Extreme Risks [T-WIWI-102841]**

**Responsibility:** Ute Werner
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 2.5 | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**
Non exam assessment (following §4(2), 3 of the examination regulation).
T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks will be offered latest until summer term 2017 (beginners only).

**Conditions**
None

**Recommendations**
None

# T Course: Morphodynamics [T-BGU-101859]

**Responsibility:** Franz Nestmann
**Contained in:** [M-WIWI-101642] Natural Hazards and Risk Management 1
[M-WIWI-101644] Natural Hazards and Risk Management 2

| ECTS | Exam type | Version |
|------|-----------|---------|
| 3 | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6222805 | Morphodynamics | Vorlesung / Übung (VÜ) | 2 | Franz Nestmann |

**Learning Control / Examinations**
See German version.

**Conditions**
None

## T  Course: Multivariate Statistical Methods [T-WIWI-103124]

**Responsibility:** Oliver Grothe
**Contained in:** [M-WIWI-103289] Stochastic Optimization
[M-WIWI-101637] Analytics and Statistics
[M-WIWI-101639] Econometrics and Statistics II

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550554 | | Vorlesung (V) | 2 | Oliver Grothe |
| SS 2018 | 2550555 | | Übung (Ü) | 2 | Maximilian Coblenz, Oliver Grothe |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).
The exam is offered every semester. Re-examinations are offered only for repeaters.

**Conditions**
None

**Recommendations**
The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course ''Advanced Statistics''. Without this, participation in the course is not advised.
Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

## V  Event excerpt:  (SS 2018)

**Aim**
Students

- choose appropriate methods for the illustration of multivariate data and apply these.
- choose appropriate methods for structure analysis and apply these.
- choose appropriate methods for dimension reduction and apply these.
- apply software.

**Content**
Graphical methods for multivariate Data
Regression Analysis (incl. logistic regression, Ridge and Lasso)
Principal Component, and Correspondence Analysis
Local linear Embedding
Multidimensional Scaling
Hierarchical Classification

**Literature**
Comprehensive lecture notes

## T Course: Nanotechnology for Engineers and Natural Scientists [T-MACH-105180]

**Responsibility:** Martin Dienwiebel, Hendrik Hölscher, Stefan Walheim
**Contained in:** [M-MACH-101294] Nanotechnology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142861 | Nanotechnology for Engineers and Natural Scientists | Vorlesung (V) | 2 | Martin Dienwiebel, Hendrik Hölscher, Stefan Walheim |

**Learning Control / Examinations**
written or oral exam

**Conditions**
none

## V Event excerpt: Nanotechnology for Engineers and Natural Scientists (SS 2018)

**Aim**
The student can

- explain the most common measurement principles of nanotechnology especialy scanning probe methods and is able to use them for the characterisation of chemical and physical properties of surfaces
- decribe interatomic forces and their influence on nanotechnology
- describe methods of micro- and nanofabrication and of –nanolithography
- explain simple models used in contact mechanics and nanotribology
- describe basic concepts used for nanoscale components

**Content**
1) Introduction into nanotechnology
2) History of scanning probe techniques
3) Scanning tunneling microscopy (STM)
4) Atomic force microscopy (AFM)
5) Dynamic Modes (DFM, ncAFM, MFM, KPFM, . . . )
6) Friction force microscopy & nanotribology
7) Nanolithography
8) Other families of the SPM family

**Workload**
lectures 30 h
self study 30 h
preparation for examination 30 h

**Literature**

1. Lecture notes, slides, script
2. Scanning Probe Microscopy – Lab on a Tip: Meyer, Hug, Bennewitz, Springer (2003)

## T | Course: Nanotechnology with Clusterbeams [T-MACH-102080]

**Responsibility:** Jürgen Gspann
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101294] Nanotechnology

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
written examination
presence in more that 70% of the lectures
Duration: 1 h

aids: none

**Conditions**

## T   Course: Nanotribology and -Mechanics [T-MACH-102167]

**Responsibility:** Martin Dienwiebel, Hendrik Hölscher
**Contained in:** [M-MACH-101291] Microfabrication
[M-MACH-101294] Nanotechnology

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 3 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2182712 | Nanotribology and -Mechanics | Block-Vorlesung (BV) | 2 | Martin Dienwiebel |
| WS 18/19 | 2182712 | Nanotribology and -Mechanics | Block-Vorlesung (BV) | 2 | Martin Dienwiebel |

**Learning Control / Examinations**
presentation (40%) and oral examination (30 min, 60%)

no tools or reference materials

**Conditions**
none

**Recommendations**
preliminary knowlegde in mathematics and physics

## V   Event excerpt: Nanotribology and -Mechanics (WS 18/19)

**Aim**
The student can

- explain the physical foundations and common models used in the field of nanotribology and nanomechanics
- describe the most important experimental methods in nanotribology
- critically evauate scientific papers on nanotribological issues with respect to their substantial quality

**Content**
Part 1: Basics:

- Nanotechnology
- Forces at nanometer scale
- contact mechanics models (Hertz, JKR, DMT)
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Atomic-Scale Wear

Part 2: Topical papers

**Workload**
regular attendance: 22,5 hours
preparation for presentation: 22,5 hours
self-study: 75 hours

**Literature**
Lecture notes, slides and copies of articles

## T  Course: Nature-Inspired Optimisation Methods [T-WIWI-102679]

**Responsibility:** Pradyumn Kumar Shukla
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2511106 | | Vorlesung (V) | 2 | Pradyumn Kumar Shukla |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called "bonus exam", 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exersices . The bonus exam may be split into several shorter written tests.
The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

**Conditions**
None

## V  Event excerpt:  (SS 2018)

**Aim**
To learn:

1. Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization
2. Different aspects and limitation of the methods
3. Applications of such methods
4. Multi-objective optimization methods
5. Constraint handling methods
6. Different aspects in parallelization and computing platforms

**Content**
Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

**Literature**
* E. L. Aarts and J. K. Lenstra: 'Local Search in Combinatorial Optimization'. Wiley, 1997 * D. Corne and M. Dorigo and F. Glover: 'New Ideas in Optimization'. McGraw-Hill, 1999 * C. Reeves: 'Modern Heuristic Techniques for Combinatorial Optimization'. McGraw-Hill, 1995 * Z. Michalewicz, D. B. Fogel: How to solve it: Modern Heuristics. Springer, 1999 * E. Bonabeau, M. Dorigo, G. Theraulaz: 'Swarm Intelligence'. Oxford University Press, 1999 * A. E. Eiben, J. E. Smith: 'Introduction to Evolutionary Computation'. * M. Dorigo, T. Stützle: 'Ant Colony Optimization'. Bradford Book, 2004 Springer, 2003

## T Course: Non- and Semiparametrics [T-WIWI-103126]

| | |
|---|---|
| **Responsibility:** | Melanie Schienle |
| **Contained in:** | [M-WIWI-101638] Econometrics and Statistics I |
| | [M-WIWI-101639] Econometrics and Statistics II |

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**

None

**Recommendations**

Knowledge of the contents covered by the course *"Applied Econometrics"* [2520020]

**Remarks**

The course takes place every second winter semester: 2018/19 then 2020/21

# T Course: Nonlinear Optimization I [T-WIWI-102724]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 3 |

## Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2550111 | | Vorlesung (V) | 2 | Oliver Stein |
| WS 18/19 | 2550112 | | Übung (Ü) | | Robert Mohr, Oliver Stein |
| WS 18/19 | 2550142 | | Übung (Ü) | | Robert Mohr, Oliver Stein |

**Learning Control / Examinations**
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of *Nonlinear Optimization II* [2550113]. In this case, the duration of the written examination takes 120 minutes.

**Conditions**
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

**Modeled Conditions**
The following conditions must be met:

- The course [T-WIWI-103637] *Nonlinear Optimization I and II* must not have been started.

**Remarks**
Part I and II of the lecture are held consecutively in the *same* semester.

# V Event excerpt: (WS 18/19)

**Aim**
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.

**Content**
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**
**Elective literature:**

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

## T Course: Nonlinear Optimization I and II [T-WIWI-103637]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 9 | Jedes Wintersemester | Prüfungsleistung schriftlich | 5 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2550111 | | Vorlesung (V) | 2 | Oliver Stein |
| WS 18/19 | 2550112 | | Übung (Ü) | | Robert Mohr, Oliver Stein |
| WS 18/19 | 2550113 | | Vorlesung (V) | 2 | Oliver Stein |
| WS 18/19 | 2550142 | | Übung (Ü) | | Robert Mohr, Oliver Stein |

### Learning Control / Examinations

The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The exam takes place in the semester of the lecture and in the following semester.

### Conditions

None.

### Modeled Conditions

The following conditions must be met:

1. The course [T-WIWI-102724] *Nonlinear Optimization I* must not have been started.
2. The course [T-WIWI-102725] *Nonlinear Optimization II* must not have been started.

### Remarks

Part I and II of the lecture are held consecutively in the **same** semester.

## V Event excerpt: (WS 18/19)

### Aim

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.

### Content

The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**
**Elective literature:**

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

## V Event excerpt: (WS 18/19)

**Aim**
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.

**Content**
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**
**Elective literature:**

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

## T  Course: Nonlinear Optimization II [T-WIWI-102725]

**Responsibility:**  Oliver Stein
**Contained in:**  [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2550112 | | Übung (Ü) | | Robert Mohr, Oliver Stein |
| WS 18/19 | 2550113 | | Vorlesung (V) | 2 | Oliver Stein |

**Learning Control / Examinations**
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The exam can also be combined with the examination of *Nonlinear OptimizationI* [2550111]. In this case, the duration of the written exam takes 120 minutes.

**Conditions**
None.

**Modeled Conditions**
The following conditions must be met:

- The course [T-WIWI-103637] *Nonlinear Optimization I and II* must not have been started.

**Remarks**
Part I and II of the lecture are held consecutively in the same semester.

## V  Event excerpt:  (WS 18/19)

**Aim**
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.

**Content**
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**
**Elective literature:**

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

## T   Course: Novel Actuators and Sensors [T-MACH-102152]

**Responsibility:** Manfred Kohl, Martin Sommer
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101295] Optoelectronics and Optical Communication
[M-MACH-101294] Nanotechnology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2141865 | Novel actuators and sensors | Vorlesung (V) | 2 | Manfred Kohl, Martin Sommer |

**Learning Control / Examinations**
oral exam (30 Min.)

**Conditions**
none

## V   Event excerpt: Novel actuators and sensors (WS 18/19)

**Aim**
- Knowledge of the principles of actuation and sensing including pros and cons
- Explanation of layout and function of important actuators and sensors
- Calculation of important properties (time constants, forces, displacements, sensitivity, etc.)
- Development of a layout based on specifications

**Content**
**Contents:** - Basic knowledge in the material science of actuator and sensor principles
- Layout and design optimization
- Fabrication technologies
- Selected developments
- Applications
**Index:** The lecture includes amongst others the following topics:

- Piezo actuators
- Magnetostrictive actuators
- Shape memory actuators
- Electro-/magnetorheological actuators
- Sensors: Concepts, materials, fabrication
- Micromechanical sensors: Pressure, force, inertia sensors
- Temperature sensors
- Micro sensors for bio analytics
- Mechano-magnetic sensors

The lecture addresses students in the fields of mechanical engineering, mechatronics and information technology, materials science and engineering, electrical engineering and economic sciences. A comprehensive introduction is given in the basics and current developments on the macroscopic length scale.
The lecture is core subject of the major course "Actuators and Sensors" of the specialization "Mechatronics and Microsystems Technology" in Mechanical Engineering.

**Workload**
**Work Lecture:**
time of attendance: 21 hours

Self-study: 99 hours

**Literature**
- Lecture notes
- 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   Course: Operation Methods for Earthmoving [T-BGU-101801]

**Responsibility:** Heinrich Schlick
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 1.5 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241905 | | Vorlesung (V) | 1 | Shervin Haghsheno, Heinrich Schlick |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

**T** **Course: Operation Methods for Foundation and Marine Construction [T-BGU-101832]**

**Responsibility:** Harald Schneider
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 1.5 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241904 | | Vorlesung (V) | 1 | Shervin Haghsheno, Harald Schneider |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

**T** **Course: Operations Research in Health Care Management [T-WIWI-102884]**

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-102805] Service Operations

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the lecture and the following lecture.

**Conditions**
None

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

**Remarks**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

## T Course: Operations Research in Supply Chain Management [T-WIWI-102715]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102805] Service Operations
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the lecture and the following lecture.

**Conditions**
None

**Recommendations**
Basic knowledge as conveyed in the module *Introduction to Operations Research* and in the lectures *Facility Location and Strategic SCM*, *Tactical and operational SCM* is assumed.

**Remarks**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

## T  Course: Optical Transmitters and Receivers [T-ETIT-100639]

**Responsibility:** Wolfgang Freude
**Contained in:** [M-MACH-101295] Optoelectronics and Optical Communication

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | englisch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2309460 | | Vorlesung (V) | 2 | Wolfgang Freude |
| WS 18/19 | 2309461 | | Übung (Ü) | 1 | Wolfgang Freude |

**Conditions**
none

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## T | Course: Optical Waveguides and Fibers [T-ETIT-101945]

**Responsibility:** Christian Koos
**Contained in:** [M-MACH-101295] Optoelectronics and Optical Communication
[M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | englisch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2309464 | | Vorlesung (V) | 2 | Christian Koos |
| WS 18/19 | 2309465 | | Übung (Ü) | 1 | Christian Koos |

**Conditions**

## T  Course: Optimization under uncertainty [T-WIWI-106545]

**Responsibility:** Steffen Rebennack
**Contained in:** [M-WIWI-103289] Stochastic Optimization

| ECTS | Recurrence | Exam type | Version |
|:----:|:----------:|:---------:|:-------:|
| 5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2550464 | | Vorlesung (V) | | Marcel Sinske |
| WS 18/19 | 2550465 | | Übung (Ü) | | Christian Füllner |
| WS 18/19 | 2550466 | | Übung (Ü) | 2 | Christian Füllner |

**Learning Control / Examinations**
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.

**Conditions**
None.

## T   Course: Optoelectronic Components [T-ETIT-101907]

**Responsibility:** Wolfgang Freude
**Contained in:** [M-MACH-101293] Microsystem Technology

| ECTS | Language | Exam type | Version |
|:---:|:---:|:---:|:---:|
| 4 | englisch | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2309486 | Optoelectronic Components | Vorlesung (V) | 2 | Wolfgang Freude |

**Conditions**

**T**  **Course: P&C Insurance Simulation Game [T-WIWI-102797]**

**Responsibility:** Ute Werner
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**
T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on.

**Conditions**
None

**Recommendations**
See German version.

## T  Course: Panel Data [T-WIWI-103127]

**Responsibility:** Wolf-Dieter Heller
**Contained in:** [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2520320 | | Vorlesung (V) | 2 | Wolf-Dieter Heller |
| SS 2018 | 2520321 | | Übung (Ü) | 2 | Wolf-Dieter Heller, Carlo Siebenschuh |

**Conditions**
None

## T Course: Parametric Optimization [T-WIWI-102855]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

**Conditions**

None

**Recommendations**

It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

**Remarks**

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

## T Course: Patent Law [T-INFO-101310]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 24656 | Patent Law | Vorlesung (V) | 2 | Matthias Koch |

## V Event excerpt: Patent Law (SS 2018)

**Aim**

Ziel der Vorlesung ist es, den Studenten aufbauend auf der Überblicksvorlesung *Gewerblicher Rechtsschutz und Urheberrecht* vertiefte Kenntnisse auf dem Rechtsgebiet des Patentrechts und des Business mit technischem IP zu verschaffen. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen und den rechtspolitischen Anliegen, auf dem Gebiet des technischen IP, insbesondere auf dem Gebiet der Informations- und Kommunikationstechnik kennen lernen. Sie sollen die Regelungen des nationalen, europäischen und internationalen Patentrechts, des Know-How-Schutzes kennen lernen und auf praktische Sachverhalte anwenden, insbesondere für die Nutzung von technischem IP durch Verträge und Gerichtsverfahren. Der Konflikt zwischen dem MonopolPatent und der Politik der Europäischen Kartellrechtsverwaltung wird mit den Studenten erörtert.

**Content**

Die Vorlesung befasst sich mit dem Recht und den Gegenständen des technischen IP, insbesondere Erfindungen, Patente, Gebrauchsmuster, Geschmacksmuster, Know-How, den Rechten und Pflichten von Arbeitnehmererfindern als Schöpfern von technischem IP, der Lizenzierung, den Beschränkungen und Ausnahmen der Patentierbarkeit, der Schutzdauer, der Durchsetzung der Rechte und der Verteidigung gegen solche Rechte in Nichtigkeits- und Löschungsverfahren. Gegenstand der Vorlesung ist nicht allein das deutsche, sondern auch das amerikanische und das europäische und das internationale Patentrecht. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen bei technischem IP, insbesondere bei der Informations- und Kommunikationstechnik, und dem rechtlichen Regelungsrahmen erkennen und auf praktische Sachverhalte anwenden, insbesondere für die Nutzung von technischem IP durch Verträge und Gerichtsverfahren. Der Konflikt zwischen dem MonopolPatent und der Politik der Europäischen Kartellrechtsverwaltung wird mit den Studenten erörtert.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

## T  Course: Personalization and Services [T-WIWI-102848]

**Responsibility:** Andreas Sonnenbichler
**Contained in:** [M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101410] Business & Service Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2540533 | Personalization & Services | Vorlesung (V) | 2 | Andreas Sonnen-bichler |
| WS 18/19 | 2540534 | Exercise Personalization & Services | Übung (Ü) | 1 | Andreas Sonnen-bichler |

**Learning Control / Examinations**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Personalization & Services (WS 18/19)

**Aim**
The student

- knows the options and opportunities of personalization, especially in the area of Internet based services
- knows important methods for authentication, authorization, and accounting
- can use these methods practically in internet-based services.

**Content**

- Personalization of Services and Applications
- User Modeling
- User Profiles
- Authentification
- Authorization
- Applications in e-Commerce and for internet-based Services
- Personalized Web Search
- Privacy

**Workload**

The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

**Sum: 135h 00m**

**Literature**

The course follows latest scientific papers. References to these papers are listed at the end of each course unit.

# T  Course: PH APL-ING-TL01 [T-WIWI-106291]

**Responsibility:**
**Contained in:**     [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Einmalig | Prüfungsleistung anderer Art | 1 |

# T Course: PH APL-ING-TL02 [T-WIWI-106292]

**Responsibility:**
**Contained in:**     [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Einmalig | Prüfungsleistung anderer Art | 1 |

# T  Course: PH APL-ING-TL03 [T-WIWI-106293]

**Responsibility:**
**Contained in:**    [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Einmalig | Prüfungsleistung anderer Art | 1 |

## T  Course: PH APL-ING-TL04 ub [T-WIWI-106294]

**Responsibility:**
**Contained in:**     [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 0 | Einmalig | Studienleistung | 1 |

## T Course: PH APL-ING-TL05 ub [T-WIWI-106295]

**Responsibility:**
**Contained in:**     [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 0 | Einmalig | Studienleistung | 1 |

## T  Course: PH APL-ING-TL06 ub [T-WIWI-106296]

**Responsibility:**
**Contained in:**  [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 0 | Einmalig | Studienleistung | 1 |

## T Course: PH APL-ING-TL07 [T-WIWI-108384]

**Responsibility:**
**Contained in:**     [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Einmalig | Prüfungsleistung anderer Art | 1 |

## T  Course: Photovoltaic System Design [T-ETIT-100724]

**Responsibility:** N.N.
**Contained in:** [M-ETIT-101164] Generation and transmission of renewable power

| ECTS | Language | Exam type | Version |
|:---:|:---:|:---:|:---:|
| 3 | deutsch | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2307380 | | Vorlesung (V) | 2 | Robin Grab |

**Conditions**

## T  Course: Physics for Engineers [T-MACH-100530]

**Responsibility:** Martin Dienwiebel, Peter Gumbsch, Alexander Nesterov-Müller, Daniel Weygand
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 6 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142890 | Physics for Engineers | Vorlesung (V) | 2 | Martin Dienwiebel, Peter Gumbsch, Alexander Nesterov-Müller, Daniel Weygand |
| SS 2018 | 8030087 | | Klausur | | Martin Dienwiebel |

**Learning Control / Examinations**
written exam

**Conditions**
none

## V  Event excerpt: Physics for Engineers (SS 2018)

**Aim**
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

**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 (2142891, 2 SWS) 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.

**Workload**
regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises 2142891)
self-study: 97,5 hours and 49 hours (excerises 2142891)

**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 Course: Planning and Management of Industrial Plants [T-WIWI-102631]

**Responsibility:** Frank Schultmann
**Contained in:** [M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581952 | Planning and Management of Industrial Plants | Vorlesung (V) | 2 | Simon Glöser-Chahoud |
| WS 18/19 | 2581953 | | Übung (Ü) | 2 | Sonja Rosenberg, Carmen Schiel |

**Learning Control / Examinations**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
None

**Recommendations**
None

## V Event excerpt: Planning and Management of Industrial Plants (WS 18/19)

**Aim**

- Students shall be able to describe the tasks of plant management.
- Students shall be proficient in using selected methods of investment and cost estimates.
- Students shall be able to consider necessary processing and logistical requirements of designing industrial plants.
- Students shall be able to discuss interdependencies between capacity planning, process design and plant optimization.
- Students shall be proficient in discussing and applying selected methods of quality management, plant maintenance and plant dismantling.

**Content**
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.
During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

**Workload**
Total effort required will account for approximately 165h (5.5 credits).

**Literature**
will be announced in the course

## T  Course: PLM for Product Development in Mechatronics [T-MACH-102181]

**Responsibility:** Martin Eigner
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2122376 | PLM for product development in mechatronics | Vorlesung (V) | | Martin Eigner |

**Learning Control / Examinations**
Oral examination 20 min.

**Conditions**
none

## V  Event excerpt: PLM for product development in mechatronics (SS 2018)

**Aim**
Students have a basic overview about product data management and product lifecycle management.
Students know components and core functions of PLM solutions
Students can describe trends in research and practice in the environment of PLM

**Workload**
The total workload for this course is approximately 120 hours. For further information see German version.

## T  Course: PLM-CAD Workshop [T-MACH-102153]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2121357 | PLM-CAD Workshop | Praktikum (P) | 4 | Mitarbeiter, Jivka Ovtcharova |
| WS 18/19 | 2121357 | PLM-CAD Workshop | Seminar / Praktikum (S/P) | 4 | Mitarbeiter, Jivka Ovtcharova |

**Learning Control / Examinations**
Alternative exam assessment (graded)

**Conditions**
None

**Remarks**
Number of participants is limited, compulsory attendance

## V  Event excerpt: PLM-CAD Workshop (WS 18/19)

**Aim**
Ziel des Workshops ist es, den Nutzen der kollaborativen Produktentwicklung mit PLM aufzuzeigen und deren Mehrwert gegenüber einer klassischen CAD- Entwicklung hervorzuheben. Den Studierenden wird im Einzelnen vermittelt, wie durch PLM produktbeschreibende Daten, wie z. B. Stücklisten und Zeichnungen, ganzheitlich und transparent verwaltet werden, sowie Abläufe in der Produktentwicklung automatisiert gesteuert werden können.

**Content**
Im Rahmen des Workshops wird eine Produktentwicklung als Projektauftrag innerhalb des Produktlebenszyklus durch den Einsatz moderner PLM/PDM- und CAD- Systeme abgewickelt.

## T  Course: Polymers in MEMS A: Chemistry, Synthesis and Applications [T-MACH-102192]

**Responsibility:** Bastian Rapp
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2141853 | Polymers in MEMS A: Chemistry, Synthesis and Applications | Block-Vorlesung (BV) | 2 | Bastian Rapp |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

## V  Event excerpt: Polymers in MEMS A: Chemistry, Synthesis and Applications (WS 18/19)

**Aim**
The aim of the lecture is providing mechanical or chemical engineers, as well as interested students from the life or material sciences the basic knowledge required for understanding what polymers are and how they are made, highlighting their importance for modern MEMS systems with a wide view to applications in everyday life.
After attending the lecture the students will be able:

- . . . to understand the physic/chemical basics of organic chemistry in polymer synthesis.
- . . . to state the most important polymers and polymer classes and to develop application examples for these.
- . . . to state the most important polymers in MEMS.
- . . . to understand the most important techniques for rapid prototyping.
- . . . to state and to understand the most important resists in MEMS.
- . . . to understand the chemical synthesis of polymers.

. . . to correctly estimate the application scope of the individual classes of polymers.

**Content**
We all come in contact with numerous polymeric products in everyday life. From water bottles to packaging to the cover of the iPad, many things are made of polymers. Polymers are also important materials for modern microelectromechanical systems (MEMS) allowing cost effective mass market compatible products, e.g., in the life sciences or diagnostics. But polymers are not just cost-effective replacements for more expensive classical materials in MEMS (such as, e.g., silicon) – some polymers have intrinsic properties that make them ideal materials for sensors, actuators or templates for biology and chemistry in MEMS.
This lecture will introduce the basics of organic chemistry required for understanding what polymers are, how they are manufactured and which mechanisms are responsible for their unique properties. The lecture will highlight (in the context of MEMS but also in a wider scope) where and why polymers are applied with a strong focus on their chemical and physical properties (and on their synthesis).
Some of the topics covered are:

- What is the basic chemistry of polymers? What are monomers, what are macromolecules and how are they formed?
- How are polymers produced on industrial scale – but also on the laboratory scale? Numerous examples of how to make (commonly and lesser known) polymers will be discussed including materials such as Plexiglas.
- Why are polymers so important for biochemistry and tissue engineering?
- How do photoresists work and why do some polymers contract when exposed to light?

- What are high-performance polymers and why do they have such a wide application range, e.g., in implants?
- What polymers fuel the household 3D printing community and what materials do 3D printers such as, e.g., the RepRap work with?
- How does 3D printing and rapid prototyping work and which polymers can be employed for which techniques?
- Why does silicone always smell like vinegar and why is this material so important for modern day microfluidics? How do you built fluid-logic devices using silicone?
- How do shape memory polymers remember their shape?
- What are polymer foams and why are they not only important for heat insulation but also for organic chemistry?
- How do glues work? Why are there two-component glues, what is superglue and how can you make glue from potatoes?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu). Preregistration is not necessary.

The examination will be held in oral form at the end of the lecture. The lecture can be chosen as "Nebenfach" or part of a "Hauptfach". The second lecture of the lecture series "Polymers in MEMS B – Physics, manufacturing and applications" (which is also held in winter semester) can be combined with this lecture as part of a "Hauptfach". In summer semester, the third part of the lecture series "Polymers in MEMS C – Biopolymers, Biopolymers and applications" will be given which may be combined with lectures A and B to form a complete "Hauptfach".

**Workload**

- lecture: 15 * 1.5 h (22 h)
- lecture preparation (before and after lecture): 15 * 2 h (30 h)
- preparation of final exam: 70 h

## T Course: Polymers in MEMS B: Physics, Microstructuring and Applications [T-MACH-102191]

**Responsibility:** Matthias Worgull
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2141854 | Polymers in MEMS B: Physics, Microstructuring and Applications | Vorlesung (V) | 2 | Matthias Worgull |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

## V Event excerpt: Polymers in MEMS B: Physics, Microstructuring and Applications (WS 18/19)

**Aim**
The aim of the lecture is providing mechanical or chemical engineers, as well as interested students from the life or material sciences the basic knowledge required for understanding what polymers are and how they are made, highlighting their importance for modern MEMS systems with a wide view to applications in everyday life.
After attending the lecture the students will be able:

- ... to understand the properties of polymers as a consequence of their morphology.
- ... to describe the most important structuring techniques and technologies for polymers in MEMS.
- ... to understand the mathematical basis of the most important physical models for polymers.
- ... to correctly judge polymer properties and the applicability of the polymers for their industrial processability.
- ... to understand the basics of process simulation in polymer structuring.
- ... to state the most important technical thermoplasts in MEMS and to understand their properties.
- ... to correctly classify the various types of polymers, blends, composite materials.

**Content**
We all come in contact with numerous polymeric products in everyday life. From water bottles to packaging to the cover of the iPad, many things are made of polymers. Polymers are also important materials for modern microelectromechanical systems (MEMS) allowing cost effective mass market compatible products, e.g., in the life sciences or diagnostics. But polymers are not just cost-effective replacements for more expensive classical materials in MEMS (such as, e.g., silicon) – some polymers have intrinsic properties that make them ideal materials for sensors, actuators or templates for biology and chemistry in MEMS.
This lecture will introduce the basics of physics and material science required for the understanding of the mechanical behavior seen from the engineers view. Micro and nanostructuring of polymers allows the fabrication of micro parts fulfilling their tasks in mostly invisible different applications. But also the fabrication of polymer parts with functional surfaces inspired from Bionics will be presented in this lesson. The lesson will give further an overview over the polymer based structuring processes and will underline the importance by a number of applications e.g. photonic structures or Lotus-like structures.
Some of the topics covered are:

- How can polymers described from the view of engineers?
- What are the differences between polymers and metals?

- Rheology of polymer melts – How does polymer melts flow?
- How can polymers be formed and demolded?
- Which structuring processes (replication) processes are available?
- How does stress influence molded parts (e.g. the deformation of a CD in a hot car)
- Shrinkage of polymers – which precision is achievable
- Gluing or welding – How can polymers be assembled?
- Simulation of replication processes
- Characterization of polymers – which properties can be measured?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

The examination will be held in oral form at the end of the lecture. The lecture can be chosen as "Nebenfach" or part of a "Hauptfach". The second lecture of the lecture series ""Polymers in MEMS A – Chemistry, synthesis and applications " (which is also held in winter semester) can be combined with this lecture as part of a "Hauptfach". In summer semester, the third part of the lecture series "Polymers in MEMS C – Biopolymers, Biopolymers and applications" will be given which may be combined with lectures A and B to form a complete "Hauptfach".

**Workload**

- lecture: 15 * 1.5 h (22 h)
- lecture preparation (before and after lecture): 15 * 2 h (30 h)
- preparation of final exam: 70 h

## T  Course: Polymers in MEMS C: Biopolymers and Bioplastics [T-MACH-102200]

**Responsibility:** Bastian Rapp, Matthias Worgull
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142855 | | Vorlesung (V) | 2 | Bastian Rapp, Matthias Worgull |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

## V  Event excerpt:  (SS 2018)

**Aim**
The aim of the lecture is providing mechanical or chemical engineers, as well as interested students from the life or material sciences the basic knowledge of biopolymers and bioplastics, highlighting their importance for modern MEMS systems with a wide view to applications in everyday life.
After attending the lecture the students will be able:

- ... to correctly classify biopolymers and bioplastics.
- ... to correctly state their properties, advantages and disadvantages.
- ... to correctly estimate their application scope in MEMS.
- ... to understand their usage in everyday life.
- ... to correctly judge their sustainability.
- ... to develop further applications of this class of materials.

... to correctly estimate the suitability of biopolymers and bioplastics, especially compared to conventionally polymers.

**Content**
Polymers are ubiquitous in everyday life: from packaging materials all the way to specialty products in medicine and medical engineering. Today it is difficult to find a product which does not (at least in parts) consist of polymeric materials. The question of how these materials can be improved with respect to their disposal and consumption of (natural) resources during manufacturing is often raised. Today polymers must be fully recycled in Germany and many other countries due to the fact that they do not (or only very slowly) decompose in nature. Furthermore significant reductions of crude oil consumption during synthesis are of increasing importance in order to improve the sustainability of this class of materials. With respect to disposal polymers which do not have to be disposed by combustion but rather allow natural decomposition (composting) are of increasing interest. Polymers from renewable sources are also of interest for modern microelectromechanical systems (MEMS) especially if the systems designed are intended as single-use products. This lecture will introduce the most important classes of these so-called biopolymers and bioplastics. It will also discuss and highlight polymers which are created from naturally created analogues (e.g. via fermentation) to petrochemical polymer precursors and describe their technical processing. Numerous examples from MEMS as well as everyday life will be given.
Some of the topics covered are:

- What are biopolyurethanes and how can you produce them from castor oil?
- What are "natural glues" and how are they different from chemical glues?
- How do you make tires from natural rubbers?

- What are the two most important polymers for life on earth?
- How can you make polymers from potatoes?
- Can wood be formed by injection molding?
- How do you make buttons from milk?
- Can you play music on biopolymers?
- Where and how do you use polymers for tissue engineering?
- How can you built LEGO with DNA?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu) and PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

**Workload**

- lecture: 15 * 1.5 h (22 h)
- lecture preparation (before and after lecture): 15 * 2 h (30 h)

preparation of final exam: 70 h

**Literature**
Additional literature is not required.

## T   Course: Portfolio and Asset Liability Management [T-WIWI-103128]

**Responsibility:**   Mher Safarian
**Contained in:**   [M-WIWI-101639] Econometrics and Statistics II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2520357 | Portfolio and Asset Liability Management | Vorlesung (V) | 2 | Mher Safarian |
| SS 2018 | 2520358 | | Übung (Ü) | 2 | Mher Safarian |

**Learning Control / Examinations**
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

## V   Event excerpt: Portfolio and Asset Liability Management (SS 2018)

**Aim**
Introduction and deepening of various portfolio management techniques in the financial industry.

**Content**
Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment
Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

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

**Literature**
To be announced in lecture.
**Elective literature:**
To be announced in lecture.

## T  Course: Power Network [T-ETIT-100830]

**Responsibility:** Thomas Leibfried
**Contained in:** [M-ETIT-101164] Generation and transmission of renewable power

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 6 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2307371 | | Vorlesung (V) | 2 | Thomas Leibfried |
| WS 18/19 | 2307373 | | Übung (Ü) | 2 | Anja Nelles, Yannick Rink |

## T   Course: Power Transmission and Power Network Control [T-ETIT-101941]

**Responsibility:** Thomas Leibfried
**Contained in:** [M-ETIT-101164] Generation and transmission of renewable power

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2307372 | Power Transmission and Power Network Control | Vorlesung (V) | 2 | Thomas Leibfried |
| SS 2018 | 2307374 | | Übung (Ü) | 1 | Timo Nowak |

**Conditions**

## T  Course: Practical Course Polymers in MEMS [T-MACH-105556]

**Responsibility:**  Bastian Rapp, Matthias Worgull
**Contained in:**  [M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Studienleistung | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2142856 | | Block (B) | 2 | Bastian Rapp, Matthias Worgull |

**Learning Control / Examinations**
The practical course will close with an oral examination. There will be only passed and failed results, no grades.

**Conditions**
none

## V  Event excerpt:  (SS 2018)

**Aim**
The practical course will provide mechanical or chemical engineers, as well as interested students from the life or material sciences a deeper understanding of polymers, their synthesis and their processing.
After attending the lecture the students will be able:

- ... to synthesize relevant polymers on a laboratory scale.
- ... to characterize these materials.
- ... to structure these polymers.

... to use these polymers in exemplary MEMS applications..

**Content**
This practical course complements the lectures "Polymers in MEMS A", "Polymers in MEMS B" and "Polymers in MEMS C" and will allow students to gain a deeper understanding of polymers and their processing. During the course of this practical course, various polymers will be synthesized and molded into components suitable for microelectromechanical systems (MEMS) applications. The aim of the course is to bring a polymer all the way from synthesis to application.
The practical course will be given in German language unless non-German speaking students attend. In this case, the course will be given in English (with some German translations of technical vocabulary). Lecture notes for the experiments are in English language and will be handed out to the students. The practical course will be held "en block" at the end of the semester (presumably beginning of October)
For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu) and PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is mandatory. The number of participants is limited to 5 students.

**Workload**

- practical course: 3 * 8 h (24 h)
- experiment preparation (before and after lecture): 30 h

preparation of final exam: 66 h

**Literature**
Scripts of the corresponding lectures, further literature as named there.

## T  Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

**Responsibility:**  Wolf Fichtner, Alexander Mädche, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt

**Contained in:**  [M-WIWI-102808] Digital Service Systems in Industry

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540554 | Practical Seminar: Information Systems and Service Design | Seminar (S) | 3 | Alexander Mädche |

**Learning Control / Examinations**

The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

**Conditions**

None

**Recommendations**

None

**Remarks**

New course title starting summer term 2017: "Practical Seminar Digital Service Systems".

The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

## V  Event excerpt: Practical Seminar: Information Systems and Service Design (SS 2018)

**Aim**

The students will:

- Explore a real-world digital service design challenge
- Learn and apply selected digital service design practices & tools
- Understand capabilities of state-of-the-art digital platforms and realize a digital service prototype

**Content**

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

## T  Course: Practical Seminar Service Innovation [T-WIWI-102799]

**Responsibility:** Gerhard Satzger
**Contained in:** [M-WIWI-102806] Service Innovation, Design & Engineering
[M-WIWI-101410] Business & Service Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical components and an active participation in class.

Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

**Conditions**

None

**Recommendations**

Knowledge of Service Innovation Methods is assumed. Therefore it is recommended to attend the course Service Innovation [2540468] beforehand.

**Remarks**

Due to the project work, the number of participants is limited and participation requires knowledge about models, concepts and approaches that are taught in the Service Innovation lecture. Having taken the Service Innovation lecture or demonstrating equivalent knowledge is a prerequisite for participating in this Practical Seminar. Details for registration will be announced on the web pages for this course.

The seminar is not offered regularly.

## T  Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550498 | Practical seminar: Health Care Management | Veranstaltung (Ver-anst.) | 5 | Stefan Nickel, Melanie Reuter-Oppermann, Anne Zander |

**Learning Control / Examinations**
The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

**Conditions**
None.

**Recommendations**
Basic knowledge as conveyed in the module *Introduction toOperations Research* is assumed.

**Remarks**
The credits have been reduced to 4,5 starting summer term 2016.
The lecture is offered every term.
The planned lectures and courses for the next three years are announced online.

## T Course: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]

| | |
|---|---|
| **Responsibility:** | Norbert Koppenhagen, Alexander Mädche |
| **Contained in:** | [M-WIWI-104080] Designing Interactive Information Systems |
| | [M-WIWI-102806] Service Innovation, Design & Engineering |
| | [M-WIWI-104068] Information Systems in Organizations |

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 4.5 | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2540554 | Practical Seminar: Information Systems and Service Design | Seminar (S) | 3 | Alexander Mädche |

**Learning Control / Examinations**

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

**Conditions**

None.

**Modeled Conditions**

The following conditions must be met:

- The course [T-WIWI-102799] *Practical Seminar Service Innovation* must not have been started.

**Recommendations**

Attending the course „Digital Service Design" is recommended, but not mandatory.

**Remarks**

The course is held in English.

## V Event excerpt: Practical Seminar: Information Systems and Service Design (SS 2018)

**Aim**

The students will:

- Explore a real-world digital service design challenge
- Learn and apply selected digital service design practices & tools
- Understand capabilities of state-of-the-art digital platforms and realize a digital service prototype

**Content**

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

**T**  **Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]**

**Responsibility:** Arndt Last
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101291] Microfabrication
[M-MACH-101294] Nanotechnology
[M-MACH-101290] BioMEMS
[M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2143875 | Introduction to Microsystem Technology - Practical Course | Praktikum (P) | 2 | Arndt Last |
| SS 2018 | 2143877 | Introduction to Microsystem Technology - Practical Course | Praktikum (P) | 2 | Arndt Last |
| WS 18/19 | 2143875 | Introduction to Microsystem Technology - Practical Course | Praktikum (P) | 2 | Arndt Last |
| WS 18/19 | 2143877 | Introduction to Microsystem Technology - Practical Course | Praktikum (P) | 2 | Arndt Last |

**Learning Control / Examinations**
The assessment consists of a written exam

**Conditions**
none

**V**  **Event excerpt: Introduction to Microsystem Technology - Practical Course (WS 18/19)**

**Aim**

- Deepening of the contents of the lecture MST I resp. II
- Understanding the technological processes in the micro system technology
- Experience in lab-work at real workplaces where normally research is carried out

**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.

**Workload**
Time of attendance: 21 h + 2 h exam
Privat studies: 5 h preparing experiments + 10 h preparing the exam

**Literature**

Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997

Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

## V Event excerpt: Introduction to Microsystem Technology - Practical Course (WS 18/19)

**Aim**

- Deepening of the contents of the lecture MST I resp. II
- Understanding the technological processes in the micro system technology
- Experience in lab-work at real workplaces where normally research is carried out

**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.

**Workload**

Time of attendance: 21 h + 2 h exam

Privat studies: 5 h preparing experiments + 10 h preparing the exam

**Literature**

Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997

Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

## T | Course: Predictive Mechanism and Market Design [T-WIWI-102862]

**Responsibility:** Johannes Philipp Reiß
**Contained in:** [M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101505] Experimental Economics

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

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

**Conditions**

None

**Remarks**

The course is given every second fall term, e.g., WS2017/18, WS2019/20, . . .
The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.

## T  Course: Price Management [T-WIWI-105946]

**Responsibility:** Andreas Geyer-Schulz, Paul Glenn
**Contained in:** [M-WIWI-101409] Electronic Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540529 | Price Management | Vorlesung (V) | 2 | Paul Glenn |
| SS 2018 | 2540530 | Exercise Price Management | Übung (Ü) | 1 | Paul Glenn |

**Learning Control / Examinations**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively.
The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

**Conditions**
None

**Recommendations**
None

**Remarks**
The lecture is offered for the first time in summer term 2016.

## V  Event excerpt: Price Management (SS 2018)

**Aim**
Students

- know the conceptual and methodic basics of price management (price-sales function, price elasticity and adequate measurement, estimation and optimization techniques)
- know pricing strategies and the managerial instruments of price management (including price communication, enforcement and control)

- know methods of price formation in complex environments (product-spanning price optimization, bundling, services and solutions) and can make use of them
- know and understand pricing processes and the involved pricing department(s) in firms
- know and understand special topics in price management (pricing on the internet, yield management and international price management)
- know the regulatory framework of European competition law

**Content**

1. Introduction to Price Management
2. Pricing Strategies
3. Information Base for Pricing in Price Management
4. Price-Sales Function, Price Elasticity and Survey Methods
5. Procedure of the Price Formation and innovative Pricing-Models
6. Willingness of Payment, Value, Methods of Measuring Value and Value-Based Pricing
7. Behavioural Science and Psychology of Prices
8. Multidimensional Pricing and Price Differentiation
9. Product-Spanning Price Optimisation and Bundling
10. B2B and B2C Pricing
11. Price Management for Services and Solutions
12. Excursion: Pricing-Tools, Professional Software for Pricing
13. Enforcing Prices, Discounting and Systems of Terms and Conditions
14. Communication of Prices, Price Adjustments and Controlling
15. International Pricing and Global Price Management
16. Pricing and Competition Law
17. Organisational Forms of Pricing, Processes, Development Paths, and Change Management in Enterprises

**Workload**
The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

**Sum: 135h 00m**

**Literature**

- H. Simon and M. Fassnacht, *Preismanagement*, vol. 4. Wiesbaden: Springer Gabler, 2016.
- T. T. Nagle, J. E. Hogan, and J. Zalee, *The Strategy and Tactics of Pricing: A guide to growing more profitably*. New Jersey: Prentice Hall, 2010.

## T  Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

**Responsibility:**  Martin Klarmann, Mark Schröder
**Contained in:**  [M-WIWI-101487] Sales Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | deutsch | Jedes Wintersemester | Prüfungsleistung anderer Art | 3 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2572198 | Price Negotiation and Sales Presentations | Block (B) | 1 | Martin Klarmann, Mark Schröder |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a presentation with a subsequent discussion totalling 25 minutes. Moreover learning contents are checked by realistic 30-minute price negotiations.

**Conditions**
None

**Recommendations**
None

**Remarks**
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing &amp; Sales (marketing.iism.kit.edu).
Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).
Please note that only one of the following courses can be attended in the Sales Management module: Country Manager Simulation, Case Studies in Sales and Pricing, Price Negotiation and Sales Presentations or Digital Marketing and Sales in B2B.

## V  Event excerpt: Price Negotiation and Sales Presentations (WS 18/19)

**Aim**
Students

- gain a clear impression of the theoretical knowledge about price negotiations and sales presentations
- improve their own negotiation abilities

**Content**
At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

**Workload**
The total workload for this course is approximately 45.0 hours. For further information see German version.

**Literature**
None

## T  Course: Pricing [T-WIWI-102883]

**Responsibility:** Sven Feurer
**Contained in:** [M-WIWI-101489] Strategy, Communication, and Data Analysis
[M-WIWI-101487] Sales Management
[M-WIWI-101490] Marketing Management
[M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2572157 | Pricing | Vorlesung (V) | 2 | Sven Feurer |
| WS 18/19 | 2572169 | | Übung (Ü) | 1 | Wiebke Klingemann |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Pricing (WS 18/19)

**Aim**
See German version.

**Content**
This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

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

**Literature**
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.
Simon, Hermann, Fassnacht, Martin (2008), Preismanagement, 3. Aufl., Wiesbaden.

## T  Course: Principles of Food Process Engineering [T-CIWVT-101874]

**Responsibility:** Volker Gaukel
**Contained in:** [M-CIWVT-101120] Principles of Food Process Engineering

| ECTS | Language | Exam type | Version |
|:---:|:---:|:---:|:---:|
| 9 | deutsch | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 22214 | | Vorlesung (V) | 2 | Volker Gaukel |
| SS 2018 | 22215 | | Vorlesung (V) | 2 | Peter Braun, Ulrich Bröckel, Guenter Esper, Mario Hirth, Heike Karbstein, Matthias Kind, Frank Müller, Hermann Nirschl, Matthias Sass, Michael Türk |
| WS 18/19 | 22207 | | Vorlesung (V) | 2 | Bernhard Watzl |
| WS 18/19 | 22213 | | Vorlesung (V) | 2 | Volker Gaukel |

**Conditions**

## T  Course: Principles of Information Engineering and Management [T-WIWI-102638]

**Responsibility:** Timm Teubner, Christof Weinhardt
**Contained in:** [M-WIWI-101411] Information Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2540450 | Principles of Information Engineering and Management | Vorlesung (V) | 2 | Christof Weinhardt |
| WS 18/19 | 2540451 | | Übung (Ü) | 1 | Dominik Jung |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Principles of Information Engineering and Management (WS 18/19)

**Aim**
The students should be able to understand and analyze the central role of information as an economic good, a production factor, and a competitive factor in today's societies. Students are supposed to be able to identify, evaluate, price, and market information goods with the help of the concepts and methods taught in the lecture. Furthermore, students learn basic aspects about information systems and information flows within and between organizations, as well as their design parameters.

**Content**
Information plays a central role in today's society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the "information lifecycle" that systematizes all phases from information generation to information distribution. The single phases of that cycle,

- extraction/generation,
- storage,
- transformation,
- evaluation,
- marketing
- and usage of information

are analyzed from the business administration perspective and the microeconomic perspective. The state of the art of economic theory is presented across this information lifecycle within the lectures. The content of the lecture is deepened in accompanying lecture courses.

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

**Literature**

- Shapiro, C., Varian, H., Information Rules: A Strategic Guide to the Network Economy. Harvard Business School Press 1999.

- Stahlknecht, P., Hasenkamp, U., Einführung in die Wirtschaftsinformatik. Springer Verlag 7. Auflage, 1999.
- Wirth, H., Electronic Business. Gabler Verlag 2001.

## T Course: Principles of Insurance Management [T-WIWI-102603]

**Responsibility:** Ute Werner
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Learning Control / Examinations

The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).
The examination will be offered latest until summer term 2017 (beginners only).

### Conditions

None

### Recommendations

None

## T  Course: Process Engineering [T-BGU-101844]

**Responsibility:** Harald Schneider
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241703 | | Vorlesung (V) | 2 | Uwe Görisch, Heinrich Schlick, Harald Schneider |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Product and Innovation Management [T-WIWI-102812]

**Responsibility:** Martin Klarmann
**Contained in:** [M-WIWI-101514] Innovation Economics
[M-WIWI-101490] Marketing Management
[M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2571154 | Product and Innovation Marketing | Vorlesung (V) | 2 | Sven Feurer |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Remarks**
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

## V  Event excerpt: Product and Innovation Marketing (SS 2018)

**Aim**
See German version.

**Content**
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Homburg, Christian (2012), Marketingmanagement, 4. Aufl., Wiesbaden.

## T  Course: Production and Logistics Controlling [T-WIWI-103091]

**Responsibility:** Helmut Wlcek
**Contained in:** [M-MACH-101277] Material Flow in Logistic Systems
[M-MACH-101263] Introduction to Logistics
[M-MACH-101280] Logistics in Value Chain Networks
[M-MACH-101282] Global Production and Logistics
[M-MACH-101279] Technical Logistics
[M-MACH-101278] Material Flow in Networked Logistic Systems

| ECTS | Language | Recurrence | Exam type | Version |
|:----:|:--------:|:----------:|:---------:|:-------:|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2500005 | | Vorlesung (V) | 2 | Alexander Rausch |

**Learning Control / Examinations**
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.

**Conditions**
None

## V  Event excerpt:  (WS 18/19)

**Aim**
Die Studierenden ...

- können den Aufbau und Funktion von Controlling-Regelkreisen (Planung, Analyse, Überwachung, Einleitung von Maßnahmen, Reporting etc.) erläutern,
- verstehen die spezifischen Anforderungen von Produktion und Logistik an das Controlling,
- kennen grundlegende Methoden zur Evaluierung der Performance und

**Content**
1. Overview of Controlling
2. Performance Measurement
3. Planning
4. Reporting
5. Deviation Analysis

**Workload**
Gesamtaufwand: ca. 90 Stunden
32 SWS Vorlesung, zusätzlich ca. 65 Stunden Vor- und Nachbereitung der Vorlesungen und Übungen einschl. Klausurvorbereitung

**Literature**
Vorlesungsbegleitendes Skript in ILIAS zum Download
Tafelanschriebe

## T | Course: Production and Logistics Management [T-WIWI-102632]

**Responsibility:** Frank Schultmann
**Contained in:** [M-WIWI-101412] Industrial Production III

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|-----------|-----------|---------|
| 5.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2581954 | Production and Logistics Management | Vorlesung (V) | 2 | Simon Glöser-Chahoud |
| SS 2018 | 2581955 | | Übung (Ü) | 2 | Andreas Rudi, Tobias Zimmer |

**Learning Control / Examinations**
The assessment consists of a written exam (90 minutes) (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

**Conditions**
None

**Recommendations**
None

## V | Event excerpt: Production and Logistics Management (SS 2018)

**Aim**

- Students discuss the basic tasks of an operative production and logistics management.
- Students discuss approaches to solve these tasks and shall be able to apply certain ones.
- Students explain the interdependencies between the tasks and methods to solve.
- Students discuss possible IT tools for production and logistics management.
- Students describe emerging trends in production and logistics management.

**Content**
This course covers central tasks and challenges of operational production and logistics management. Systems analytically, central planning tasks are discussed. Exemplary solution approaches for these tasks are presented. Further practical approaches are explained. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in Supply Chain Management.

**Workload**
Total effort required will account for approximately 165h (5.5 credits).

**Literature**
will be announced in the course

## T  Course: Project Management [T-WIWI-103134]

**Responsibility:** Frank Schultmann
**Contained in:** [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581963 | Project Management | Vorlesung (V) | 2 | Felix Hübner, Carmen Schiel, Frank Schultmann, Kira Schumacher, Rebekka Volk, Marcus Wiens |
| WS 18/19 | 2581964 | | Übung (Ü) | 1 | Felix Hübner, Carmen Schiel, Kira Schumacher, Rebekka Volk, Marcus Wiens |

**Learning Control / Examinations**
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Project Management (WS 18/19)

**Aim**
The students get to know the context, rationale, strategy and tactics of project management with emphasis on the importance of project planning and project control and by identifying and examining project phases. The students discuss various approaches and standards of project management. They explain the iterative processes and the core skills required by successful project managers. The context and learning of the course enable the participants to apply project management skills to projects in a variety of industries including engineering, information technology, consulting, production, procurement, maintenance, logistics and supply chain, construction, and manufacturing. By focussing on providing knowledge in core areas of scope, time, cost and quality, and facilitating areas of risk, procurement, HR, integration, and communication management, the participants are able to confidently deal with the ever growing complexities and challenges of project management.

**Content**

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management
8. Stakeholder

9. Communication, Negotiation and Leadership
10. Project Controlling

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**
will be announced in the course

**T** **Course: Project Management in Construction and Real Estate Industry I [T-BGU-103432]**

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction
[M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241701 | | Vorlesung / Übung (VÜ) | 4 | Shervin Haghsheno, Susanne Hirschberger, Nils Münzl, Jürgen Sittinger |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Project Management in Construction and Real Estate Industry II [T-BGU-103433]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction
[M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241701 | | Vorlesung / Übung (VÜ) | 4 | Shervin Haghsheno, Susanne Hirschberger, Nils Münzl, Jürgen Sittinger |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: project paper Lean Construction [T-BGU-101007]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 1.5 | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241901 | | Vorlesung / Übung (VÜ) | 4 | Shervin Haghsheno, Mitarbeiter/innen |

**Learning Control / Examinations**
project:
report, appr. 10 pages, and
presentation, appr. 10 min.

**Conditions**
none

**Recommendations**
none

**Remarks**

## T | Course: Project Studies [T-BGU-101847]

**Responsibility:** Sascha Gentes
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 6243801 | | Vorlesung / Übung (VÜ) | 2 | Sascha Gentes, Stephan Haupenthal |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Public Management [T-WIWI-102740]

**Responsibility:** Berthold Wigger
**Contained in:** [M-WIWI-101504] Collective Decision Making
[M-WIWI-101511] Advanced Topics in Public Finance

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2561127 | Public Management | Vorlesung / Übung (VÜ) | 3 | Berthold Wigger |

**Learning Control / Examinations**
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

**Conditions**
None

**Recommendations**
Basic knowledge of Public Finance is required.

## V Event excerpt: Public Management (WS 18/19)

**Aim**
See German version.

**Content**
The lecture "Public Management" deals with the economic theory of public sector administration. It is divided into four parts. The first section gives an overview of the legal framework of governmental administration in the Federal Republic of Germany and introduces the classical theory of administration as developed by Weber. Part two studies concepts of public decision-making, which have a significant impact on the operation of public sector administrations and where one focus is on consistency problems of collective decision-making. The third chapter deals with efficiency problems arising in conventionally organized public administrations and companies. X-inefficiency, information and control problems, the isolated consideration of income-spending-relations as well as rent-seeking problems will be considered. In section four the concept of New Public Management, which is a new approach to public sector administration that is mainly based in contract theory, is introduced. Its foundations in institutional economics are developed, with a focus on the specific incentive structures in self-administered administrations. Finally, the achievements of New Public Management approaches are discussed.

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

**Literature**
**Elective literature:**

- Damkowski, W. and C. Precht (1995): Public Management; Kohlhammer
- Richter, R. and E.G. Furubotn (2003): Neue Institutionenökonomik; 3rd edition; Mohr
- Schedler, K. and I. Proeller (2003): New Public Management; 2nd edition; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2nd edition; Springer

## T Course: Public Media Law [T-INFO-101311]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101217] Public Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 24082 | Public Media Law | Vorlesung (V) | 2 | Christian Kirchberg |

## V Event excerpt: Public Media Law (WS 18/19)

### Aim

Die "neuen Medien" (online-Dienste bzw. Internet) sind genauso wie die herkömmlichen Medien (Presse, Rundfunk bzw. Fernsehen) in einen öffentlich-rechtlichen Ordnungsrahmen eingespannt, wenn auch mit unterschiedlicher Regelungs-dichte sowie mit manifesten Auswirkungen auf die Privatrechtsordnung. Wesentliche Impulse erhält das Medienrecht insbesondere durch das Verfassungsrecht und das Europäische Gemeinschaftsrecht. Die Vorlesung will eine Übersicht über die Gemeinsamkeiten und Unterschiedlichkeiten der aktuellen Medienordnung und über die absehbaren Perspektiven der Kongruenz der Medien vermitteln. Aktuelle Entwicklungen der Tages- und Wirtschaftspolitik, die den Vorlesungsstoff berühren, werden zur Veranschaulichung des Vorlesungsstoffes in die Darstellung integriert. Darüber hinaus die Teilnahme an einschlägigen Gerichtsverhandlungen, insbesondere an einer solchen entweder des Bundesverfassungsgerichts und/oder des Bundesgerichtshofs, geplant.

### Content

Die Vorlesung erläutert zunächst die verfassungsrechtlichen Grundlagen der geltenden Medienordnung, also einerseits die entsprechenden Zuständigkeitsverteilungen zwischen Bund und Ländern sowie andererseits die Meinungs- und Informa-tionsfreiheit sowie die Mediengrundrechte des Art. 5 Abs. 1 GG und ihre Einschränkungen durch allgemeine Gesetze, das Zensurverbot und das Gegendarstellungsrecht. Ergänzt wird dieser Grundsatzabschnitt durch die Darstellung der gemeinschaftsrechtlichen Vorgaben der Rundfunk- und Medienordnung. Daran anschließend erfolgt ein Überblick über die Mediengesetze im Einzelnen, also im Bereich des Rundfunks (insbesondere: Rundfunkstaatsvertrag), des Presserechts (Landespressegesetze) und der sog. Telemedien (Telemediengesetz). Daran schließt sich die Darstellung des Jugend-schutzes in den Medien nach Maßgabe des Jugendschutzgesetzes einerseits und des Jugendmedienschutz-Staatsvertrages andererseits an.

### Workload

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

### Literature

Zum Verständnis der rechtlichen Grundlagen ist eine entsprechende Textsammlung erforderlich, z.B. 'Telemediarecht. Telekommunikations- und Multimediarecht', Beck-Texte im dtv, 7. Aufl. 2007.
Als Einführung und Studienliteratur wird empfohlen: Frank Fechner, Medienrecht, Verlag Mohr Siebek, 8. Aufl. 2007.

## T  Course: Public Revenues [T-WIWI-102739]

**Responsibility:** Berthold Wigger
**Contained in:** [M-WIWI-101511] Advanced Topics in Public Finance

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2560120 | Public Revenues | Vorlesung (V) | 2 | Berthold Wigger |
| SS 2018 | 2560121 | | Übung (Ü) | 1 | Berthold Wigger |

**Learning Control / Examinations**
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

**Conditions**
None

**Recommendations**
Basic knowledge of Public Finance is required.

## V  Event excerpt: Public Revenues (SS 2018)

**Aim**
See German version.

**Content**
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

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

**Literature**
**Elective literature:**

- Homburg, S.(2000): *Allgemeine Steuerlehre,* Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4th ed., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* and *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2nd ed., Springer

## T  Course: Quality Management [T-MACH-102107]

**Responsibility:** Gisela Lanza
**Contained in:** [M-MACH-101284] Specialization in Production Engineering
[M-MACH-101282] Global Production and Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2149667 | Quality Management | Vorlesung (V) | 2 | Gisela Lanza |

**Learning Control / Examinations**
Written Exam (60 min)

**Conditions**
none

## V  Event excerpt: Quality Management (WS 18/19)

**Aim**
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 specic problem.

**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-specic elds 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 servicerelated quality management. The content is completed with the presentation of certication 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

**Workload**
regular attendance: 21 hours
self-study: 99 hours

## T  Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

**Responsibility:** Dogan Keles, Patrick Plötz
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581007 | Quantitative Methods in Energy Economics | Vorlesung (V) | 2 | Dogan Keles, Patrick Plötz |
| WS 18/19 | 2581008 | | Übung (Ü) | 1 | Patrick Plötz |

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

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Quantitative Methods in Energy Economics (WS 18/19)

**Aim**
The student

- knows and understands selected quantitative methods of energy economics
- is able to use selected quantitative methods of energy economics
- understands they range of usage, limits and is autonomously able to adress new problems by them.

**Content**
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

**Workload**
The total workload for this course is approximately 120 hours. For further information see German version.

**Literature**
Wird in der Vorlesung bekannt gegeben.

## T Course: Quantum Functional Devices and Semiconductor Technology [T-ETIT-100740]

**Responsibility:** Christian Koos
**Contained in:** [M-MACH-101295] Optoelectronics and Optical Communication
[M-MACH-101294] Nanotechnology

| ECTS | Language | Exam type | Version |
|------|----------|-----------|---------|
| 3 | deutsch | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2309476 | Quantum Functional Devices and Semiconductor Technology | Vorlesung (V) | 2 | Martin Walther |

**Conditions**

## T  Course: Real Estate Economics and Sustainability Part 1: Basics and Valuation [T-WIWI-102838]

**Responsibility:** David Lorenz
**Contained in:** [M-WIWI-101508] Real Estate Economics and Sustainability

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (Part 1: Basics and Valuation and Part 2: Reporting and Rating) happen in the same semester in which the lectures take place.
Therefore, Part I currently only takes place in the winter semester and Part II takes place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

**Conditions**
None

**Recommendations**
A combination with courses in the area of

- Finance
- Insurance
- Civil engineering and architecture

is recommended.
Particularly recommended is the successful completion of the following Bachelor-Modules:

- Real Estate Management I and II
- Design, Construction and Assessment of Green Buildings I and II

## T  Course: Real Estate Economics and Sustainability Part 2: Reporting and Rating [T-WIWI-102839]

**Responsibility:** David Lorenz
**Contained in:** [M-WIWI-101508] Real Estate Economics and Sustainability

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2585406 | Real Estate Economics and Sustainability, Part 2 | Vorlesung (V) | 2 | David Lorenz |
| SS 2018 | 2585407 | | Übung (Ü) | 1 | David Lorenz |

**Learning Control / Examinations**

It is currently unclear whether the course "Real Estate Economics and Sustainability Part 2: Reporting and Rating" can be offered in summer term 2018. It must therefore be expected that the corresponding module M-WIWI-101508 "Real Estate Management and Sustainability" can not be completed according to schedule.

The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (Part 1: Basics and Valuation and Part 2: Reporting and Rating) happen in the same semester in which the lectures take place.

Therefore, Part I currently only takes place in the winter semester and Part II takes place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

**Conditions**

None

**Recommendations**

A combination with courses in the area of

- Finance
- Insurance
- Civil engineering and architecture

is recommended.

Particularly recommended is the successful completion of the following Bachelor-Modules:

- Real Estate Management I and II
- Design, Construction and Assessment of Green Buildings I and II

## V  Event excerpt: Real Estate Economics and Sustainability, Part 2 (SS 2018)

**Aim**

The student

- possesses an overview of important methods and processes which are applied within the real estate industry to assess property related risks (e.g. property ratings);
- is aware of key instruments to communicate property performance towards third parties (e.g. sustainability assessment of buildings and sustainability reporting of companies).

**Content**

This course is concerned with the implementation of sustainable development principles within the real estate industry. The course explains important methods and procedures – besides property valuation – which are applied within the industry in order to assess property related risks (e.g. property rating) and discusses them within the context of the sustainable development debate. Further topics in this regard are:

- sustainability assessment of buildings,
- sustainability reporting of companies,
- sustainable property investment products,
- assessment of real estate funds and investment vehicles, and
- sustainability and real estate lending.

The tutorial provides examples in order to practice the application of theoretical knowledge to practical real estate related problems.

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

# T  Course: Recommender Systems [T-WIWI-102847]

**Responsibility:** Andreas Geyer-Schulz
**Contained in:** [M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101410] Business & Service Engineering

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2540506 | Recommender Systems | Vorlesung (V) | 2 | Andreas Geyer-Schulz |
| SS 2018 | 2540507 | Exercise Recommender Systems | Übung (Ü) | 1 | Victoria-Anne Schweigert |

**Learning Control / Examinations**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Recommender Systems (SS 2018)

**Aim**
The student

- is proficient in different statistical, data-mining, and game theory methods of computing implicit and explicit recommendations
- evaluates recommender systems and compares these with related services

**Content**

At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

**Workload**

The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

**Sum: 135h 00m**

**Literature**

Rakesh Agrawal, Tomasz Imielinski, and Arun Swami. Mining association rules between sets of items in large databases. In Sushil Jajodia Peter Buneman, editor, Proceedings of the ACM SIGMOD International Conference on Management of Data, volume 22, Washington, D.C., USA, Jun 1993. ACM, ACM Press.

Rakesh Agrawal and Ramakrishnan Srikant. Fast algorithms for mining association rules. In Proceedings of the 20th Very Large Databases Conference, Santiago, Chile, pages 487 − 499, Sep 1994.

Asim Ansari, Skander Essegaier, and Rajeev Kohli. Internet recommendation systems. Journal of Marketing Research, 37:363 − 375, Aug 2000.

Christopher Avery, Paul Resnick, and Richard Zweckhauser. The market for evaluations. American Economic Review, 89(3):564 − 584, 1999.

Ibrahim Cingil, Asuman Dogac, and Ayca Azgin. A Broader Approach to Personalization. Communications of the ACM, 43(8):136 − 141, Aug 2000.

Richard O. Duda, Peter E. Hart, and David G. Stork. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.

Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. A customer purchase incidence model applied to recommender services. In R. Kohavi et al., editor, Proceedings of the WebKDD 2001 − Mining log data across all customer touchpoints, volume 2356 of Lecture Notes in Artificial Intelligence LNAI, pages 25–47, Berlin, 2002. ACM, Springer-Verlag.

Jon M. Kleinberg. Authoritative sources in a hyperlinked environment. JACM, 46(5):604–632, sep 1999.

Joseph Konstan, Bradley Miller, David Maltz, Jonathan Herlocker, Lee Gordon, and John Riedl. Grouplens: Applying Collaborative Filtering to Usernet News. Communications of the ACM, 40(3):77 − 87, Mar 1997.

Paul Resnick, Neophytos Iacovou, Peter Bergstrom, and John Riedl. Grouplens: An open architecture for collaborative filtering of netnews. In Proceedings of the conference on Computer supported cooperative work, pages 175 − 186. ACM Press, 1994.

**Elective literature:**

Antoinette Alexander. The return of hardware: A necessary evil? Accounting Technology, 15(8):46 − 49, Sep 1999.

Christopher Avery and Richard Zeckhauser. Recommender systems for evaluating computer messages. Communications of the ACM, 40(3):88 − 89, Mar 1997.

Steven Bellman, Gerald Lohse, and Eric Johnson. Predictors of Online Buying Behavior. Communications of the ACM, 42(12):32 − 38, Dec 1999.

Thomas J. Blischok. Every transaction tells a story. Chain Store Age Executive with Shopping Center Age, 71(3):50–56, Mar 1995.

Hans Hermann Bock. Automatische Klassifikation. Vandenhoeck und Ruprecht, Göttingen, 1974.

Andrew S.C. Ehrenberg. Repeat-Buying: Facts, Theory and Applications. Charles Griffin & Company Ltd, London, 2 edition, 1988.

Wolfgang Gaul, Andreas Geyer-Schulz, Michael Hahsler, and Lars Schmidt-Thieme. eMarketing mittels Recommendersystemen. Marketing ZFP, 24:47 − 55, 2002.

Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. myvu: a next generation recommender system based on observed consumer behavior and interactive evolutionary algorithms. In W. Gaul, O. Opitz, and M. Schader, editors,

Data Analysis – Scientific Modeling and Practical Applications, volume 18 of Studies in Classification, Data Analysis and Knowledge Organization, pages 447 – 457, Heidelberg, Germany, 2000. Springer.

Andreas Geyer-Schulz, Michael Hahsler, and Maximillian Jahn. Educational and scientific recommender systems: Designing the information channels of the virtual university. International Journal of Engineering Education, 17(2):153 – 163, 2001.

Mark-Edward Grey. Recommendersysteme auf Basis linearer Regression, 2004.

John A. Hartigan. Clustering Algorithms. John Wiley and Sons, New York, 1975.

Kevin Kelly. New Rules for the New Economy: 10 Radical Strategies for a Connected World. Viking, 1998.

Taek-Hun Kim, Young-Suk Ryu, Seok-In Park, and Sung-Bong Yang. An improved recommendation algorithm in collaborative filtering. In K. Bauknecht, A. Min Tjoa, and G. Quirchmayr, editors, E-Commerce and Web Technologies, Third International Conference, Aix-en-Provence, France, volume 2455 of Lecture Notes in Computer Science, pages 254–261, Berlin, Sep 2002. Springer-Verlag.

Ron Kohavi, Brij Masand, Myra Spiliopoulou, and Jaideep Srivastava. Web mining. Data Mining and Knowledge Discovery, 6:5 – 8, 2002.

G. S. Maddala. Introduction to Econometrics. John Wiley, Chichester, 3 edition, 2001.

Andreas Mild and Martin Natter. Collaborative filtering or regression models for Internet recommendation systems? Journal of Targeting, Measurement and Analysis for Marketing, 10(4):304 – 313, Jan 2002.

Andreas Mild and Thomas Reutterer. An improved collaborative filtering approach for predicting cross-category purchases based on binary market basket data. Journal of Retailing & Consumer Services, 10(3):123–133, may 2003.

Paul Resnick and Hal R. Varian. Recommender Systems. Communications of the ACM, 40(3):56 – 58, Mar 1997.

Badrul M. Sarwar, Joseph A. Konstan, Al Borchers, Jon Herlocker, Brad Miller, and John Riedl. Using filtering agents to improve prediction quality in the grouplens research collaborative filtering system. In Proceedings of ACM Conference on Computer-Supported Cooperative Work, Social Filtering, Social Influences, pages 345 – 354, New York, 1998. ACM Press.

J. Ben Schafer, Joseph Konstan, and Jon Riedl. Recommender Systems in E-commerce. In Proceedings of the 1st ACM conference on Electronic commerce, pages 158 – 166, Denver, Colorado, USA, Nov 1999. ACM.

Upendra Shardanand and Patti Maes. Social information filtering: Algorithms for automating "word of mouth". In Proceedings of ACM SIGCHI, volume 1 of Papers: Using the Information of Others, pages 210 – 217. ACM, 1995.

## T  Course: Regulation Theory and Practice [T-WIWI-102712]

**Responsibility:** Kay Mitusch
**Contained in:** [M-WIWI-101406] Network Economics
[M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2560234 | Regulation Theory and Practice | Vorlesung (V) | | Kay Mitusch |
| SS 2018 | 2560235 | | Übung (Ü) | | Cornelia Gremm |

**Learning Control / Examinations**
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.

**Conditions**
None

**Recommendations**
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.
Particularly helpful but not necessary: Industrial Economics and Principal-Agent- or Contract theories. Prior attendance of the lecture *Competition in Networks* [26240] is helpful in any case but not considered a formal precondition.

## V  Event excerpt: Regulation Theory and Practice (SS 2018)

**Aim**
Students

- will learn the basic aims and possibilities as well as the problems and limits of regulation
- will achieve an understanding of regulation as an incentive system under severe problems of asymmetric information and corporate governance
- will be able to apply general formal methods to the practice of regulation.

The lecture is suited for all students who want to work in companies of the network sectors – or who would like to become active on the side of regulators or in the respective political areas

**Content**
The lecture begins with a short description about the history of regulation and its relation to competition policies. Then it turns to the aims, the possibilities and the practice of regulation which are presented and analyzed critically. This happens from both a theoretical (microeconomic modelling) perspective as well as from a practical perspective with the help of various examples.

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

**Literature**
Literature and lecture notes are handed out during the course.

## T  Course: Risk Communication [T-WIWI-102649]

**Responsibility:** Ute Werner
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Learning Control / Examinations**

The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (30 min.) according to Section 4 (2), 2 of the examination regulation.
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

**Conditions**
None

**Recommendations**
None

## T Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

**Responsibility:** Marcus Wiens
**Contained in:** [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2581992 | Risk Management in Industrial Supply Networks | Vorlesung (V) | 2 | Marcus Wiens |
| WS 18/19 | 2581993 | Übung zu Risk Management in Industrial Supply Networks | Übung (Ü) | 1 | Miriam Klein, Marcus Wiens |

**Learning Control / Examinations**
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

**Conditions**
None

**Recommendations**
None

## V Event excerpt: Risk Management in Industrial Supply Networks (WS 18/19)

**Aim**
Students shall learn methods and tools to manage risks in complex and dynamically evolving supply chain networks. Students learn the characteristics of modern logistics and supply chain management including trends such as globalization, lean production and e-business and learn to identify and analyze the arising risks. On the basis of this overview on supply chain management, the students gain knowledge about approaches and methods of industrial risk management. These approaches will be adapted to answer the specific questions arising in supply chain management. Key aspects include the identification of major risks, which provide the basis for the development of robust networks, and the design of strategic and tactic risk prevention and mitigation measures. In this manner, students will gain knowledge in designing and steering of robust internal and external value-creating networks.

**Content**

- supply chain management: introduction, aims and trends
- industrial risk management
- definition und characterization of risks: sourcing and procurement, demand, production and infrastructure
- identification of risks
- risk controlling
- risk assessment and decision support tools
- risk prevention and mitigation strategies
- robust design of supply chain networks
- supplier selection
- capacity management
- business continuity management

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**
will be announced in the course

## T  Course: River and Floodplain Ecology [T-BGU-102997]

**Responsibility:** Florian Wittmann
**Contained in:** [M-WIWI-101642] Natural Hazards and Risk Management 1
[M-WIWI-101644] Natural Hazards and Risk Management 2

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Studienleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6111231 | | Vorlesung (V) | 2 | Florian Wittmann |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Roadmapping [T-WIWI-102853]

**Responsibility:** Daniel Jeffrey Koch
**Contained in:** [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**

Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**

None

**Recommendations**

Prior attendance of the course *Innovation Management* [2545015] is recommended.

**Remarks**

See German version.

## T  Course: Safety Engineering [T-MACH-105171]

**Responsibility:** Hans-Peter Kany
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2117061 | Safety Engineering | Vorlesung (V) | 2 | Hans-Peter Kany |

**Learning Control / Examinations**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

## V  Event excerpt: Safety Engineering (WS 18/19)

**Aim**
Students are able to:

- Name and describe relevant safety conceps of safety engeneering,
- Discuss basics of health at work and labour protection in Germany,
- Evaluate the basics for the safe methods of design of machinery with the national and european safety regulations and
- Realize these objectives by using examples in the field of storage and material handling systems.

**Content**
The course provides basic knowledge of safety engineering. In particular the basics of health at the working place, job safety in Germany, national and European safety rules and the basics of safe machine design are covered. The implementation of these aspects will be illustrated by examples of material handling and storage technology. This course focuses on: basics of safety at work, safety regulations, basic safety principles of machine design, protection devices, system security with risk analysis, electronics in safety engineering, safety engineering for storage and material handling technique, electrical dangers and ergonomics. So, mainly, the technical measures of risk reduction in specific technical circumstances are covered.

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Defren/Wickert: Sicherheit für den Maschinen- und Anlagenbau, Druckerei und
Verlag: H. von Ameln, Ratingen, ISBN: 3-926069-06-6

## T   Course: Sales Management and Retailing [T-WIWI-102890]

**Responsibility:**   Martin Klarmann
**Contained in:**   [M-WIWI-101487] Sales Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2572156 | Sales Management and Retailing | Vorlesung (V) | 2 | Martin Klarmann |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
None

**Remarks**
The lecture is compulsory for the module Sales Management. It is taught in English.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

## V   Event excerpt: Sales Management and Retailing (WS 18/19)

**Aim**
Students

- know challenges regarding the organization of distribution systems
- have knowledge in the field of forecasting and are able to predict the expected sales with the help of different approaches (e.g. exponential smoothing and moving averages)
- are able to plan and to put into practice customer satisfaction measurements
- know the main goals of customer relationship management and are able to implement them with the suitable instruments (e.g. loyalty programs, cross selling and customers-recruit-customers programs)
- are capable to put customer prioritization into place and to calculate the customer lifetime value
- know and have mastered the processes to generate recommendations (e.g. collaborative filtering process and affinity analysis)
- have well-founded knowledge of complaint management and customer recovery)
- understand the transaction cost theory and know its meaning in practice
- know different kinds of sales channels and can analyze their success
- are aware of power sources and conflicts between producer and retailer and can use this knowledge for a successful vertical marketing
- know the particularities of trade marketing regarding the components of the extended marketing mix
- have well-founded knowledge of quantitative determining of retail prices

**Content**
The aim of the course "Sales Management and Retailing" is on the one hand to give insights into the challenging realization of a successful sales management and on the other hand to discuss peculiarities of retailing contexts. The contents are below others:

- Customer relationship management (word-of-mouth-analysis, key account management, loyalty programs, complain management etc.)
- Retail marketing (trends, point of sale design etc.)
- Retailer-producer relationships

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

## T  Course: Selected Applications of Technical Logistics [T-MACH-102160]

**Responsibility:** Viktor Milushev, Martin Mittwollen
**Contained in:** [M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2118087 | Selected Applications of Technical Logistics | Vorlesung (V) | 3 | Viktor Milushev, Martin Mittwollen |

**Learning Control / Examinations**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

**Recommendations**
Knowledge out of Basics of Technical Logistics (T-MACH-102163) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned

## V  Event excerpt: Selected Applications of Technical Logistics (SS 2018)

**Aim**
Students are able to:

- Model the dynamic behaviour of material handling systems

- based on this calculate the dynamical behavior

- Transfer this approach autonomous to further, different material handling installations

- Discuss the knowledge with subject related persons

**Content**

- design and dimension of machines from intralogistics

- static and dynamic behaviour

- operation properties and specifics

- Inside practical lectures: sample applications and calculations in addition to the lectures

**Workload**
presence: 36h
rework: 84h

**Literature**
Recommendations during lessons

**T** **Course: Selected Applications of Technical Logistics - Project [T-MACH-108945]**

**Responsibility:** Viktor Milushev, Martin Mittwollen
**Contained in:** [M-MACH-101279] Technical Logistics

| ECTS | Recurrence | Version |
|------|-----------|---------|
| 2 | Jedes Sommersemester | 1 |

**Learning Control / Examinations**
presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation

**Conditions**
T-MACH-102160 (selected applications of technical logistics) must have been started

**Modeled Conditions**
The following conditions must be met:

- The course [T-MACH-102160] *Selected Applications of Technical Logistics* must have been started.

**Recommendations**
Knowledge out of Basics of Technical Logistics (T-MACH-102163) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned

**Replaces**
T-MACH-102161

## T Course: Selected Issues in Critical Information Infrastructures [T-WIWI-109251]

**Responsibility:** Ali Sunyaev
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015). Details will be announced in the respective course.

**Conditions**
None.

## T  Course: Selected legal issues of Internet law [T-INFO-108462]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 24821 | Selected legal issues of Internet law | Kolloquium (KOL) | 2 | Thomas Dreier |

**Modeled Conditions**
The following conditions must be met:

- The course [T-INFO-101307] *Internet Law* must not have been started.

**Responsibility:** Timo Mappes
**Contained in:** [M-MACH-101293] Microsystem Technology
[M-MACH-101290] BioMEMS
[M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2143892 | Selected Topics on Optics and Microoptics for Mechanical Engineers | Block-Vorlesung (BV) | 2 | Timo Mappes |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

**V** **Event excerpt: Selected Topics on Optics and Microoptics for Mechanical Engineers (SS 2018)**

**Aim**
Die Vorlesung "Ausgewählte Kapitel der Optik und Mikrooptik für Maschinenbauer" verfolgt folgende Lernziele:
(a) Die Studierenden können den Aufbau eines optischen Instruments beschreiben und erklären.
(b) Die Studierenden können Fertigungsverfahren (mikro)optischer Bauteile gegeneinander abwägen und bewerten sowie Ansätze zu neuen Fertigungsprozessen entwickeln.
(c) Die Studierenden können die Ursachen von Aberrationen beschreiben und unterschiedliche optische Effekte in die technische Nutzung übertragen.
(d) Die Studierenden können Kontrastverfahren zur optimalen Sichtbarmachung mikroskopischer Strukturen im Auf- und Durchlicht problemorientiert auswählen.
(e) Die Studierenden wenden das Wissen um den Aufbau und die Fertigungsverfahren eines optischen Instruments im Design eines Instruments mit ungewöhnlichen Anforderungen konkret an und skizzieren die Vor- und Nachteile der entwickelten Konstruktionsansätze.
(f) Die Studierenden können die erlernten Techniken (Auslegung eines optischen Strahlengangs, Funktionsweisen einfacher mikroskopischer Kontrastverfahren und zudem des Projektmanagements) in einem der Aufgabe entsprechenden Format präsentieren.

**Content**
In dieser Veranstaltung wird in die Grundlagen der Optik eingeführt. Vor dem Hintergrund der technischen Nutzung optischer Effekte und Messverfahren werden an ausgewählten Beispielen Bauelemente der Optik diskutiert. Dazu wird die Anwendung optischer Zusammenhänge und Effekte in optischen Instrumenten und Apparaten erörtert. Die Fertigungsverfahren für makroskopische und mikroskopische Optiken werden mit den technischen Randbedingungen erläutert. Die Studierenden erhalten die Möglichkeit in einer die Vorlesung begleitenden Gruppenarbeit ein optisches Instrument als Konzept zu entwerfen und können damit das Erlernte vertiefen sowie die Ergebnisse gemeinsam diskutieren.

**Workload**
Präsenzzeit: 26 Stunden
Selbststudium: 94 Stunden

**Literature**
(a) Hecht Eugene: Optik; 5., überarb. Aufl.; Oldenbourg Verlag, München und Wien, 2009
(b) Folien der Vorlesung als *.pdf

## T  Course: Semantic Web Technologies [T-WIWI-102874]

**Responsibility:** York Sure-Vetter
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2511310 | Semantic Web Technologies | Vorlesung (V) | 2 | Maribel Acosta Deibe, York Sure-Vetter |
| SS 2018 | 2511311 | Exercises to Semantic Web Technologies | Übung (Ü) | 1 | Maribel Acosta Deibe, Tobias Christof Käfer, York Sure-Vetter |

**Learning Control / Examinations**
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

**Conditions**
None

**Recommendations**
Lectures on Informatics of the Bachelor on Information Management (Semester 1-4) or equivalent are required.

## V  Event excerpt: Semantic Web Technologies (SS 2018)

**Aim**
The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

**Content**
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

**Workload**

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours

- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

**Literature**

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

**Additional Literature**

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

## T  Course: Seminar Creating a Patent Specification [T-ETIT-100754]

**Responsibility:** Wilhelm Stork
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Exam type | Version |
|------|----------|-----------|---------|
| 3 | deutsch | Studienleistung | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2311633 | Seminar Creating a Patent Specification | Seminar (S) | 2 | Wilhelm Stork |

**Conditions**

## T  Course: Seminar Data-Mining in Production [T-MACH-108737]

**Responsibility:** Gisela Lanza
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|------|----------|------------|---------|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2151643 | Seminar Data Mining in Production | Seminar (S) | 2 | Gisela Lanza |

**Learning Control / Examinations**
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

**Conditions**
none

**Remarks**
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.

## V  Event excerpt: Seminar Data Mining in Production (WS 18/19)

**Aim**
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.

**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.

**Workload**
regular attendance: 10 hours
self-study: 80 hours

## T  Course: Seminar in Business Administration A (Master) [T-WIWI-103474]

**Responsibility:** Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters

**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2400121 | Practical Seminar: Interactive Analytics | Proseminar / Seminar (PS/S) | 2 | Michael Beigl, Alexander Mädche, Erik Pescara, Peyman Toreini |
| SS 2018 | 2530364 | Applied Risk and Asset Management | Seminar (S) | 2 | Maxim Ulrich |
| SS 2018 | 2530372 | Automated Financial Advisory | Seminar (S) | 2 | Elmar Jakobs, Maxim Ulrich |
| SS 2018 | 2530580 | Seminar in Finance (Master, Prof. Uhrig-Homburg) | Seminar (S) | 2 | Jelena Eberbach, Stefan Fiesel, Michael Hofmann, Marcel Müller, Michael Reichenbacher, Philipp Schuster, Marliese Uhrig-Homburg |
| SS 2018 | 2540510 | | Seminar (S) | 2 | Andreas Geyer-Schulz |
| SS 2018 | 2550493 | Hospital Management | Block (B) | 2 | Martin Ludwig Hansis |
| SS 2018 | 2573011 | Seminar Human Resource Management | Seminar (S) | 2 | Mitarbeiter, Petra Nieken |
| SS 2018 | 2579904 | Seminar Management Accounting | Seminar (S) | 2 | N.N., Marcus Wouters |
| SS 2018 | 2579905 | Special Topics in Management Accounting | Seminar (S) | 2 | Ana Mickovic |
| SS 2018 | 2579908 | Innovation in Management Accounting | Seminar (S) | 2 | Markus Kirchberger |
| SS 2018 | 2581030 | | Seminar (S) | 2 | Fritz Braeuer, Russell McKenna, Jann Michael Weinand |
| SS 2018 | 2581977 | | Seminar (S) | 2 | Frank Schultmann |
| WS 18/19 | 2400013 | Seminar: Energy Informatics | Seminar (S) | 2 | Lukas Barth, Wolf Fichtner, Sascha Gritzbach, Veit Hagenmeyer, Patrick Jochem, Dorothea Wagner, Franziska Wegner, Matthias Wolf |
| WS 18/19 | 2500002 | Automated Financial Advisory | Seminar (S) | 2 | Maxim Ulrich |

| | | | | | |
|---|---|---|---|---|---|
| WS 18/19 | 2530293 | | Seminar (S) | 2 | Andreas Benz, Daniel Hoang, Torsten Luedecke, Martin Ruckes, Meik Scholz-Daneshgari, Richard Schubert, Jan-Oliver Strych |
| WS 18/19 | 2530374 | Applied Risk and Asset Management | Seminar (S) | 2 | Maxim Ulrich |
| WS 18/19 | 2540510 | Master Seminar in Information Engineering and Management | Seminar (S) | 2 | Fabian Ball, Andreas Geyer-Schulz, Victoria-Anne Schweigert, Marvin Schweizer |
| WS 18/19 | 2572181 | | Seminar (S) | | Martin Klarmann |
| WS 18/19 | 2573010 | Seminar Human Resources and Organizations | Seminar (S) | 2 | Mitarbeiter, Petra Nieken |
| WS 18/19 | 2573011 | Seminar Human Resource Management | Seminar (S) | 2 | Mitarbeiter, Petra Nieken |
| WS 18/19 | 2581976 | Seminar in Production and Operations Management I | Seminar (S) | 2 | Simon Glöser-Chahoud, Frank Schultmann |
| WS 18/19 | 2581977 | Seminar in Production and Operations Management II | Seminar (S) | 2 | Frank Schultmann, Rebekka Volk |
| WS 18/19 | 2581978 | Seminar in Production and Operations Management III | Seminar (S) | 2 | Frank Schultmann, Marcus Wiens |
| WS 18/19 | 2581980 | | Seminar (S) | 2 | Dogan Keles |
| WS 18/19 | 2581981 | | Seminar (S) | 2 | Armin Ardone |

**Learning Control / Examinations**

The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**

None.

**Recommendations**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**

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.

## V Event excerpt: Seminar Human Resource Management (WS 18/19)

**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

## V  Event excerpt: Special Topics in Management Accounting (SS 2018)

**Aim**
Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

**Content**
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Will be announced in the course.

## V  Event excerpt: Automated Financial Advisory (SS 2018)

**Aim**
In this seminar students work on issues related to the automatization of risk and investment management applications.

**Content**
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**
The total workload for this course is approximately 90 hours.

**Literature**
Literature will be distributed during the first lecture.

## V  Event excerpt: Master Seminar in Information Engineering and Management (WS 18/19)

**Aim**
The student is able to

- to perform a literature search for a given topic, to identify, find, value and evaluate the relevant literature.
- to commit to a topic (pr.n., in teamwork); this may include technical conceptual work and implementation.
- to write his seminar thesis of 15-20 pages in a structured scientific manner.
- to communicate his results in a presentation with discussion afterwards.

**Content**

The seminar servers on one hand to improve the scientific working skills. On the other hand, the student should work intensively on a given topic and develop a scientific work, that is based on a profound literature research.

The seminar can also be a implementation of software for a scientific problem (e.g. Business Games/dynamic systems) according to the individual focus in the current semester. The software has to be well documented. The written elaboration covers a description and explanation of the software as well as a discussion about limits and extensibility. Furthermore the software must be deployable und shall be presented on the infrastructure stack of the chair. An implementation of a software has to examine the scientific state of the art in a critical way, too.

A concrete description of the current topics is announced in time for the begin of the application stage.

**Workload**

The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

## V Event excerpt: Seminar Human Resources and Organizations (WS 18/19)

**Aim**

The student

- looks critically into current research topics in the fields of Human Resources an 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.

**Content**

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

**Workload**

The total workload for this course is approximately 90 hours.
Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

## V Event excerpt: Seminar: Energy Informatics (WS 18/19)

**Aim**

Der/die Studierende besitzt einen vertieften Einblick in Themenbereiche der Energieinformatik und hat grundlegende Kenntnisse in den Bereichen der Modellierung, Simulation und Algorithmen in Energienetzen. Ausgehend von einem vorgegebenen Thema kann er/sie mithilfe einer Literaturrecherche relevante Literatur identifizieren, auffinden, bewerten und schließlich auswerten. Er/sie kann das Thema in den Themenkomplex einordnen und in einen Gesamtzusammenhang bringen.

Er/sie ist in der Lage eine Seminararbeit (und später die Bachelor-/Masterarbeit) mit minimalem Einarbeitungsaufwand anzufertigen und dabei Formatvorgaben zu berücksichtigen, wie sie von allen Verlagen bei der Veröffentlichung von Dokumenten vorgegeben werden. Außerdem versteht er/sie das vorgegebene Thema in Form einer wissenschaftlichen Präsentation auszuarbeiten und kennt Techniken um die vorzustellenden Inhalte auditoriumsgerecht aufzuarbeiten und vorzutragen. Somit besitzt er/sie die Kenntnis wissenschaftliche Ergebnisse der Recherche in schriftlicher Form derart zu präsentieren, wie es in wissenschaftlichen Publikationen der Fall ist.

**Content**

Energieinformatik ist eine junges Forschungsgebiet, welches verschiedene Bereiche ausserhalb der Informatik beinhaltet wie der Wirtschaftswissenschaft, Elektrotechnik und Rechtswissenschaften. Bedingt durch die Energiewende wird vermehrt Strom aus erneuerbaren Erzeugern in das Netz eingespeist. Der Trend hin zu dezentralen und volatilen Stromerzeugung führt jedoch schon heute zu Engpässen in Stromnetzen, da diese für ein bidirektionales Szenario nicht ausgelegt wurden. Mithilfe der Energieinformatik und der dazugehörigen Vernetzung der verschiedenen Kompetenzen soll eine intelligente Steuerung der Netzinfrastruktur—von Stromverbrauchern, -erzeugern, -speichern und Netzkomponenten—zu einer umweltfreundlichen, nachhaltigen, effizienten und verlässlichen Energieversorgung beitragen.

Daher sollen im Rahmen des Seminars „Seminar: Energieinformatik", unterschiedliche Algorithmen, Simulationen und Modellierungen bzgl. ihrer Vor- und Nachteile in den verschiedenen Bereichen der Netzinfrastruktur untersucht werden.

**Workload**

4 LP entspricht ca. 120 Stunden

ca. 21 Std. Besuch des Seminars,

ca. 45 Std. Analyse und Bearbeitung des Themas,

ca. 27 Std. Vorbereitung und Erstellung der Präsentation, und

ca. 27 Std. Schreiben der Ausarbeitung.

## V  Event excerpt: Seminar in Finance (Master, Prof. Uhrig-Homburg) (SS 2018)

**Aim**

The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.

Through the presentations in this seminar the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

**Content**

Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

Will be announced at the end of the foregoing semester.

## V  Event excerpt: Automated Financial Advisory (WS 18/19)

**Aim**

In this seminar students work on issues related to the automatization of risk and investment management applications.

**Content**

At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**

The total workload for this course is approximately 90 hours.

**Literature**

Literature will be distributed during the first lecture.

## V  Event excerpt: Hospital Management (SS 2018)

**Aim**

The student

- knows the scope of duties and decisions of a hospital manager and
- is able to give profound guidance.

**Content**

The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

**Workload**

The total workload for this course is approximately 90 hours.

## V  Event excerpt: Seminar Management Accounting (SS 2018)

**Aim**

Students

- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

**Content**

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

Will be announced in the course.

## V Event excerpt: (WS 18/19)

**Aim**

Students

- can exploit a literature field systematically
- are able to write an academic paper in a formally correct way
- can assess the relevance and quality of sources
- are able to get an overview of sources very quickly
- know how to find relevant sources for a literature field
- are capable to write a convincing outline
- know how to categorize a subject under a research field
- understand how to systematize literature fields theoretically and empirically with the help of literature tables
- can identify the most important findings in a huge number of sources
- are able to present a research field
- can discuss the theoretical and practical implications of a topic
- are capable to identify interesting research gaps

**Content**

The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

will be announced in the seminary.

**T** **Course: Seminar in Business Administration B (Master) [T-WIWI-103476]**

**Responsibility:** Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters

**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2530364 | Applied Risk and Asset Management | Seminar (S) | 2 | Maxim Ulrich |
| SS 2018 | 2530372 | Automated Financial Advisory | Seminar (S) | 2 | Elmar Jakobs, Maxim Ulrich |
| SS 2018 | 2530580 | Seminar in Finance (Master, Prof. Uhrig-Homburg) | Seminar (S) | 2 | Jelena Eberbach, Stefan Fiesel, Michael Hofmann, Marcel Müller, Michael Reichenbacher, Philipp Schuster, Marliese Uhrig-Homburg |
| SS 2018 | 2540510 | | Seminar (S) | 2 | Andreas Geyer-Schulz |
| SS 2018 | 2550493 | Hospital Management | Block (B) | 2 | Martin Ludwig Hansis |
| SS 2018 | 2573011 | Seminar Human Resource Management | Seminar (S) | 2 | Mitarbeiter, Petra Nieken |
| SS 2018 | 2579904 | Seminar Management Accounting | Seminar (S) | 2 | N.N., Marcus Wouters |
| SS 2018 | 2579905 | Special Topics in Management Accounting | Seminar (S) | 2 | Ana Mickovic |
| SS 2018 | 2579908 | Innovation in Management Accounting | Seminar (S) | 2 | Markus Kirchberger |
| SS 2018 | 2581030 | | Seminar (S) | 2 | Fritz Braeuer, Russell McKenna, Jann Michael Weinand |
| SS 2018 | 2581977 | | Seminar (S) | 2 | Frank Schultmann |
| WS 18/19 | 2400013 | Seminar: Energy Informatics | Seminar (S) | 2 | Lukas Barth, Wolf Fichtner, Sascha Gritzbach, Veit Hagenmeyer, Patrick Jochem, Dorothea Wagner, Franziska Wegner, Matthias Wolf |
| WS 18/19 | 2500002 | Automated Financial Advisory | Seminar (S) | 2 | Maxim Ulrich |
| WS 18/19 | 2530293 | | Seminar (S) | 2 | Andreas Benz, Daniel Hoang, Torsten Luedecke, Martin Ruckes, Meik Scholz-Daneshgari, Richard Schubert, Jan-Oliver Strych |

| WS 18/19 | 2530374 | Applied Risk and Asset Management | Seminar (S) | 2 | Maxim Ulrich |
|----------|---------|-----------------------------------|-------------|---|--------------|
| WS 18/19 | 2540510 | Master Seminar in Information Engineering and Management | Seminar (S) | 2 | Fabian Ball, Andreas Geyer-Schulz, Victoria-Anne Schweigert, Marvin Schweizer |
| WS 18/19 | 2572181 | | Seminar (S) | | Martin Klarmann |
| WS 18/19 | 2573010 | Seminar Human Resources and Organizations | Seminar (S) | 2 | Mitarbeiter, Petra Nieken |
| WS 18/19 | 2573011 | Seminar Human Resource Management | Seminar (S) | 2 | Mitarbeiter, Petra Nieken |
| WS 18/19 | 2581976 | Seminar in Production and Operations Management I | Seminar (S) | 2 | Simon Glöser-Chahoud, Frank Schultmann |
| WS 18/19 | 2581977 | Seminar in Production and Operations Management II | Seminar (S) | 2 | Frank Schultmann, Rebekka Volk |
| WS 18/19 | 2581978 | Seminar in Production and Operations Management III | Seminar (S) | 2 | Frank Schultmann, Marcus Wiens |
| WS 18/19 | 2581980 | | Seminar (S) | 2 | Dogan Keles |
| WS 18/19 | 2581981 | | Seminar (S) | 2 | Armin Ardone |

**Learning Control / Examinations**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**

None.

**Recommendations**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**

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.

## V Event excerpt: Seminar Human Resource Management (WS 18/19)

**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

## V Event excerpt: Special Topics in Management Accounting (SS 2018)

**Aim**
Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

**Content**
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Will be announced in the course.

## V Event excerpt: Automated Financial Advisory (SS 2018)

**Aim**
In this seminar students work on issues related to the automatization of risk and investment management applications.

**Content**
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**
The total workload for this course is approximately 90 hours.

**Literature**
Literature will be distributed during the first lecture.

## V Event excerpt: Master Seminar in Information Engineering and Management (WS 18/19)

**Aim**
The student is able to

- to perform a literature search for a given topic, to identify, find, value and evaluate the relevant literature.
- to commit to a topic (pr.n., in teamwork); this may include technical conceptinal work and implementation.
- to write his seminar thesis of 15-20 pages in a structured scientific manner.
- to communicate his results in a presentation with discussion afterwards.

**Content**
The seminar servers on one hand to improve the scientific working skills. On the other hand, the student should work intensively on a given topic and develop a scientific work, that is based on a profound literature research.
The seminar can also be a implementation of software for a scientific problem (e.g. Business Games/dynamic systems) according to the individual focus in the current semester. The software has to be well documented. The written elaboration covers a description and explanation of the software as well as a discussion about limits and extensibility. Furthermore

the software must be deployable and shall be presented on the infrastructure stack of the chair. An implementation of a software has to examine the scientific state of the art in a critical way, too.

A concrete description of the current topics is announced in time for the begin of the application stage.

**Workload**

The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

## V Event excerpt: Seminar Human Resources and Organizations (WS 18/19)

**Aim**

The student

- looks critically into current research topics in the fields of Human Resources an 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.

**Content**

The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

**Workload**

The total workload for this course is approximately 90 hours.
Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

## V Event excerpt: Seminar: Energy Informatics (WS 18/19)

**Aim**

Der/die Studierende besitzt einen vertieften Einblick in Themenbereiche der Energieinformatik und hat grundlegende Kenntnisse in den Bereichen der Modellierung, Simulation und Algorithmen in Energienetzen. Ausgehend von einem vorgegebenen Thema kann er/sie mithilfe einer Literaturrecherche relevante Literatur identifizieren, auffinden, bewerten und schließlich auswerten. Er/sie kann das Thema in den Themenkomplex einordnen und in einen Gesamtzusammenhang bringen.

Er/sie ist in der Lage eine Seminararbeit (und später die Bachelor-/Masterarbeit) mit minimalem Einarbeitungsaufwand anzufertigen und dabei Formatvorgaben zu berücksichtigen, wie sie von allen Verlagen bei der Veröffentlichung von Dokumenten vorgegeben werden. Außerdem versteht er/sie das vorgegebene Thema in Form einer wissenschaftlichen Präsentation auszuarbeiten und kennt Techniken um die vorzustellenden Inhalte auditoriumsgerecht aufzuarbeiten und vorzutragen. Somit besitzt er/sie die Kenntnis wissenschaftliche Ergebnisse der Recherche in schriftlicher Form derart zu präsentieren, wie es in wissenschaftlichen Publikationen der Fall ist.

**Content**

Energieinformatik ist eine junges Forschungsgebiet, welches verschiedene Bereiche ausserhalb der Informatik beinhaltet wie der Wirtschaftswissenschaft, Elektrotechnik und Rechtswissenschaften. Bedingt durch die Energiewende wird vermehrt Strom aus erneuerbaren Erzeugern in das Netz eingespeist. Der Trend hin zu dezentralen und volatilen Stromerzeugung führt jedoch schon heute zu Engpässen in Stromnetzen, da diese für ein bidirektionales Szenario nicht ausgelegt wurden. Mithilfe der Energieinformatik und der dazugehörigen Vernetzung der verschiedenen Kompetenzen soll eine intelligente Steuerung der Netzinfrastruktur—von Stromverbrauchern, -erzeugern, -speichern und Netzkomponenten—zu einer umweltfreundlichen, nachhaltigen, effizienten und verlässlichen Energieversorgung beitragen.

Daher sollen im Rahmen des Seminars „Seminar: Energieinformatik", unterschiedliche Algorithmen, Simulationen und Modellierungen bzgl. ihrer Vor- und Nachteile in den verschiedenen Bereichen der Netzinfrastruktur untersucht werden.

**Workload**

4 LP entspricht ca. 120 Stunden
ca. 21 Std. Besuch des Seminars,
ca. 45 Std. Analyse und Bearbeitung des Themas,
ca. 27 Std. Vorbereitung und Erstellung der Präsentation, und

ca. 27 Std. Schreiben der Ausarbeitung.

## V Event excerpt: Seminar in Finance (Master, Prof. Uhrig-Homburg) (SS 2018)

**Aim**

The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.
Through the presentations in this seminar the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

**Content**

Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.
The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

Will be announced at the end of the foregoing semester.

## V Event excerpt: Automated Financial Advisory (WS 18/19)

**Aim**

In this seminar students work on issues related to the automatization of risk and investment management applications.

**Content**

At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**

The total workload for this course is approximately 90 hours.

**Literature**

Literature will be distributed during the first lecture.

## V Event excerpt: Hospital Management (SS 2018)

**Aim**

The student

- knows the scope of duties and decisions of a hospital manager and
- is able to give profound guidance.

**Content**

The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.
Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

**Workload**

The total workload for this course is approximately 90 hours.

## V Event excerpt: Seminar Management Accounting (SS 2018)

**Aim**

Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

**Content**

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

Will be announced in the course.

## V Event excerpt: (WS 18/19)

**Aim**

Students

- can exploit a literature field systematically
- are able to write an academic paper in a formally correct way
- can assess the relevance and quality of sources
- are able to get an overview of sources very quickly
- know how to find relevant sources for a literature field
- are capable to write a convincing outline
- know how to categorize a subject under a research field
- understand how to systematize literature fields theoretically and empirically with the help of literature tables
- can identify the most important findings in a huge number of sources
- are able to present a research field
- can discuss the theoretical and practical implications of a topic
- are capable to identify interesting research gaps

**Content**

The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

will be announced in the seminary.

## T  Course: Seminar in Economic Policy [T-WIWI-102789]

**Responsibility:** Ingrid Ott
**Contained in:** [M-WIWI-101514] Innovation Economics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2512312 | Cooperation seminar: Innovative applications on single board computers as well as their economic relevance | Seminar / Praktikum (S/P) | 3 | David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller |

**Learning Control / Examinations**
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted graded examinations. (Essay 50%, 40% oral presentation, active participation 10%).

**Conditions**
None

**Recommendations**
At least one of the lectures "Theory of Endogenous Growth" or "Innovation Theory and Policy" should be attended in advance, if possible.

## V  Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

**Content**
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

## T Course: Seminar in Economics A (Master) [T-WIWI-103478]

**Responsibility:** Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger

**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2521310 | Advanced Topics in Econometrics | Seminar (S) | 2 | Rebekka Buse, Chong Liang, Melanie Schienle |
| SS 2018 | 2560282 | | Seminar (S) | 2 | Assistenten, Ingrid Ott |
| WS 18/19 | 2512312 | Cooperation seminar: Innovative applications on single board computers as well as their economic relevance | Seminar / Praktikum (S/P) | 3 | David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller |
| WS 18/19 | 2560140 | Topics on Political Economics | Seminar (S) | 2 | David Huber, Nora Szech |
| WS 18/19 | 2560141 | | Seminar (S) | 2 | Jeroen Jannis Engel, Nora Szech |
| WS 18/19 | 2560400 | Seminar in Macroeconomics | Seminar (S) | 2 | Johannes Brumm, Christopher Krause, Luca Pegorari |
| WS 18/19 | 2561208 | | Seminar (S) | 1 | Eckhard Szimba |

**Learning Control / Examinations**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**

None.

**Recommendations**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**

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.

## V Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

**Content**

Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

## V Event excerpt: Topics on Political Economics (WS 18/19)

**Aim**

The student develops an own idea for an economic experiment in this research direction.

**Workload**

About 90 hours.

### T  Course: Seminar in Economics B (Master) [T-WIWI-103477]

**Responsibility:** Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2521310 | Advanced Topics in Econometrics | Seminar (S) | 2 | Rebekka Buse, Chong Liang, Melanie Schienle |
| SS 2018 | 2560282 | | Seminar (S) | 2 | Assistenten, Ingrid Ott |
| WS 18/19 | 2512312 | Cooperation seminar: Innovative applications on single board computers as well as their economic relevance | Seminar / Praktikum (S/P) | 3 | David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller |
| WS 18/19 | 2560140 | Topics on Political Economics | Seminar (S) | 2 | David Huber, Nora Szech |
| WS 18/19 | 2560141 | | Seminar (S) | 2 | Jeroen Jannis Engel, Nora Szech |
| WS 18/19 | 2560400 | Seminar in Macroeconomics | Seminar (S) | 2 | Johannes Brumm, Christopher Krause, Luca Pegorari |
| WS 18/19 | 2561208 | | Seminar (S) | 1 | Eckhard Szimba |

**Learning Control / Examinations**
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**
None.

**Recommendations**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**
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.

### V  Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

**Content**
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

## V Event excerpt: Topics on Political Economics (WS 18/19)

**Aim**

The student develops an own idea for an economic experiment in this research direction.

**Workload**

About 90 hours.

**T** **Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]**

**Responsibility:** Fachvertreter ingenieurwissenschaftlicher Fakultäten
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**
See German version.

**Conditions**
See module description.

**Recommendations**
None

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## T  Course: Seminar in Informatics A (Master) [T-WIWI-103479]

**Responsibility:** Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2512300 | | Seminar / Praktikum (S/P) | 3 | Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma |
| SS 2018 | 2513200 | | Seminar (S) | 2 | Sascha Alpers, Andreas Fritsch, Andreas Oberweis, Oliver Raabe, Gunther Schiefer, Melanie Volkamer, Manuela Wagner |
| SS 2018 | 2513300 | Technology-enhanced Learning | Seminar (S) | 2 | Jürgen Beyerer, Klemens Böhm, Matthias Frank, Gerd Gidion, Martin Mandausch, Wolfgang Roller, Alexander Streicher, York Sure-Vetter, Daniel Szentes |
| SS 2018 | 2513306 | Data Science & Real-time Big Data Analytics | Seminar / Praktikum (S/P) | 2 | Dominik Riemer, Suad Sejdovic, York Sure-Vetter |
| SS 2018 | 2513400 | | Seminar (S) | 2 | Sebastian Lins, Ali Sunyaev, Scott Thiebes |
| SS 2018 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt |
| WS 18/19 | 2400125 | | Seminar (S) | 2 | Franziska Boehm, Nina Gerber, Melanie Volkamer |
| WS 18/19 | 2512301 | Linked Data and the Semantic Web | Seminar / Praktikum (S/P) | 3 | Maribel Acosta Deibe, Lars Heling, Tobias Christof Käfer, York Sure-Vetter, Tobias Weller |
| WS 18/19 | 2512311 | Data Science with Open Data | Seminar / Praktikum (S/P) | 3 | Matthias Frank, York Sure-Vetter |

| WS 18/19 | 2512312 | Cooperation seminar: Innovative applications on single board computers as well as their economic relevance | Seminar / Praktikum (S/P) | 3 | David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller |
|----------|---------|------|------|---|------|
| WS 18/19 | 2513400 | | Seminar (S) | 2 | Sebastian Lins, Ali Sunyaev, Scott Thiebes |
| WS 18/19 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt |

**Learning Control / Examinations**

The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**

None.

**Recommendations**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**

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.

## V Event excerpt: Linked Data and the Semantic Web (WS 18/19)

**Workload**

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

## V Event excerpt: Seminar Service Science, Management & Engineering (WS 18/19)

**Aim**

The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

**Content**

Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

**Workload**

The total workload for this course is approximately 120 hours. For further information see German version.

**Literature**

The student will receive the necessary literature for his research topic.

## V Event excerpt: Technology-enhanced Learning (SS 2018)

**Content**

Die Liste der Seminarthemen finden Sie unter https://portal.wiwi.kit.edu/ys/1868

**Literature**

Werden im Seminar bekanntgegeben

## V Event excerpt: (SS 2018)

**Content**

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

**Literature**

Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

## V Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

**Content**

Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

## V Event excerpt: (WS 18/19)

**Aim**

Students (1) independently analyze current questions in the field of information systems; (2) work on the respective scientific question with recognized scientific methods and write a seminar thesis on it; (3) can combine already learned theoretical and practical lecture contents of the respective question.

## T Course: Seminar in Informatics B (Master) [T-WIWI-103480]

**Responsibility:** Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch/englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2512300 | | Seminar / Praktikum (S/P) | 3 | Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma |
| SS 2018 | 2513200 | | Seminar (S) | 2 | Sascha Alpers, Andreas Fritsch, Andreas Oberweis, Oliver Raabe, Gunther Schiefer, Melanie Volkamer, Manuela Wagner |
| SS 2018 | 2513300 | Technology-enhanced Learning | Seminar (S) | 2 | Jürgen Beyerer, Klemens Böhm, Matthias Frank, Gerd Gidion, Martin Mandausch, Wolfgang Roller, Alexander Streicher, York Sure-Vetter, Daniel Szentes |
| SS 2018 | 2513306 | Data Science & Real-time Big Data Analytics | Seminar / Praktikum (S/P) | 2 | Dominik Riemer, Suad Sejdovic, York Sure-Vetter |
| SS 2018 | 2513400 | | Seminar (S) | 2 | Sebastian Lins, Ali Sunyaev, Scott Thiebes |
| SS 2018 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt |
| WS 18/19 | 2400125 | | Seminar (S) | 2 | Franziska Boehm, Nina Gerber, Melanie Volkamer |
| WS 18/19 | 2512301 | Linked Data and the Semantic Web | Seminar / Praktikum (S/P) | 3 | Maribel Acosta Deibe, Lars Heling, Tobias Christof Käfer, York Sure-Vetter, Tobias Weller |
| WS 18/19 | 2512311 | Data Science with Open Data | Seminar / Praktikum (S/P) | 3 | Matthias Frank, York Sure-Vetter |

| | | | | | |
|---|---|---|---|---|---|
| WS 18/19 | 2512312 | Cooperation seminar: Innovative applications on single board computers as well as their economic relevance | Seminar / Praktikum (S/P) | 3 | David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller |
| WS 18/19 | 2513400 | | Seminar (S) | 2 | Sebastian Lins, Ali Sunyaev, Scott Thiebes |
| WS 18/19 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt |

**Learning Control / Examinations**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**
None.

**Recommendations**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**
Placeholder for seminars offered by the Institute AIFB.
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

## V Event excerpt: Linked Data and the Semantic Web (WS 18/19)

**Workload**
Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

## V Event excerpt: Seminar Service Science, Management & Engineering (WS 18/19)

**Aim**
The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

**Content**

Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

**Workload**

The total workload for this course is approximately 120 hours. For further information see German version.

**Literature**

The student will receive the necessary literature for his research topic.

## V Event excerpt: Technology-enhanced Learning (SS 2018)

**Content**

Die Liste der Seminarthemen finden Sie unter https://portal.wiwi.kit.edu/ys/1868

**Literature**

Werden im Seminar bekanntgegeben

## V Event excerpt: (SS 2018)

**Content**

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

**Literature**

Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

## V Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

**Content**

Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

## V Event excerpt: (WS 18/19)

**Aim**

Students (1) independently analyze current questions in the field of information systems; (2) work on the respective scientific question with recognized scientific methods and write a seminar thesis on it; (3) can combine already learned theoretical and practical lecture contents of the respective question.

## T  Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

**Responsibility:** Stefan Nickel, Steffen Rebennack, Oliver Stein
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550132 | | Seminar (S) | 2 | Robert Mohr, Christoph Neumann, Oliver Stein |
| SS 2018 | 2550473 | | Seminar (S) | 2 | Peter Kirst, Steffen Rebennack |
| SS 2018 | 2550491 | Seminar: Recent Topics in OR | Block (B) | | Mitarbeiter, Stefan Nickel |
| WS 18/19 | 2550491 | Seminar: Recent Topics in OR | Seminar (S) | | Mitarbeiter, Stefan Nickel |

**Learning Control / Examinations**

The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**

None.

**Recommendations**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**

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.

## V  Event excerpt: Seminar: Recent Topics in OR (WS 18/19)

**Aim**

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.

**Content**

The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

Literature and relevant sources will be announced at the beginning of the seminar.

## T  Course: Seminar in Operations Research B (Master) [T-WIWI-103482]

**Responsibility:**   Stefan Nickel, Steffen Rebennack, Oliver Stein
**Contained in:**   [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550132 | | Seminar (S) | 2 | Robert Mohr, Christoph Neumann, Oliver Stein |
| SS 2018 | 2550473 | | Seminar (S) | 2 | Peter Kirst, Steffen Rebennack |
| SS 2018 | 2550491 | Seminar: Recent Topics in OR | Block (B) | | Mitarbeiter, Stefan Nickel |
| WS 18/19 | 2550491 | Seminar: Recent Topics in OR | Seminar (S) | | Mitarbeiter, Stefan Nickel |

**Learning Control / Examinations**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**
None.

**Recommendations**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**
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.

## V  Event excerpt: Seminar: Recent Topics in OR (WS 18/19)

**Aim**
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.

**Content**

The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

Literature and relevant sources will be announced at the beginning of the seminar.

## T  Course: Seminar in Statistics A (Master) [T-WIWI-103483]

**Responsibility:** Oliver Grothe, Melanie Schienle
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2521310 | Advanced Topics in Econometrics | Seminar (S) | 2 | Rebekka Buse, Chong Liang, Melanie Schienle |

**Learning Control / Examinations**
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**
None.

**Recommendations**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**
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.

## T Course: Seminar in Statistics B (Master) [T-WIWI-103484]

**Responsibility:** Oliver Grothe, Melanie Schienle
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | englisch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2521310 | Advanced Topics in Econometrics | Seminar (S) | 2 | Rebekka Buse, Chong Liang, Melanie Schienle |

**Learning Control / Examinations**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**Conditions**
None.

**Recommendations**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Remarks**
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.

## **T** Course: Seminar in Transportation [T-BGU-100014]

**Responsibility:** Bastian Chlond, Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232903 | | Seminar (S) | 2 | Martin Kagerbauer, Peter Vortisch |
| WS 18/19 | 6232903 | | Seminar (S) | 2 | Mitarbeiter/Innen KIT, Peter Vortisch |

**Learning Control / Examinations**
seminar paper, appr. 10 pages, and presentation, appr. 10 min.

**Conditions**
none

**Recommendations**
none

**Remarks**

**T**  **Course: Seminar Mobility Services (Master) [T-WIWI-103174]**

**Responsibility:** Gerhard Satzger, Carola Stryja
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**
A final written exam will be conducted.

**Conditions**
None

**Remarks**
The course is not offered regularly.

## T   Course: Seminar Production Technology [T-MACH-109062]

**Responsibility:**   Jürgen Fleischer, Gisela Lanza, Volker Schulze
**Contained in:**   [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|------|----------|------------|---------|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2149665 | Seminar Production Technology | Seminar (S) | 1 | Jürgen Fleischer, Gisela Lanza, Volker Schulze, Frederik Zanger |

**Learning Control / Examinations**
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

**Conditions**
none

**Remarks**
The specific topics are published on the homepage of the wbk Institute of Production Science.

## V   Event excerpt: Seminar Production Technology (SS 2018)

**Aim**
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.

**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

**Workload**
regular attendance: 10 hours
self-study: 80 hours

## T   Course: Seminar: Legal Studies I [T-INFO-101997]

**Responsibility:** Thomas Dreier
**Contained in:** [M-WIWI-101808] Seminar Module
[M-INFO-101242] Governance, Risk & Compliance

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2400041 | Governance, Risk & Compliance | Seminar (S) | 2 | Andreas Herzig |
| SS 2018 | 2400088 | | Seminar (S) | 2 | Franziska Boehm, Alexander Mädche, Martina Zitterbart |
| SS 2018 | 24820 | Current Issues in Patent Law | Seminar (S) | 2 | Klaus-Jürgen Melullis |
| WS 18/19 | 24389 | | Seminar (S) | 2 | Martin Schallbruch |

## V   Event excerpt: Governance, Risk & Compliance (SS 2018)

### Aim

Der/die Studierende hat vertiefte Kenntnisse hinsichtlich der Thematik "Governance, Risk & Compliance"sowohl auf regulatorischer Ebene als auch auf betriebswirtschaftlicher Ebene. Er/sie ist in der Lage, eine konkrete Fragestellung schriftlich in Form einer Seminararbeit auszuarbeiten sowie anschließend im mündlichen Vortrag zu präsentieren.

### Content

Das Seminar beinhaltet neben der Einordnung der Thematik in den rechtlichen wie betriebswirtschaftlichen Kontext die Begrifflichkeiten, gesetzlichen Grundlagen und Haftungsaspekte. Darüber hinaus werden sowohl das Risikomanagementsystem als auch das Compliance-Management-System näher erläutert sowie die Relevanz dieser Systeme für das Unternehmen dargestellt. Den Abschluss bildet ein Blick in die Praxis hinsichtlich der Aufdeckung und dem adäquaten Umgang mit Verstößen. Die Themen werden zudem durch die Ausarbeitung einer konkreten Fragestellung in Form von Seminararbeiten sowie der anschließenden Präsentation abgerundet.

### Workload

21 h Präsenzzeit, 60 h schriftliche Ausarbeitung, 9h Vortrag vorbereiten.

## V   Event excerpt: Current Issues in Patent Law (SS 2018)

### Aim

Ziel der Veranstaltung ist es, Studenten aller Fachrichtungen an das Patentrecht heranzuführen, und ihnen vertiefte Kenntnisse des Patentrechts zu vermitteln. Sie sollen die rechtspolitischen Anliegen und die wirtschaftlichen Hintergründe dieses Rechts anhand der Interessenlage typischer Fallgestaltungen erarbeiten und über einen Vergleich mit den gesetzlichen Regelungen Einblick in die gesetzlichen Regelungen gewinnen, die ihnen in ihrer späteren beruflichen Tätigkeit als Naturwissenschaftler oder Techniker ebenso wie als juristischer Berater umfangreich begegnen können. Dabei sollen sie an die Regelungen des nationalen, europäischen und internationalen Patentrechts, wie auch des Know-How-Schutzes herangeführt werden. Auch der Konflikt zwischen Patent als einem Monopolrecht und den Anforderungen einer freien Marktwirtschaft sowie deren Schutz durch das Kartellrecht wird mit den Studenten erörtert werden.

### Workload

Der gesamte Arbeitsaufwand beträgt ca. 75-100 h, davon sind 22,5 h Präsenzzeit.

## V   Event excerpt:   (WS 18/19)

**Aim**

Das Seminar soll ausgehend von den Schutzzielen des IT-Sicherheitsrechts und der Bedrohungslage einen Überblick über die Entwicklung des IT-Sicherheitsrechts geben und seine Weiterentwicklung, auch vor dem Hintergrund des vom Bundesverfassungsgericht entwickelten Rechts auf den Schutz der Integrität und Vertraulichkeit informationstechnischer Systeme diskutieren.

**Content**

Die Sicherheit der Informationstechnik ist zu einer Schlüsselfrage der Gestaltung der Informationsgesellschaft geworden. Die Abhängigkeit der Wirtschaft und des Staates vom Funktionieren von IT-Systemen und Internet, die zunehmende Komplexität der IT-Systeme, die Verteilung der Verantwortung auf unterschiedliche Beteiligte und die steigende Zahl von Cyberangriffen durch verschiedenste Akteure erschweren die IT-Sicherheit.

Rechtsfragen der IT- und Cybersicherheit berühren unterschiedliche Rechtsgebiete. Hierbei spielen klassische Fragen des Strafrechts und des Polizei- und Ordnungsrechts ebenso eine Rolle wie besondere Verwaltungsrechte, etwa für kritische Infrastrukturen, oder spezielle Rechtsvorschriften der öffentlichen Verwaltung für die Gestaltung der Informationstechnik. Daneben sind zivilrechtliche Fragen der Verantwortungsverteilung und der Produktsicherheit von Belang.

Der rasanten technischen Entwicklung folgend hat das IT-Sicherheitsrecht in den letzten Jahren durch die Grundgesetzänderung im Rahmen der Förderalismusreform, querschnittliche Regelungen wie die Novellierung des BSI-Gesetzes, das Personalausweis- und das De-Mail-Gesetz sowie Spezialvorschriften in Fachrechten eine stetige Weiterentwicklung erfahren. Zuletzt hat der Deutsche Bundestag im Juni 2015 ein "IT-Sicherheitsgesetz" verabschiedet, das Neuregelungen vor allem für den Bereich der kritischen Infrastrukturen erfährt. Weitere Veränderungen zeichnen sich durch die Beratung der Europäischen Richtlinie für Netzwerk- und Informationssicherheit ab.

Das Seminar im WS 2015/16 soll ausgehend von den Schutzzielen des IT-Sicherheitsrechts und der Cybersicherheitslage einen Überblick über die unterschiedlichen Materien des IT-Sicherheitsrechts geben und seine Weiterentwicklung, auch vor dem Hintergrund des vom Bundesverfassungsgericht entwickelten Rechts auf den Schutz der Integrität und Vertraulichkeit informationstechnischer Systeme, diskutieren.

Themen für Seminararbeiten:

1. Das Recht auf Gewährleistung der Integrität und Vertraulichkeit informationstechnischer Systeme als "IT-Sicherheitsgrundrecht"
2. Datenschutz und Datensicherheit - IT-Sicherheit als Hilfsmittel zum Schutz des Persönlichkeitsrechts
3. Deutsches Computerstrafrecht und die Umsetzung der Cybercrime-Konvention des Europarats
4. IT-Sicherheit im Zivilrecht - wer haftet für Sicherheitsvorfälle?
5. Online-Shopping und seine Tücken (Fernabsatzrecht)
6. Schutz des Verbrauchers gegen unlautere Methoden im Internet (Spam, Abofallen)
7. IT-Sicherheit kritischer Infrastrukturen - rechtliche Absicherung unter besonderer Berücksichtigung des IT-Sicherheitsgesetzes
8. Das Bundesamt für Sicherheit in der Informationstechnik und seine rechtlichen Grundlagen nach Verabschiedung des IT-Sicherheitsgesetzes
9. Pässe und Personalausweise als gesicherte elektronische Identitäten
10. Elektronische Signaturen - praxisgerecht und überreguliert?
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12. IT-Sicherheit in der öffentlichen Verwaltung - Art. 91c GG und der IT-Planungsrat
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14. Europäische IT-Sicherheitsstrukturen - die IT-Sicherheitsagentur ENISA und die Diskussion über eine EU-Richtlinie für Netzwerk und Informationssicherheit
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Die Verteilung der Themen erfolgt rechtzeitig vor Semesterbeginn. Die Teilnahme an der Vorbesprechung ist verpflichtend.

**Workload**

ca. 100 - 120 h (2 - 4 Credits)

## T  Course: Seminar: Legal Studies II [T-INFO-105945]

**Responsibility:** Thomas Dreier
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Exam type | Version |
|------|----------|-----------|---------|
| 3 | deutsch | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2400014 | Current Issues in Patent Law | Seminar (S) | 2 | Klaus-Jürgen Melullis |
| WS 18/19 | 2400015 | | Seminar (S) | 2 | Thomas Dreier |
| WS 18/19 | 2400125 | | Seminar (S) | 2 | Franziska Boehm, Nina Gerber, Melanie Volkamer |
| WS 18/19 | 24186 | Patents at the point of intersection between technology, economy and law | Seminar (S) | 2 | Markus Dammler |
| WS 18/19 | 24389 | | Seminar (S) | 2 | Martin Schallbruch |

## V  Event excerpt: Current Issues in Patent Law (WS 18/19)

**Aim**

Ziel der Veranstaltung ist es, Studenten aller Fachrichtungen an das Patentrecht heranzuführen, und ihnen vertiefte Kenntnisse des Patentrechts zu vermitteln. Sie sollen die rechtspolitischen Anliegen und die wirtschaftlichen Hintergründe dieses Rechts anhand der Interessenlage typischer Fallgestaltungen erarbeiten und über einen Vergleich mit den gesetzlichen Regelungen Einblick in die gesetzlichen Regelungen gewinnen, die ihnen in ihrer späteren beruflichen Tätigkeit als Naturwissenschaftler oder Techniker ebenso wie als juristischer Berater umfangreich begegnen können. Dabei sollen sie an die Regelungen des nationalen, europäischen und internationalen Patentrechts, wie auch des Know-How-Schutzes herangeführt werden. Auch der Konflikt zwischen Patent als einem Monopolrecht und den Anforderungen einer freien Marktwirtschaft sowie deren Schutz durch das Kartellrecht wird mit den Studenten erörtert werden.

**Workload**

Der gesamte Arbeitsaufwand beträgt ca. 75-100 h, davon sind 22,5 h Präsenzzeit.

## V  Event excerpt: Patents at the point of intersection between technology, economy and law (WS 18/19)

**Aim**

Das Seminar dient dazu, diese Schnittstelle zwischen Technik, Wirtschaft und Recht anhand aktueller Themen näher zu beleuchten und gemeinverträgliche Lösungen für die aufgeworfenen Probleme zu entwickeln.

**Content**

Die jeweils aktuellen zu bearbeitenden Themenvorschläge werden im Internet unter http://www.zar.kit.edu veröffentlicht.

**Workload**

Gesamtarbeitsaufwand 90 h, davon 15 h Präsenzzeit und 75 h sonstiger Arbeitsaufwand (Erstellung der Seminararbeit etc.).

**Literature**

Die Basisliteratur wird entsprechend der zu bearbeitenden Themen bereitgestellt.

## V  Event excerpt:  (WS 18/19)

**Aim**

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**Workload**

ca. 100 - 120 h (2 - 4 Credits)

## T   Course: Service Analytics A [T-WIWI-105778]

**Responsibility:** Hansjörg Fromm, Thomas Setzer
**Contained in:** [M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101506] Service Analytics
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2595501 | Service Analytics A | Vorlesung (V) | 2 | Hansjörg Fromm, Niklas Kühl, Thomas Setzer |
| SS 2018 | 2595502 | | Übung (Ü) | 1 | Lucas Baier, Niklas Kühl |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) according to §4(2), 1 of the examination regulations.

**Conditions**
None

**Recommendations**
The lecture is addresed to students with interests and basic knowledge in the topics of Operations Research, decritptive and inductive statistics.

## V   Event excerpt: Service Analytics A (SS 2018)

**Aim**
Participants are able to structure large sets of available data and to use that data for planning, operation, personalization of complex services, in particular for IT services. They learn a step-by-step approach starting with analyzing possibly incomplete data, techniques of multivariate statistics to filter data and to extract data features, forecast techniques, and robust planning and control procedures for enterprise decision support.

**Content**
Today's service-oriented companies are starting to optimize the way services are planned, operated, and personalized by analyzing vast amounts of data from customers, IT-systems, or sensors. As the statistical learning and business optimization world continues to progress, skills and expertise in advanced data analytics and data and fact-based optimization become vital for companies to be competitive. In this lecture, relevant methods and tools will be considered as a package, with a strong focus on their inter-relations. Students will learn to analyze and structure large amounts of potentially incomplete and unreliable data, to apply multivariate statistics to filter data and to extract key features, to predict future behavior and system dynamics, and finally to formulate data and fact-based service planning and decision models.

More specifically, the lessons of this lecture will include:

- Co-Creation of Value Across Enterprises
- Instrumentation, Measurement, Monitoring of Service Systems
- Descriptive, predictive, and prescriptive Analytics
- Usage Characteristics and Customer Dynamics
- Big Data, Dimensionality Reduction, and Real-Time Analytics
- System Models and What-If-Analysis
- Robust Mechanisms for Service Management
- Industry Applications of Service Analytics

**Tutorials**

Students will conduct lecture accompanying, guided exercises throughout the semester.

**Workload**

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

**Literature**

- Business Forecasting, Wilson, J. H., Keating, B., McGraw-Hill, 2002
- Multivariate Data Analysis, Hair, J. F., Black, B., Babin, B., Anderson, R. E., 2008
- Analytics at Work, Davenport, T. H., Harris, J. G., Morion, R., Harward Business Press, 2010
- Business Analytics for Managers, Jank, W., Springer, 2011

Online Sources:

- The data deluge, The Economist, Feb. 2010
- Competing on Analytics, T. Davenport in Harward Business Review, Feb. 2007
- Mit Advanced Analytics können Händler Kundendaten optimal nutzen, McKinsey Handelsmarketing, Feb. 2011

Further readings will be provided in the lecture.

## T   Course: Service Design Thinking [T-WIWI-102849]

**Responsibility:** Gerhard Satzger, Christof Weinhardt
**Contained in:** [M-WIWI-101503] Service Design Thinking

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 9 | englisch | Unregelmäßig | Prüfungsleistung anderer Art | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2595600 | Service Design Thinking | Vorlesung (V) | 6 | Niels Feldmann, Gerhard Satzger, Christof Weinhardt |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
The course is compulsory and must be examined.

**Recommendations**
This course is held in English – proficiency in writing and communication is required.
Our past students recommend to take this course at the beginning of the masters program.

**Remarks**
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems". For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

## V   Event excerpt: Service Design Thinking (SS 2018)

**Aim**

- Deep knowledge of the innovation method "Design Thinking", as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Communicate, work and present in an interdisciplinary and international project setting

**Content**

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges.
- Design Space Exploration: Exploring the problem space through customer and user observation.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions.

- Funky Prototype: Integration of the individually tested and successful functions to a complete solution, which is further tested and developed.
- Functional Prototype: Further selection and convergence of existing ideas. Building a higher resolution prototype that can be tested by customers.
- Final Prototype: Preparing and presenting the final solution to the customer.

**Workload**

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

**Literature**

Lewrick/Link/Leifer:

- The Design Thinking Playbook
- The Design Thinking Toolbook

## T  Course: Service Innovation [T-WIWI-102641]

**Responsibility:** Gerhard Satzger
**Contained in:** [M-WIWI-102806] Service Innovation, Design & Engineering
[M-WIWI-101410] Business & Service Engineering
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2595468 | Service Innovation | Vorlesung (V) | 2 | Gerhard Satzger |

**Learning Control / Examinations**
The assessment consists of an 1h written exam (following §4(2) 1 of the examination regulations) and of assignments during the course as an non exam assessment (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Service Innovation (SS 2018)

**Aim**
Understand the difference between innovation and invention and gain an overview of different types of innovations. Understand particular challenges of innovation in services. Know the ambidexterity challenge for service organizations and ways to deal with it. Know examples for innovation in processes, organization and business models; understand how service and product innovation differ. Get to know several methods and tools that support service innovation (service design thinking, open innovation, technolgy and strategic foresight, etc.)

**Content**
While innovation in manufacturing can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice, while many organizations have a well-understood process for innovating in the product business, innovating in services is often still a fuzzy and complex undertaking. In this lecture we will discuss the state of research, compare product and service innovation and understand how innovation diffusion works. We examine case studies on service innovation, compare open vs. closed innovation and learn how to apply different innovation tools, methods and strategies (e.g. service design thinking as a human-centered approach to innovation or technology and strategic foresight, as methods supporting the generation of assumptions on the impact of technology).

**Workload**
Total workload: approximately 136 hours
Attendance time: 30 hours
Self-study: 105 hours

**Literature**

- Barras, Richard (1986) Towards a theory of innovation in services. Research Policy 15, 161-173
- Hauschildt, Jürgen und Salomo, Sören (2007) Innovationsmanagement. 4. Auflage, München: Vahlen.
- von Hippel, Erich (2007) Horizontal innovation networks - by and for users. Industrial and Corporate Change, 16:2
- Sundbo, Jon (1997) Management of Innovation in Services. The Service Industries Journal, Vo. 17, No. 3, pp. 432-455

**Elective literature:**

- Benkler, Yochai (2006) The Wealth of Networks: How Social Production Transforms Markets and Freedom. Yale University Press. (Online: http://www.benkler.org)
- Christensen, Clayton M. (2003) The Innovator's Dilemma, Harper Collins.
- Kanerva, M.; Hollanders, H. & Arundel, A. (2006) TrendChart Report: Can we Measure and Compare Innovation in Services?
- von Hippel, Erich (2005) Democratizing Innovation. The MIT Press, Cambridge, MA. (Online: http://web.mit.edu/evhippel/www/books/DI/DemocInn.pdf)
- Howells, Jeremy & Tether, Bruce (2004) Innovation in Services: Issues at Stake and Trends. Commission of the European Communities, Brussels/Luxembourg. (Online: http://www.isi.fhg.de/publ/downloads/isi04b25/inno-3.pdf)
- Miles, I. (2008) Patterns of innovation in service industries. IBM Systems Journal, Vol. 47, No 1
- Morison, Eltling E. (1966) Gunfire at Sea: A Case Study of Innovation. In: Men, Machines and Modern Times. The MIT Press, pp. 17-44.
- Fundamentals of Service Systems: http://primo.bibliothek.kit.edu/primo_library/libweb/action/display.do;jsessionid=EB30837

## T  Course: Service Oriented Computing  [T-WIWI-105801]

**Responsibility:** York Sure-Vetter
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

**Learning Control / Examinations**
Please note that the exam will be offered to first-time applicants in the winter semester 2018/2019. A last examination possibility exists in the summer semester 2019 (only for repeaters).
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

**Conditions**
None

## T Course: Simulation Game in Energy Economics [T-WIWI-108016]

**Responsibility:** Massimo Genoese
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2581025 | Simulation Game in Energy Economics | Vorlesung / Übung (VÜ) | 2 | Massimo Genoese |

**Learning Control / Examinations**
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

**Conditions**
None

**Recommendations**
Visiting the course "Introduction to Energy Economics"

**Remarks**
See German version.

## V Event excerpt: Simulation Game in Energy Economics (SS 2018)

**Aim**
Students

- understand market mechanisms, pricing and investment decisions in a liberalised electricity market,
- apply methods and instruments in a subarea of "Energy Economics",
- choose the appropriate methods to solve given problems (unit dispatch, investment planning) and apply them,
- find and discuss arguments for solution approaches.

**Content**

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
**Elective literature:**
Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

## T Course: Simulation of Stochastic Systems [T-WIWI-106552]

**Responsibility:** Oliver Grothe, Steffen Rebennack
**Contained in:** [M-WIWI-103289] Stochastic Optimization

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
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.

**Conditions**
None.

## T  Course: Site Management [T-BGU-103427]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction
[M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 1.5 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6241807 | | Vorlesung (V) | 1 | Peter Steffek |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Smart Energy Infrastructure [T-WIWI-107464]

**Responsibility:** Armin Ardone, Andrej Marko Pustisek
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581023 | | Vorlesung (V) | 2 | Armin Ardone, Andrej Marko Pustisek |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Conditions**
None.

**Remarks**
New course starting winter term 2017/2018.

## V Event excerpt: (WS 18/19)

**Aim**
Der/die Studierende

- kennt die Grundzüge von Infrastruktur im Kontext von Energietransport (insbesondere von Gas- und Stromnetzen sowie Erdgasspeichern) und
- versteht deren (energie-)wirtschaftliche Bedeutung.

**Workload**
Gesamtaufwand bei 3 Leistungspunkten: ca. 90 Stunden
Präsenzzeit: 30 Stunden
Selbststudium: 60 Stunden

## T  Course: Smart Grid Applications [T-WIWI-107504]

**Responsibility:** Johannes Gärttner, Christof Weinhardt
**Contained in:** [M-WIWI-103720] eEnergy: Markets, Services and Systems

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2540452 | Smart Grid Applications | Vorlesung (V) | 2 | Philipp Staudt, Clemens van Dinther |
| WS 18/19 | 2540453 | Übung zu Smart Grid Applications | Vorlesung (V) | 2 | Esther Marie Mengelkamp, Philipp Staudt |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Conditions**
None

**Recommendations**
None

**Remarks**
The lecture will be read for the first time in winter term 2018/19.

## T  Course: Social Choice Theory [T-WIWI-102859]

**Responsibility:** Clemens Puppe
**Contained in:** [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101504] Collective Decision Making

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2520537 | Social Choice Theory | Vorlesung (V) | 2 | Michael Müller, Clemens Puppe |
| SS 2018 | 2520539 | | Übung (Ü) | 1 | Michael Müller, Clemens Puppe |

**Learning Control / Examinations**
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.

**Conditions**
None

## V  Event excerpt: Social Choice Theory (SS 2018)

**Aim**
The student should acquire knowledge of formal theories of collective decision making and learn to apply them to real life situations.

**Content**
The course provides a comprehensive treatment of preference and judgement aggregation, including proofs of general results that have Arrow's famous impossibility theorem and Gibbard's oligarchy theorem as corollaries. The second part of the course is devoted to voting theory. Among other things, we prove the Gibbard-Satterthwaite theorem.

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

**Literature**
Main texts:

- Hervé Moulin: Axioms of Cooperative Decision Making, Cambridge University Press, 1988
- Christian List and Clemens Puppe: Judgement Aggregation. A survey, in: Handbook of rational & social choice, P.Anand, P.Pattanaik, C.Puppe (Eds.), Oxford University Press 2009.

Secondary texts:

- Amartya Sen: Collective Choice and Social Welfare, Holden-Day, 1970
- Wulf Gaertner: A Primer in Social Choice Theory, revised edition, Oxford University Press, 2009
- Wulf Gaertner: Domain Conditions in Social Choice Theory, Oxford University Press, 2001

## T Course: Sociotechnical Information Systems Development [T-WIWI-109249]

**Responsibility:** Ali Sunyaev
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch/englisch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2512400 | | Praktikum (P) | | Theresa Kromat, Ali Sunyaev |

**Learning Control / Examinations**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of an implementation and a final thesis documenting the development and use of the application.

**Conditions**
None.

## V Event excerpt: (WS 18/19)

**Aim**

- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

**Workload**
4 ECTS = approx. 120 h

## T  Course: Software Quality Management [T-WIWI-102895]

**Responsibility:** Andreas Oberweis
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2511208 | Software Quality Management | Vorlesung (V) | 2 | Andreas Oberweis |
| SS 2018 | 2511209 | | Übung (Ü) | 1 | Susan Hickl, Andreas Oberweis |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Conditions**
None

**Remarks**
This course was formely named "Software Technology: Quality Management".

## V  Event excerpt: Software Quality Management (SS 2018)

**Aim**
Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of sofware certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

**Content**
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

**Workload**
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

**Literature**

- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 2008
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Further literature is given in lectures.

## T Course: Spatial Economics [T-WIWI-103107]

| | |
|---|---|
| **Responsibility:** | Ingrid Ott |
| **Contained in:** | [M-WIWI-101496] Growth and Agglomeration |
| | [M-WIWI-101485] Transport Infrastructure Policy and Regional Development |
| | [M-WIWI-101497] Agglomeration and Innovation |

| ECTS | Recurrence | Exam type | Version |
|---|---|---|---|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

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

**Conditions**

None

**Recommendations**

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required. The attendance of the course Introduction to economic policy [2560280] is recommended.

**Remarks**

Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

## T Course: Special Topics in Information Engineering & Management [T-WIWI-102706]

**Responsibility:** Christof Weinhardt
**Contained in:** [M-WIWI-101411] Information Engineering
[M-WIWI-101506] Service Analytics
[M-WIWI-101410] Business & Service Engineering

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Learning Control / Examinations

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical components and an active participation in class.

Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

### Conditions

None

### Recommendations

None

### Remarks

All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Engineering & Management course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre

The Special Topics Information Engineering and Management is equivalent to the practical seminar, as it was only offered for the major in "Information Management and Engineering" so far. With this course students majoring in "Industrial Engineering and Management" and "Economics Engineering" also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Engineering and Managementcan 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 | Course: Special Topics of Efficient Algorithms [T-WIWI-102657]

**Responsibility:** Hartmut Schmeck
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 5 | Jedes Semester | Prüfungsleistung anderer Art | 1 |

**Learning Control / Examinations**
The assessment consists of assignments or of a bonus exam (wrt §4 (2), 3 SPO), and a written exam (60 min.) in the week after the end of the lecturing periodwrt (§4 (2), 1 SPO). The exam will be offered in every semester and can be repeated on regular examination dates.
If the mark obtained in the written exam is in between 1.3 and 4.0, a successful completion of the assignments or the bonus exam will improve the mark by one level (i.e. by 0.3 or 0.4).

**Conditions**
None

**Remarks**
This course can be particularly used for recognising the external courses with the topics in the area of algorithms, data-structures and computer infrastructures but are not associated in other courses in this subject area.

## T  Course: Special Topics of Enterprise Information Systems [T-WIWI-102676]

**Responsibility:** Andreas Oberweis
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 5 | Jedes Semester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511228 | | Vorlesung (V) | 2 | Agnes Koschmider |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

**Conditions**
None

## T | Course: Special Topics of Software- and Systemsengineering [T-WIWI-102678]

**Responsibility:** Andreas Oberweis
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 5 | Jedes Semester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment consists of an 1h written exam in the first week after lecture period.

**Conditions**
None

**Remarks**
This course can be used in particular for the acceptance of external courses whose content is in the broader area of software and systems engineering, but cannot assigned to another course of this topic.

## T Course: Special Topics of Web Science [T-WIWI-108751]

**Responsibility:** York Sure-Vetter
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 5 | Jedes Semester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
Assesment is provided by a written exam of 60 minutes or an oral exam during the first few weeks after the lecturing period (acc. to §4(2), 1 or 2 SPO). The exam is offered each semester and may be repeated at the regular examination day.

**Conditions**
None

**Remarks**
see german version

## T  Course: Specialization in Food Process Engineering [T-CIWVT-101875]

**Responsibility:**  Volker Gaukel
**Contained in:**  [M-CIWVT-101119] Specialization in Food Process Engineering

| ECTS | Language | Exam type | Version |
|:---:|:---:|:---:|:---:|
| 9 | deutsch/englisch | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 22215 | | Vorlesung (V) | 2 | Peter Braun, Ulrich Bröckel, Guenter Esper, Mario Hirth, Heike Karbstein, Matthias Kind, Frank Müller, Hermann Nirschl, Matthias Sass, Michael Türk |
| SS 2018 | 22633 | Microbiology for Engineers | Vorlesung (V) | 2 | Thomas Schwartz |
| SS 2018 | 6601 | | Vorlesung (V) | 2 | Mirko Bunzel |
| WS 18/19 | 22207 | | Vorlesung (V) | 2 | Bernhard Watzl |
| WS 18/19 | 22209 | | Vorlesung (V) | 1 | Heike Karbstein |
| WS 18/19 | 22246 | Extrusion technology in food processing | Vorlesung (V) | 1 | Azad Emin |

**Conditions**
The Module "Principles of Food Process Engineering" must be passed.

**Modeled Conditions**
The following conditions must be met:

- The module [M-CIWVT-101120] *Principles of Food Process Engineering* must have been passed.

## T   Course: Statistical Modeling of generalized regression models [T-WIWI-103065]

**Responsibility:** Wolf-Dieter Heller
**Contained in:** [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2521350 | | Vorlesung (V) | 2 | Wolf-Dieter Heller |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

**Conditions**
None

**Recommendations**
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

## V   Event excerpt: (WS 18/19)

**Aim**
The student

- shows comprehensive knowledge of regression techniques

**Workload**
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours

## T  Course: Stochastic Calculus and Finance [T-WIWI-103129]

**Responsibility:**   Mher Safarian
**Contained in:**   [M-WIWI-101639] Econometrics and Statistics II

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2521331 | Stochastic Calculus and Finance | Vorlesung (V) | 2 | Mher Safarian |

**Learning Control / Examinations**
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.) and of possibble additional assignments during the course (§4 (3) SPO).

**Conditions**
None

**Remarks**
For more information see http://statistik.econ.kit.edu/

## V  Event excerpt: Stochastic Calculus and Finance (WS 18/19)

**Aim**
After successful completion of the course students will be familiar with many common methods of pricing and portfolio models in finance. Emphasis we be put on both finance and the theory behind it.

**Content**
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus. Stochastic Processes, Brownian Motion and Martingales, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes. Stable and tempered stable processes. Levy processes.
2. Mathematical Finance: Pricing Models. The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Option pricing with tempered stable and Levy-Processes and volatility clustering, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem), Equilibrium models, Consumption-Based CAPM, Numerical Methods.

Stochastic processes (Poisson-process, Brownian motion, martingales), stochastic Integral (Integral, quadratic und co-variation, Ito-formula), stochastic differential equation for price-processes, trading strategies, option pricing(Feynman-Kac), neutral risk rating(equivalent martingale measure, Girsanov theorem), term structure models

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

**Literature**
To be announced in lecture.
**Elective literature:**

- Dynamic Asset Pricing Theory, Third Edition. by Darrell Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models, by Steven E. Shreve , Springer, 2003
- An Introduction to Stochastic Integration (Probability and its Applications) by Kai L. Chung , Ruth J. Williams , Birkhaueser,

- Methods of Mathematical Finance by Ioannis Karatzas , Steven E. Shreve , Springer 1998
- Kim Y.S. ,Rachev S.T. ,Bianchi M-L, Fabozzi F. Financial market models with Levy processes and time-varying volatility, Journal of Banking and Finance, 32/7,1363-1378, 2008.
- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, Sixth Edition, (2005).

## T  Course: Strategic Brand Management [T-WIWI-102842]

**Responsibility:** Joachim Blickhäuser, Martin Klarmann
**Contained in:** [M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 1.5 | deutsch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2571185 | Strategic Brand Management | Block (B) | | Joachim Blickhäuser, Martin Klarmann |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of group presentation with a subsequent round of questions totalling about 30 minutes.

**Conditions**
None

**Recommendations**
None

**Remarks**
Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop.

Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

## V  Event excerpt: Strategic Brand Management (SS 2018)

**Aim**
See German version.

**Content**
Die Veranstaltung konzentriert sich auf das strategische Markenmanagement. Der Fokus liegt dabei auf zentralen Branding-Elementen wie z.B. Markenpositionierungen und –identitäten. Gehalten wird die Veranstaltung von Herrn Blickhäuser, einem langjährigen Manager der BMW Group, der aktuell für das Brand Management des Automobilherstellers zuständig ist.

**Workload**
The total workload for this course is approximately 45.0 hours. For further information see German version.

**Literature**
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

## T  Course: Strategic Management of Information Technology [T-WIWI-102669]

**Responsibility:** Thomas Wolf
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2511602 | Strategic Management of Information Technology | Vorlesung (V) | 2 | Thomas Wolf |
| SS 2018 | 2511603 | | Übung (Ü) | 1 | Thomas Wolf |

**Learning Control / Examinations**
The assessment of this course is a written (60 min.) or (if necessary) oral examination according (30 min.) to §4(2) of the examination regulation.

**Conditions**
None

## V  Event excerpt: Strategic Management of Information Technology (SS 2018)

**Aim**
Students know the outer frame of IT in an enterprise and know which functions IT has within an enterprise. They unterstand the organization and the content of these functions.

**Content**
The following topics will be covered: strategic planing of ICT, architecture of ICT, overall planning of ICT, outsourcing, operation and controlling of ICT.

**Literature**

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995
- Heinrich, L. J., Burgholzer, P.: Informationsmanagement, Planung, Überwachung, Steuerung d. Inform.-Infrastruktur. Oldenbourg, München 1990
- Nolan, R.: Managing the crises in data processing. Harvard Business Review, Vol. 57, Nr. 2 1979
- Österle, H. et al.: Unternehmensführung und Informationssystem. Teubner, Stuttgart 1992
- Thome, R.: Wirtschaftliche Informationsverarbeitung. Verlag Franz Vahlen, München 1990

## T  Course: Strategic Transport Planning [T-BGU-103426]

**Responsibility:** Volker Waßmuth
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232808 | | Vorlesung (V) | 2 | Volker Waßmuth |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## **T** Course: Strategy and Management Theory: Developments and "Classics" [T-WIWI-106190]

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-103119] Advanced Topics in Strategy and Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Unregelmäßig | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2577923 | Strategy and Management Theory: Developments and "Classics" | Seminar (S) | 2 | Kerstin Fehre, Alexander Klopfer, Hagen Lindstädt |
| WS 18/19 | 2577922 | Strategy and Management Theory: Developments and "Classics" | Seminar (S) | 2 | Alexander Klopfer, Hagen Lindstädt |

**Learning Control / Examinations**
Non exam assessment (following §4(2) 3 of the examination regulation).

**Conditions**
None

**Recommendations**
Basic knowledge as conveyed in the bachelor module „Strategy and Organization" is recommended.

**Remarks**
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

## **V** Event excerpt: Strategy and Management Theory: Developments and "Classics" (WS 18/19)

**Aim**
Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

**Content**
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

**Workload**
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

## **V** Event excerpt: Strategy and Management Theory: Developments and "Classics" (SS 2018)

**Aim**

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

**Content**

In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

**Workload**

The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

## T  Course: Supplementary Claim Management [T-BGU-103428]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 1.5 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6241811 | | Vorlesung (V) | 1 | Ralph Bartsch |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T    Course: Supply Chain Management [T-MACH-105181]

**Responsibility:** Knut Alicke
**Contained in:** [M-MACH-101280] Logistics in Value Chain Networks

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 6 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2117062 | Supply chain management | Vorlesung (V) | 3 | Knut Alicke |
| WS 18/19 | 2117063 | | Übung (Ü) | 1 | Knut Alicke |

**Learning Control / Examinations**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Conditions**
none

## V    Event excerpt: Supply chain management (WS 18/19)

**Aim**
Students are able to:

- Discuss the requirements on modern supply chains,
- Use the basic concepts of demand forecast, stock optimization and supply in practical exercises,
- Analyse the typical questions of dimensioning a supply chain and evaluate a supply chain with the results.

**Content**

- Bullwhip-Effect, Demand Planning & Forecasting
- Conventional planning processes (MRP + MRPII)
- Stock keeping strategy
- Data acquisition and analysis
- Design for logistics (Postponement, Mass Customization, etc.)
- Logistic partnerships (VMI, etc.)
- Distribution structures (central vs. distributed, Hub&Spoke)
- SCM-metrics (performance measurement) e-business
- Special sectors as well as guest lectures

**Workload**
regular attendance: 42 hours
self-study: 138 hours

**Literature**
Alicke, K.: Planung und Betrieb von Logistiknetzwerken

Simchi-Levi, D., Kaminsky, P.: Designing and Managing the Supply Chain

Goldratt, E., Cox, J.: The Goal

## T    Course: Supply Chain Management in the Automotive Industry [T-WIWI-102828]

**Responsibility:**    Tilman Heupel, Hendrik Lang
**Contained in:**    [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2581957 | Supply Chain Management in the automotive industry | Vorlesung (V) | 2 | Tilman Heupel, Hendrik Lang |

**Learning Control / Examinations**
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

**Conditions**
None

**Recommendations**
None

## V    Event excerpt: Supply Chain Management in the automotive industry (WS 18/19)

**Aim**
Students are taught knowledge, methods and tools in the field of automotive supply chain management. With the help of concrete examples of a global automotive company, they acquire a basic understanding of challenges in the implementation of those solutions. Students learn about theoretic concepts and their transfer to practice in designing value-added structures, procurement logistics, risk management, quality engineering, cost engineering, and purchasing. They are able to identify, analyze and assess problems and to design adequate solutions within those aspects. In the end of the lecture, students can integrate the aspects into the general context of automotive supply chain management and development process.

**Content**

- Automotive industry significance
- The automotive supply chain
- Adding value structures of the automotive supply chain and mastering of the production systems as factors of success in the SCM
- Strategic procurement logistics
- Risk management
- Quality engineering and management in the automotive supply chain
- Cost engineering and management in the automotive supply chain
- Purchasing (Supplier selection, contract management)
- Performance measurement of the supply chain / organization

**Workload**
The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**
Will be announced in the course.

## T  Course: Supply Chain Management in the Process Industry [T-WIWI-102860]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2550494 | Supply Chain Management in the Process Industry | Vorlesung / Übung (VÜ) | 3 | Robert Blackburn |

**Learning Control / Examinations**
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation) (individual grading), case study presentation by student teams (team grading) and classroom participation (individual grading). The examination is held in the term of the lecture.

**Conditions**
None

**Recommendations**
Basic knowledge as conveyed in the module Introduction to Operations Research is assumed.
Advanced knowledge of Operations Research (e.g., as conveyed in the lectures Facility Location and Strategic SCM, Tactical and operational SCM) is recommended.

**Remarks**
The number of participants is restricted due to the execution of interactive case studies and the resulting examination effort. Due to these capacity restrictions, registration before course start is required according to the information on the course website. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

## V  Event excerpt: Supply Chain Management in the Process Industry (WS 18/19)

**Aim**
The student

- knows and classifies state-of-the art approaches for designing, planning and managing global supply chains in the process industry
- distingusihes quality in supply chains and identifies important building blocks, repeating patterns and concepts crucial to supply chain strategy, design and planning,
- explains specific challenges and approaches towards supply chain operations within the process industry with regards to transportation and warehousing, and describes the interdisciplinary linkage of SCM with information systems, performance management, project management, risk management and sustainability management,
- transfers gained knowledge into practice by using SCM case studies and SCM real life project documentations.

**Content**
The course "Supply Chain Management in the Process Industry" covers fundamental concepts in the field of supply chain management with special focus on process industry. Strategic, planning and operational topics within the end-to-end supply chain are examined, covering relevant approaches in design, processes and performance measurement. Additional focus within the course is on showing the interdisciplinary linkages SCM has with information systems, performance management, project management, risk management and sustainability management. The course is enriched by various insights from the world´s leading chemical company BASF, provided by executive management as real life examples and cases.

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

**Literature**

- Chopra, S./Meindl, P.: Supply Chain Management – Strategy, Planning, & Operations, 4th edition, Upper Saddle River, 2009.
- Various case studies, which will be provided during the course

## T Course: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]

**Responsibility:** Claus J. Bosch, Mathias Göbelt
**Contained in:** [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3.5 | englisch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2581961 | Supply Chain Management with Advanced Planning Systems | Vorlesung (V) | 2 | Claus J. Bosch, Mathias Göbelt |

**Learning Control / Examinations**
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
None

**Recommendations**
None

## V Event excerpt: Supply Chain Management with Advanced Planning Systems (SS 2018)

**Aim**
This lecture deals with supply chain management from a practitioner's perspective with a special emphasis on the software solution SAP SCM and the planning domain. First, the term supply chain management is defined and its scope is determined. Methods to analyze supply chains as well as indicators to measure supply chains are derived. Second, the structure of an APS (advanced planning system) is discussed in a generic way. Later in the lecture, the software solution SAP SCM is mapped to this generic structure. The individual planning tasks and software modules (demand planning, supply network planning, production planning / detailed scheduling, transportation planning / vehicle scheduling, global available-to-promise) are presented by discussing the relevant business processes, providing academic background, describing planning processes for a fictive company and showing the user interface and user-related processes in the software solution.
The lecture is supported by a self-explanatory tutorial, in which students can explore the software solution for the fictive company offline on their own.

**Content**
1. **Introduction to Supply Chain Management**
1.1. Supply Chain Management Fundamentals
1.2. Supply Chain Management Analytics
2. **Structure of Advanced Planning Systems**
3. **SAP SCM**
3.1. Introduction / SCM Solution Map
3.2. Demand Planning
3.3. Supply Network Planning
3.4. Production Planning and Detailed Scheduling
3.5. Deployment
3.6. Transportation Planning and Vehicle Scheduling
3.7. [Optional] Global Available to Promise
4. **SAP SCM in Practice**
4.1. Success Stories
4.2. SAP Implementation Methodology

**Workload**

The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**

will be announced in the course

## T  Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2550486 | | Vorlesung (V) | 2 | Stefan Nickel |
| SS 2018 | 2550487 | | Übung (Ü) | 1 | Mitarbeiter, Stefan Nickel |

### Learning Control / Examinations
The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation.
The exam takes place in every the semester.
Prerequisite for admission to examination is the succesful completion of the online assessments.

### Conditions
Prerequisite for admission to examination is the succesful completion of the online assessments.

### Recommendations
None

### Remarks
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

## V  Event excerpt:  (SS 2018)

### Aim
The student

- gathers expertise in fundamental techniques from procurement and distribution logistics, methods from inventory management and lot sizing,
- acquires the ability to efficiently utilize quantitative models from transportation planning (long-distance and distribution planning), inventory management and lot sizing in production,
- applies the introduced methods in more detail and in industry-relevant case-studies.

### Content
The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models).The exercisesaccompanying the lecture offer the possibility to apply the considered models to practical problems.

### Literature
### Elective Literature

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

## T  Course: Tax Law I [T-INFO-101315]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-101216] Private Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 24168 | Tax Law I | Vorlesung (V) | 2 | Detlef Dietrich |

## V  Event excerpt: Tax Law I (WS 18/19)

**Aim**

Ziel der Vorlesung ist eine Einführung in das nationale Unternehmenssteuerrecht. Die auf mehrere Einzelsteuergesetzte verteilten Rechtsnormen , die für die Besteuerung der Unternehmen und deren Inhaber maßgebend sind, werden behandelt. Praktisch verwertbares steuerliches Grundlagenwissen als Bestandteil der modernen Betriebswirtschaftslehre steht im Vordergrund.

**Content**

Außer einem Grundwissen über die existierenden deutschen Unternehmensformen und den Jahresabschluss (Bilanz, Gewinn- und Verlustrechnung) werden keine steuerrechtlichen Vorkenntnisse benötigt. Die Vorlesung soll einen aktuellen Gesamtüberblick über die wichtigsten Elemente des Rechtsstoffs verschaffen. Der Schwerpunkt liegt bei gewerblich tätigen Betrieben in den gängigen Rechtsformen der Einzelunternehmen, der Personengesellschaft und der Kapitalgesellschaft.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

**Literature**

- Grashoff Steuerrecht, Verlag C. H. Beck, in der neuesten Auflage
- Tipke/Lang Steuerrecht, Verlag C. H. Beck, in der neuesten Auflage

**Weiterführende Literatur**

## T    Course: Tax Law II [T-INFO-101314]

**Responsibility:** Detlef Dietrich, Thomas Dreier
**Contained in:** [M-INFO-101216] Private Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 24646 | Tax Law II | Vorlesung (V) | 2 | Detlef Dietrich |

## V    Event excerpt: Tax Law II (SS 2018)

**Aim**

Ziel der Vorlesung ist es, auf den Gebieten der Wirtschafts- und Rechtswissenschaft, aufbauend auf der Überblicksvorlesung 'Einführung in das Unternehmenssteuerrecht' vertiefte Kenntnisse in der betriebswirtschaftlichen Steuerlehre zu verschaffen. Die Studenten erhalten die Grundlage für eine wissenschaftliche Auseinandersetzung mit den steuerlichen Vorschriften und können die Wirkung auf unternehmerische Entscheidungen einschätzen. Hervorgehoben werden solche Steuerrechtsregelungen, die dem Steuerpflichtigen Handlungs- und Entscheidungsmöglichkeiten eröffnen.

**Content**

Ziel der Vorlesung ist es, auf den Gebieten der Wirtschafts- und Rechtswissenschaft, aufbauend auf der Überblicksvorlesung 'Einführung in das Unternehmenssteuerrecht' vertiefte Kenntnisse in der betriebswirtschaftlichen Steuerlehre zu verschaffen. Die Studenten erhalten die Grundlage für eine wissenschaftliche Auseinandersetzung mit den steuerlichen Vorschriften und können die Wirkung auf unternehmerische Entscheidungen einschätzen. Hervorgehoben werden solche Steuerrechtsregelungen, die dem Steuerpflichtigen Handlungs- und Entscheidungsmöglichkeiten eröffnen.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

**Literature**

- Grashoff, Steuerrecht,Verlag C.H. Beck, in der neuesten Auflage.
- Spangemacher, Gewerbesteuer, Band 5, Grüne Reihe, Erich Fleischer Verlag
- Falterbaum/Bolk/Reiß/Eberhart, Buchführung und Bilanz, Band 10, Grüne Reihe, Erich Fleischer Verlag
- Tipke, K./Lang, J., Steuerrecht,Köln, in der neuesten Auflage.
- Jäger/Lang Körperschaftsteuer, Band 6, Grüne Reihe, Erich Fleischer Verlag
- Lippross Umsatzsteuer, Band 11, Grüne Reihe, Erich Fleischer Verlag
- Plückebaum/Wendt/ Niemeier/Schlierenkämper Einkommensteuer, Band 3, Grüne Reihe, Erich Fleischer Verlag

**Weiterführende Literatur**

**T** **Course: Technical conditions met [T-WIWI-106623]**

**Responsibility:**
**Contained in:** [M-WIWI-101453] Applied Strategic Decisions

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 0 | Jedes Semester | Studienleistung | 1 |

**Learning Control / Examinations**
This module element is intended to record the Bachelor-examination "Introduction to Game Theory". In the master module M-WIWI-101453 "Applied Strategic Decisions", this means that the obligatory course "Advanced Game Theory" is not required.

**Conditions**
None

## T Course: Technological Change in Energy Economics [T-WIWI-102694]

**Responsibility:** Martin Wietschel
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**

The examination will be offered latest until summer term 2018 (repeaters only).

The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation).

**Recommendations**

None

## T  Course: Technologies for Innovation Management [T-WIWI-102854]

**Responsibility:**  Daniel Jeffrey Koch
**Contained in:**  [M-WIWI-101507] Innovation Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung anderer Art | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2545106 | | Block (B) | 2 | Daniel Jeffrey Koch |

**Learning Control / Examinations**
Presentation and individual paper (ca. 15 pages) as Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
None

**Recommendations**
Prior attendance of the course Innovationsmanagement: Konzepte, Strategien und Methoden [2545015] is recommended.

## V  Event excerpt:  (WS 18/19)

**Aim**
Application of a method to analyze technologies in the early ohase of innovation management.

**Content**
The seminar "Technologies for Innovation Management" will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

**Literature**
Will be announced in the first session.

## T  Course: Technology Assessment [T-WIWI-102858]

**Responsibility:** Daniel Jeffrey Koch
**Contained in:** [M-WIWI-101507] Innovation Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2545101 | | Seminar (S) | | Daniel Jeffrey Koch |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
None

**Recommendations**
Prior attendance of the course*Innovation Management*[2545015] is recommended.

**Remarks**
See German version.

## T  Course: Telecommunication and Internet Economics [T-WIWI-102713]

**Responsibility:** Kay Mitusch
**Contained in:** [M-WIWI-101406] Network Economics
[M-WIWI-101409] Electronic Markets

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2561232 | Telecommunication and Internet Economics | Vorlesung (V) | 2 | Kay Mitusch |
| WS 18/19 | 2561233 | | Übung (Ü) | 1 | Kay Mitusch |

**Learning Control / Examinations**
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.

**Conditions**
None

**Recommendations**
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.
Particularly helpful but not necessary: Industrial Economics. Prior attendance of the lecture „Competition in Networks" [26240] or "Industrial Organisation" is helpful in any case but not considered a formal precondition. The english taught course "Communications Economics" is complementary and recommendet for anyone interested in the sector.

## V  Event excerpt: Telecommunication and Internet Economics (WS 18/19)

**Aim**
The students

- will know economically relevant technological and organization characteristics of telecommunication networks - fixed and mobile - as well as of the internet
- will understand the complex competition processes in the telecommunication and internet sector
- will be able to analyse these competitive processes by means of analytic instruments and to assess current debates on economic and regulation policies

The lecture is suited for all students who will deal with these sectors in their professional life.

**Content**
Among the network sectors the telecommunication and internet sector is the most dynamic one and the one with and highest variety of phenomena. Problems of natural monopoly still exist in some parts. But there is also competition, not only at the service level but also at the infrastructural level. Both levels are characterized by (vertical) quality differentiations and by high technology dynamics. What should the regulation of this sector look like? How should the mutual network access prices of two telecommunication providers be regulated and how can regulators set incentives for infrastructure investments?
The internet is a free market par excellence, because everybody can open internet businesses without high entry costs. Why then can a company like ebay dominate the market for internet-auction platforms so strongly? The causes of market concentration on the internet will be analyzed. So will be the economic implications of the Next Generations Networks.

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

**Literature**
J.-J. Laffont, J. Tirole (2000): Competition in Telecommunications, MIT Press.
Zarnekow, Wulf, Bronstaedt (2013): Internetwirtschaft: Das Geschäft des Datentransports im Internet.
Further literature will be provided during the lecture

## T   Course: Telecommunications Law [T-INFO-101309]

**Responsibility:** Nikolaus Marsch
**Contained in:** [M-INFO-101217] Public Business Law

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 24632 | | Vorlesung (V) | 2 | Nikolaus Marsch |

## V   Event excerpt:   (SS 2018)

### Aim
Die Telekommunikation ist die technische Grundlage der Informationswirtschaft. In welcher Art und Weise beispielsweise UMTS reguliert wird, ist von maßgeblicher Bedeutung für die Bereitstellung von Diensten in der Welt der mobilen Inhaltsdienste. Die zentralen Vorgaben der Telekommunikationsregulierung finden sich im Telekommunikationsgesetz (TKG). Dieses ist infolge gemeinschaftsrechtlicher Vorgaben 2004 vollständig novelliert worden. Die Vorlesung vermittelt dem Studenten die für das Verstehen der Rahmenbedingungen der Informationsgesellschaft unablässigen telekommunikationsrechtlichen Kenntnisse.

### Content
Die Vorlesung bietet einen Überblick über das neue TKG. Dabei wird die ganze Bandbreite der Regulierung behandelt: Von den materiellrechtlichen Instrumenten der wettbewerbsschaffenden ökonomischen Regulierung (Markt-, Zugangs-, Entgeltregulierung sowie besondere Missbrauchsaufsicht) und der nicht-ökonomischen Regulierung (Kundenschutz; Rundfunkübertragung; Vergabe von Frequenzen, Nummern und Wegerechten; Fernmeldegeheimnis; Datenschutz und öffentliche Sicherheit) bis hin zur institutionellen Ausgestaltung der Regulierung. Zum besseren Verständnis werden zu Beginn der Vorlesung die technischen und ökonomischen Grundlagen sowie die gemeinschafts- und verfassungsrechtlichen Vorgaben geklärt.

### Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

### Literature
Da der Rechtsstoff teilweise im Diskurs mit den Studierenden erarbeitet werden soll, ist eine aktuelle Version des TKG zu der Vorlesung mitzubringen.
Weitere Literatur wird in der Vorlesung angegeben.
### Weiterführende Literatur
Erweiterte Literaturangaben werden in der Vorlesung bekannt gegeben.

## T | Course: Tendering, Planning and Financing in Public Transport [T-BGU-101005]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Semester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232807 | | Vorlesung (V) | 2 | Alexander Pischon |

**Learning Control / Examinations**
oral exam, appr. 20 min.

**Conditions**
none

**Recommendations**
none

**Remarks**

## T | Course: Theory of Endogenous Growth [T-WIWI-102785]

**Responsibility:** Ingrid Ott
**Contained in:** [M-WIWI-101478] Innovation and Growth
[M-WIWI-101496] Growth and Agglomeration

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Learning Control / Examinations

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

### Conditions

None

### Recommendations

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

### Remarks

Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

## T  Course: Topics in Experimental Economics [T-WIWI-102863]

**Responsibility:** Johannes Philipp Reiß
**Contained in:** [M-WIWI-101505] Experimental Economics

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4.5 | Unregelmäßig | Prüfungsleistung schriftlich | 1 |

**Learning Control / Examinations**
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Recommendations**
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

**Remarks**
The course is offered in summer 2020 for the next time, not in summer 2018.

## T  Course: Trademark and Unfair Competition Law [T-INFO-101313]

**Responsibility:** Yvonne Matz
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Jedes Semester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 24136 | Trademark and Unfair Competition Law | Vorlesung (V) | 2 | Yvonne Matz |

## V  Event excerpt: Trademark and Unfair Competition Law (WS 18/19)

**Aim**

Der/die Studierende kennt die strukturellen Grundlagen des nationalen sowie des europäischen Kennzeichenrechts. Er/sie kennt insbesondere die Schutzvoraussetzungen der eingetragenen Marke ebenso wie der Benutzungsmarke. Er/sie ist vertraut sowohl mit dem nationalen als auch mit dem europäischen markenrechtlichen Anmeldeverfahren, Er/sie weiß, welche Schutzansprüche ihm/ihr aus der Verletzung seines/ihres Kennzeichenrechts zustehen und welche Rechte anderer Kennzeicheninhaber zu beachten sind. Ferner ist er/sie vertraut mit dem Recht der geschäftlichen Bezeichnungen, der Werktitel und der geographischen Herkunftsangaben.

Am Ende der Vorlesung besitzt der/die Studierende die Fähigkeit, sich in kennzeichenrechtliche Problematiken einzuarbeiten und Lösungen zu entwickeln.

**Content**

Die Vorlesung befasst sich mit den Grundfragen des Markenrechts: was ist eine Marke, wie erhalte ich Markenschutz, welche Rechte habe ich als Markeninhaber, welche Rechte anderer Markeninhaber muss ich beachten, welche anderen Kennzeichenrechte gibt es, etc. Die Studenten werden auch in die Grundlagen des europäischen und internationalen Kennzeichenrechts eingeführt.

**Workload**

Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt 90 h, davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

**Literature**

- Berlit, Wolfgang: Markenrecht, Verlag C.H.Beck, ISBN 3-406-53782-0, neueste Auflage.

## T Course: Traffic Engineering [T-BGU-101798]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6232703 | | Vorlesung / Übung (VÜ) | 2 | Mitarbeiter/innen, Peter Vortisch |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Traffic Flow Simulation [T-BGU-101800]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232804 | | Vorlesung / Übung (VÜ) | 2 | Mitarbeiter/innen, Peter Vortisch |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Traffic Management and Transport Telematics [T-BGU-101799]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6232802 | | Vorlesung / Übung (VÜ) | 2 | Peter Vortisch |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Transport Economics [T-WIWI-100007]

**Responsibility:**  Kay Mitusch, Eckhard Szimba
**Contained in:**  [M-WIWI-101468] Environmental Economics
[M-WIWI-101485] Transport Infrastructure Policy and Regional Development
[M-WIWI-101406] Network Economics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2560230 | Transport Economics | Vorlesung (V) | | Kay Mitusch, Eckhard Szimba |
| SS 2018 | 2560231 | | Übung (Ü) | | Kay Mitusch, Eckhard Szimba, Christina Wisotzky |

### Learning Control / Examinations
The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

## V  Event excerpt: Transport Economics (SS 2018)

### Aim
Die Studierenden

- kennen die wirtschaftlich relevanten technologischen und organisatorisch-politischen Eigenschaften der verschiedenen Verkehrssektoren
- kennen wichtige verkehrspolitische Themen, Kontroversen, Instrumente und Optionen
- können mithilfe des analytischen verkehrsökonomischen Instrumentariums Verkehr analysieren und die laufenden wirtschafts- und regulierungspolitischen Diskussionen einschätzen und beurteilen
- Die Veranstaltung eignet sich für alle, die im Berufsleben mit diesen Sektoren zu tun haben werden.

### Content
The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticans and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport
- empirical analysis of transport demand
- assessment of transport infrastructure projects
- external effects in transport
- transport policy
- cost structures of transport infrastructure
- Project evaluation from the perspective of the public sector

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

### Literature
Will be announced in the lecture.
(for literature to prepare the lecture - see additional literature)
**Literature:**

Aberle, G: Transportwirtschaft: einzelwirtschaftliche und gesamtwirtschaftliche Grundlagen München; Wien: Oldenbourg, 2003.

Blauwens, G., De Baere, P. and Van der Voorde, E. (2006): Transport Economics.

Frerich, J; Müller, G: Europäische Verkehrspolitik, Landverkehrspolitik München; Wien: Oldenbourg, 2004.

Dasgupta, A, Pearce, D (1972): Cost-Benefit Analysis, MacMillan, London.

Europäische Kommission (2008): Guide to Cost Benefit Analysis of Investment Projects, online unter http://ec.europa.eu/regional_policy/sources/Ben-Akiva, M., Meerseman, H., and Van de Voorde, E. (2008): Recent developments in transport modelling: Lessons for the freight sector.

Ortúzar, J. d. D. and Willumsen, L. (1990): Modelling Transport.

## T | Course: Transportation Data Analysis [T-BGU-100010]

**Responsibility:** Martin Kagerbauer
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6232901 | | Vorlesung / Übung (VÜ) | 2 | Martin Kagerbauer |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Transportation Systems [T-BGU-106610]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung schriftlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6200406 | | Vorlesung (V) | 2 | Peter Vortisch |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T | Course: Tunnel Construction and Blasting Engineering [T-BGU-101846]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 3 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 6241903 | | Vorlesung (V) | 2 | Shervin Haghsheno, Ulrich Matz, Leopold Scheuble |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Turnkey Construction I - Processes and Methods [T-BGU-103430]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction
[M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 1.5 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6241808 | | Vorlesung (V) | 1 | Klaus Teizer |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T Course: Turnkey Construction II - Trades and Technology [T-BGU-103431]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction
[M-BGU-101884] Lean Management in Construction

| ECTS | Recurrence | Exam type | Version |
|------|-----------|-----------|---------|
| 3 | Jedes Sommersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 6241809 | | Vorlesung / Übung (VÜ) | 2 | Michael Denzer, Klaus Teizer |

**Conditions**
None

**Recommendations**
None

**Remarks**
None

## T  Course: Valuation [T-WIWI-102621]

**Responsibility:** Martin Ruckes
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101482] Finance 1
[M-WIWI-101483] Finance 2
[M-WIWI-101510] Cross-Functional Management Accounting

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4.5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2530212 | Valuation | Vorlesung (V) | 2 | Martin Ruckes |
| WS 18/19 | 2530213 | | Übung (Ü) | 1 | Martin Ruckes, Meik Scholz-Daneshgari |

**Learning Control / Examinations**
See German version.

**Conditions**
None

**Recommendations**
None

## V  Event excerpt: Valuation (WS 18/19)

**Aim**
Students are able to

- evaluate complex investment projects by taking a financial view,
- value firms,
- assess the advantageousness of potential merger and acquisitions.

**Content**
Topics:

- Projections of cash flows
- Estimation of the cost of capital
- Valuation of the firm
- Mergers and acquisitions
- Real options

**Literature**
**Elective Literature**
Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

## T Course: Virtual Engineering I [T-MACH-102123]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101283] Virtual Engineering A

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 4 | deutsch | Jedes Wintersemester | Prüfungsleistung mündlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2121352 | Virtual Engineering I | Vorlesung (V) | 2 | Jivka Ovtcharova |
| WS 18/19 | 2121353 | Exercises Virtual Engineering I | Übung (Ü) | 2 | Mitarbeiter, Jivka Ovtcharova |

**Learning Control / Examinations**
Writen examination 90 min.

**Conditions**
None

## V Event excerpt: Virtual Engineering I (WS 18/19)

**Aim**

Students are introduced to Product Lifecycle Management to understand its application in the scope of Virtual Engineering. They should be able to apply CAD/PLM systems in different phases of the product development process.

Furthermore, students should have an extensive knowledge of data models, specific modules and functions of CAD systems. They should be conscious about the IT fundament of CAx systems as well as integration issues and possible approaches. Students are given an overview on various CAE analysis methods along with possible application, constraints and limitations. They learn about different functions of preprocessors, solvers and postprocessors in CAE systems, different approaches for integrating CAD/CAE systems including advantages and disadvantages of the methods.

Students will learn how to integrate CAM modules or systems with CAD systems and are able to define and simulate production processes in CAM modules. Fundamental understanding of the Virtual Engineering philosophy and virtual factory are communicated.

They should be able to identify the advantages of Virtual Engineering compared to conventional approaches.

**Content**

The lecture communicates IT aspects required for understanding virtual product development processes. For this purpose, the focus is set on systems used in industry supporting the process chain of Virtual Engineering:

- Product Lifecycle Management is an approach for managing product related data across the entire lifecycle of the product, beginning with the concept phase until disassembling and recycling.
- CAx-systems for virtual product development allow modeling digital products regarding design, construction, manufacturing and maintenance.
- Validation systems enable the analysis of products regarding statics, dynamics, safety and manufacturing feasibility.

The objective of the lecture is to clarify the relationship between construction and validation operations by applying virtual prototypes and VR/AR/MR visualization techniques in combination with PDM/PLM-systems. This is taught by introducing each particular system in applied exercises.

**Workload**

Präsenszeit: 52,5 Stunden
Selbststudium: 115 Stunden

## T Course: Virtual Engineering II [T-MACH-102124]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung mündlich | 2 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2122378 | Virtual Engineering II | Vorlesung (V) | 2 | Mitarbeiter, Jivka Ovtcharova |

**Learning Control / Examinations**
Writen examination 90 min.

**Conditions**
None

## V Event excerpt: Virtual Engineering II (SS 2018)

**Aim**
Students are introduced to Virtual Reality, how to achieve stereoscopic visualization and which technologies can be used to create this effect.
They are able to model a scene in VR and store VR data structures. Students should understand the functionality of VR pipelines for visualizing scene. They should be familiar with several interaction systems and devices in a VR environment and should be able to assess the advantages and disadvantages of interaction and tracking devices.
Furthermore, they should know which validation tests could be carried out in product development processes with using virtual mock-up (VMU). The difference between VMU, physical mock-up (PMU) and virtual prototypes (VP) is introduced. The vision of an integrated virtual product development is communicated to understand the challenges to achieve this vision.

**Content**
The lecture presents the IT aspects required for understanding virtual product development processes:

- Corresponding models can be visualized in Virtual Reality Systems, from individual parts to complete assembles.
- Virtual Prototypes combine CAD-data and information about properties of components and assemblies for immersive visualization, functionality tests and functional validation in VR/AR/MR environments.
- Integrated Virtual Product Development explains product development processes from the point of view of Virtual Engineering.

The objective of this lecture is to clarify the relationship between construction and validation operations by using virtual prototypes and VR/AR/MR visualization techniques in combination with PDM/PLM-systems. This will be achieved by introducing each particular IT-system with practical-oriented exercises.

**Workload**
Präsenszeit: 31,5 Stunden
Selbststudium: 87 Stunden

## T   Course: Virtual Engineering Lab [T-MACH-106740]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|
| 4 | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2018 | 2123350 | Virtual Engineering Lab | Praktikum (P) | | Jivka Ovtcharova |
| WS 18/19 | 2123350 | Virtual Engineering Lab | Projekt (PRO) | | Mitarbeiter, Jivka Ovtcharova |

**Learning Control / Examinations**
Assessment of another type (graded), procedure see webpage.

## T  Course: Virtual training factory 4.X [T-MACH-106741]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Recurrence | Exam type | Version |
|------|------------|-----------|---------|
| 4 | Jedes Semester | Prüfungsleistung anderer Art | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2123351 | Virtual training factory 4.X | Vorlesung (V) | | Jivka Ovtcharova |
| WS 18/19 | 2123351 | Virtual training factory 4.X | Seminar / Praktikum (S/P) | | Mitarbeiter, Jivka Ovtcharova |

**Learning Control / Examinations**
Assessment of another type (graded), procedure see webpage.

## T   Course: Warehousing and Distribution Systems [T-MACH-105174]

**Responsibility:**   Kai Furmans
**Contained in:**   [M-MACH-101277] Material Flow in Logistic Systems
[M-MACH-101263] Introduction to Logistics
[M-MACH-101280] Logistics in Value Chain Networks
[M-MACH-101279] Technical Logistics
[M-MACH-101278] Material Flow in Networked Logistic Systems

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 4 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2118097 | Warehousing and distribution systems | Vorlesung (V) | 2 | Kai Furmans |

**Learning Control / Examinations**
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

**Conditions**
none

## V   Event excerpt: Warehousing and distribution systems (SS 2018)

**Aim**
Students are able to:

- Describe the areas of typical warehouse and distribution systems with the respective processes and can illustrate it with sketches,
- Use and choose strategies of warehouse and distribution systems according to requirements,
- Classify typical systsems using criteria discussed in the lecture, and
- Reson about the choice of appropriate technical solutions.

**Content**

- Introduction
- Yard management
- Receiving
- Storage and picking
- Workshop on cycle times
- Consoldiation and packing
- Shipping
- Added Value
- Overhead
- Case Study: DCRM
- Planning of warehouses
- Case study: Planning of warehouses
- Distribution networks
- Lean Warehousing

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**

**ARNOLD, Dieter, FURMANS, Kai (2005)**
Materialfluss in Logistiksystemen, 5. Auflage, Berlin: Springer-Verlag
**ARNOLD, Dieter (Hrsg.) et al. (2008)**
Handbuch Logistik, 3. Auflage, Berlin: Springer-Verlag
**BARTHOLDI III, John J., HACKMAN, Steven T. (2008)**
Warehouse Science
**GUDEHUS, Timm (2005)**
Logistik, 3. Auflage, Berlin: Springer-Verlag
**FRAZELLE, Edward (2002)**
World-class warehousing and material handling, McGraw-Hill
**MARTIN, Heinrich (1999)**
Praxiswissen Materialflußplanung: Transport, Hanshaben, Lagern, Kommissionieren, Braunschweig, Wiesbaden: Vieweg
**WISSER, Jens (2009)**
Der Prozess Lagern und Kommissionieren im Rahmen des Distribution Center Reference Model (DCRM); Karlsruhe : Universitätsverlag
A comprehensive overview of scientific papers can be found at:
**ROODBERGEN, Kees Jan (2007)**
Warehouse Literature

## T  Course: Water Chemistry and Water Technology I [T-CIWVT-101900]

**Responsibility:**   Harald Horn
**Contained in:**   [M-CIWVT-101121] Water Chemistry and Water Technology I

| ECTS | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|
| 6 | Jedes Wintersemester | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 22621 | | Vorlesung (V) | 2 | Harald Horn |
| WS 18/19 | 22622 | | Übung (Ü) | 1 | Harald Horn, und Mitarbeiter |
| WS 18/19 | 22664 | | Praktikum (P) | 2 | Gudrun Abbt-Braun, Harald Horn, und Mitarbeiter |

**Conditions**

T-CIWVT-103351 - Wasserchemisches Praktikum must be passed.

## T  Course: Water Chemistry and Water Technology II [T-CIWVT-101901]

**Responsibility:** Harald Horn
**Contained in:** [M-CIWVT-101122] Water Chemistry and Water Technology II

| ECTS | Exam type | Version |
|------|-----------|---------|
| 9 | Prüfungsleistung mündlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 22603 | | Vorlesung (V) | 2 | Gudrun Abbt-Braun |

**Conditions**

The module "Water Chemistry and Water Technology I" must be passed.

**Modeled Conditions**

The following conditions must be met:

- The module [M-CIWVT-101121] *Water Chemistry and Water Technology I* must have been passed.

## T  Course: Web Science [T-WIWI-103112]

**Responsibility:** York Sure-Vetter
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | englisch | Jedes Wintersemester | Prüfungsleistung schriftlich | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| WS 18/19 | 2511312 | Web Science | Vorlesung (V) | 2 | York Sure-Vetter |
| WS 18/19 | 2511313 | Exercises to Web Science | Übung (Ü) | 1 | Lars Heling, York Sure-Vetter |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

**Conditions**
None

**Remarks**
New course starting winter term 2015/2016.

## V  Event excerpt: Web Science (WS 18/19)

**Aim**
The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.

- apply interdisciplinary thinking.

- train the application of technological approaches to social science problems.

**Content**
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

**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**

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World, by David Easley and Jon Kleinberg, 2010 (free online book: http://www.cs.cornell.edu/home/kleinber/networks-book/)

- Thelwall, M. (2009). Social network sites: Users and uses. In: M. Zelkowitz (Ed.), Advances in Computers 76. Amsterdam: Elsevier (pp. 19-73)

**T**  **Course: Wildcard Key Competences Seminar 1 [T-WIWI-104680]**

**Responsibility:**
**Contained in:**   [M-WIWI-101808] Seminar Module

| ECTS | Exam type | Version |
|------|-----------|---------|
| 1 | Studienleistung | 1 |

## T Course: Wildcard Key Competences Seminar 3 [T-WIWI-104682]

**Responsibility:**
**Contained in:**     [M-WIWI-101808] Seminar Module

| ECTS | Exam type | Version |
|------|-----------|---------|
| 3 | Studienleistung | 1 |

## T Course: Wildcard Key Competences Seminar 4 [T-WIWI-104683]

**Responsibility:**
**Contained in:**  [M-WIWI-101808] Seminar Module

| ECTS | Exam type | Version |
|:---:|:---:|:---:|
| 1 | Prüfungsleistung anderer Art | 1 |

## T  Course: Wildcard Key Competences Seminar 5 [T-WIWI-104684]

**Responsibility:**
**Contained in:**    [M-WIWI-101808] Seminar Module

| ECTS | Exam type | Version |
|------|-----------|---------|
| 2 | Prüfungsleistung anderer Art | 1 |

## T Course: Wildcard Key Competences Seminar 6 [T-WIWI-104685]

**Responsibility:**
**Contained in:**    [M-WIWI-101808] Seminar Module

| ECTS | Exam type | Version |
|------|-----------|---------|
| 3 | Prüfungsleistung anderer Art | 1 |

## T Course: Wildcard Key Competences Seminar 8 [T-WIWI-105956]

**Responsibility:**
**Contained in:**  [M-WIWI-101808] Seminar Module

| ECTS | Exam type | Version |
|------|-----------|---------|
| 4 | Prüfungsleistung anderer Art | 1 |

## T   Course: Workflow-Management [T-WIWI-102662]

**Responsibility:** Andreas Oberweis
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 5 | deutsch | Jedes Sommersemester | Prüfungsleistung schriftlich | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2511204 | Workflow-Management | Vorlesung (V) | 2 | Agnes Koschmider, Andreas Oberweis |
| SS 2018 | 2511205 | | Übung (Ü) | 1 | Andreas Drescher, Tobias Heuser, Agnes Koschmider, Andreas Oberweis |

**Learning Control / Examinations**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Conditions**
None

## V   Event excerpt: Workflow-Management (SS 2018)

**Aim**
Students

- explain the concepts and principles of workflow management concepts and systems and their applications,
- create and evaluatel business process models,
- analyze static and dynamic properties of workflows.

**Content**
A workflow is that part of a business process which is automatically executed by a computerized system. Workflow management includes the design, modelling, analysis, execution and management of workflows. Workflow management systems are standard software systems for the efficient control of processes in enterprises and organizations. Knowledge in the field of workflow management systems is especially important during the design of systems for process support.
The course covers the most important concepts of workflow management. Modelling and design techniques are presented and an overview about current workflow management systems is given. Standards, which have been proposed by the workflow management coalition (WfMC), are discussed. Petri nets are proposed as a formal modelling and analysis tool for business processes. Architecture and functionality of workflow management systems are discussed. The course is a combination of theoretical foundations of workflow management concepts and of practical application knowledge.

**Workload**
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

**Literature**

- W. van der Aalst, H. van Kees: Workflow Management: Models, Methods and Systems, Cambridge 2002: The MIT Press.

- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.

- A. Oberweis: Modellierung und Ausführung von Workflows mit Petri-Netzen. Teubner-Reihe Wirtschaftsinformatik, B.G. Teubner Verlag, 1996.

- F. Schönthaler, G.Vossen, A. Oberweis, T. Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.

  Further literature is given in the lecture.

**T** **Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]**

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-103119] Advanced Topics in Strategy and Management

| ECTS | Language | Recurrence | Exam type | Version |
|------|----------|------------|-----------|---------|
| 3 | deutsch | Jedes Sommersemester | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2577912 | Workshop Business Wargaming - Analyzinig Strategic Interactions | Seminar (S) | 2 | Nicolas Burkardt, Hagen Lindstädt |

**Learning Control / Examinations**
Non exam assessment (following §4(2) 3 of the examination regulation).

**Conditions**
None

**Recommendations**
Basic knowledge as conveyed in the bachelor module „Strategy and Organization" is recommended.

**Remarks**
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

**V** **Event excerpt: Workshop Business Wargaming - Analyzinig Strategic Interactions (SS 2018)**

**Aim**
Der/die Studierende

- können selbstständig und strukturiert strategische Konfliktsituationen analysieren und Empfehlungen ableiten
- können ihre Position durch eine durchdachte Argumentationsweise in strukturierten Diskussionen überzeugend darlegen

**Content**
In this course, students simulate and analyze real-life conflict situations using Business Wargaming methods. The students will be able to understand the underlying structure and dynamics of various conflicts, this includes making own conclusions as well as deriving strategic recommendations.

**Workload**
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

**T** **Course: Workshop Current Topics in Strategy and Management [T-WIWI-106188]**

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-103119] Advanced Topics in Strategy and Management

| ECTS | Language | Recurrence | Exam type | Version |
|:---:|:---:|:---:|:---:|:---:|
| 3 | deutsch | Unregelmäßig | Prüfungsleistung anderer Art | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 18/19 | 2577921 | Workshop Current Topics in Strategy and Management | Seminar (S) | 2 | Nicolas Burkardt, Hagen Lindstädt, Florian Müller |

**Learning Control / Examinations**
Non exam assessment (following §4(2) 3 of the examination regulation).

**Conditions**
None

**Recommendations**
Basic knowledge as conveyed in the bachelor module „Strategy and Organization" is recommended.

**Remarks**
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.
The course is planned to be held for the first time in the winter term 2017/18.

**V** **Event excerpt: Workshop Current Topics in Strategy and Management (WS 18/19)**

**Aim**
Students

- are able to analyze business strategies and derive recommendations for the management
- learn to express their position through compelling reasoning in structured discussions

**Content**
In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

**Workload**
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

## T  Course: X-ray Optics [T-MACH-109122]

**Responsibility:** Arndt Last
**Contained in:** [M-MACH-101291] Microfabrication
[M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Version |
|------|----------|------------|---------|
| 4 | deutsch | Jedes Semester | 1 |

### Events

| Term | Event-No. | Events | Type | SWS | Lecturers |
|------|-----------|--------|------|-----|-----------|
| SS 2018 | 2141007 | | Vorlesung (V) | 2 | Arndt Last |
| WS 18/19 | 2141007 | X-ray Optics | Vorlesung (V) | 2 | Arndt Last |

**Learning Control / Examinations**
oral exam (about 20 min)

**Conditions**
none

## V  Event excerpt: X-ray Optics (WS 18/19)

### Aim
The lecture will enable the students to judge capabilities of different X-ray optical imaging methods and instrumentation and to select suitable methods for a given task.

### Content
The lecture covers general principles of optics as well as basics, functioning and application of reflective, refractive and diffractive X-ray optical elements and systems. Selected X-ray analytical imaging methods and the necessary optical elements are discussed including their potentials and limitations.

### Workload
lecture times plus assignment to review

### Literature
M. Born und E. Wolf
Principles of Optics, 7th (expanded) edition
Cambridge University Press, 2010
A. Erko, M. Idir, T. Krist und A. G. Michette
Modern Developments in X-Ray and Neutron Optics
Springer Series in Optical Sciences, Vol. 137
Springer-Verlag Berlin Heidelberg, 2008
D. Attwood
Soft X-Rays and Extreme Ultraviolet Radiation: Principles and Applications
Cambridge University Press, 1999

Universität des Landes Baden-Württemberg und
nationales Forschungszentrum in der Helmholtz-Gemeinschaft

# Amtliche Bekanntmachung

**I n h a l t**                                                                                           **Seite**

# Studien- und Prüfungsordnung
## des Karlsruher Instituts für Technologie (KIT) für den Masterstudiengang Technische Volkswirtschaftslehre

### vom 24. September 2015

Aufgrund von § 10 Absatz 2 Ziff. 5 und § 20 des Gesetzes über das Karlsruher Institut für Technologie (KIT-Gesetz - KITG) in der Fassung vom 14. Juli 2009 (GBl. S. 317 f), zuletzt geändert durch Artikel 5 des Dritten Gesetzes zur Änderung hochschulrechtlicher Vorschriften (3. Hochschulrechtsänderungsgesetz – 3. HRÄG) vom 01. April 2014 (GBl. S. 99, 167) und § 8 Absatz 5 des Gesetzes über die Hochschulen in Baden-Württemberg (Landeshochschulgesetz - LHG) in der Fassung vom 1. Januar 2005 (GBl. S. 1 f), zuletzt geändert durch Artikel 1 des 3. HRÄG vom 01. April 2014 (GBl. S. 99 ff.), hat der Senat des KIT am 21. September 2015 die folgende Studien- und Prüfungsordnung für den Masterstudiengang Technische Volkswirtschaftslehre beschlossen.

Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 KITG iVm. § 32 Absatz 3 Satz 1 LHG am 24. September 2015 erteilt.

## Inhaltsverzeichnis

## Präambel

Das KIT hat sich im Rahmen der Umsetzung des Bolognaprozesses zum Aufbau eines Europäischen Hochschulraumes zum Ziel gesetzt, dass am Abschluss des Studiums am KIT der Mastergrad stehen soll. Das KIT sieht daher die am KIT angebotenen konsekutiven Bachelor- und Masterstudiengänge als Gesamtkonzept mit konsekutivem Curriculum.

## I. Allgemeine Bestimmungen

### § 1 Geltungsbereich

Diese Masterprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Masterstudiengang Technische Volkswirtschaftslehre am KIT.

### § 2 Ziel des Studiums, akademischer Grad

**(1)** Im konsekutiven Masterstudium sollen die im Bachelorstudium erworbenen wissenschaftlichen Qualifikationen weiter vertieft, verbreitert, erweitert oder ergänzt werden. Ziel des Studiums ist die Fähigkeit, die wissenschaftlichen Erkenntnisse und Methoden selbstständig anzuwenden und ihre Bedeutung und Reichweite für die Lösung komplexer wissenschaftlicher und gesellschaftlicher Problemstellungen zu bewerten.

**(2)** Aufgrund der bestandenen Masterprüfung wird der akademische Grad „Master of Science (M.Sc.)" für den Masterstudiengang Technische Volkswirtschaftslehre verliehen.

### § 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

**(1)** Die Regelstudienzeit beträgt vier Semester.

**(2)** Das Lehrangebot des Studiengangs ist in Fächer, die Fächer sind in Module, die jeweiligen Module in Lehrveranstaltungen gegliedert. Die Fächer und ihr Umfang werden in § 19 festgelegt. Näheres beschreibt das Modulhandbuch.

**(3)** Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (LP) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem European Credit Transfer System (ECTS). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Zeitstunden. Die Verteilung der Leistungspunkte auf die Semester hat in der Regel gleichmäßig zu erfolgen.

**(4)** Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studien- und Prüfungsleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 120 Leistungspunkte.

**(5)** Lehrveranstaltungen können nach vorheriger Ankündigung auch in englischer Sprache angeboten werden.

### § 4 Modulprüfungen, Studien- und Prüfungsleistungen

**(1)** Die Masterprüfung besteht aus Modulprüfungen. Modulprüfungen bestehen aus einer oder mehreren Erfolgskontrollen.

Erfolgskontrollen gliedern sich in Studien- oder Prüfungsleistungen.

**(2)** Prüfungsleistungen sind:

1. schriftliche Prüfungen,

2. mündliche Prüfungen oder

3. Prüfungsleistungen anderer Art.

**(3)** Studienleistungen sind schriftliche, mündliche oder praktische Leistungen, die von den Studierenden in der Regel lehrveranstaltungsbegleitend erbracht werden. Die Masterprüfung darf nicht mit einer Studienleistung abgeschlossen werden.

**(4)** Von den Modulprüfungen sollen mindestens 70 % benotet sein.

**(5)** Bei sich ergänzenden Inhalten können die Modulprüfungen mehrerer Module durch eine auch modulübergreifende Prüfungsleistung (Absatz 2 Nr.1 bis 3) ersetzt werden.

### § 5 Anmeldung und Zulassung zu den Modulprüfungen und Lehrveranstaltungen

**(1)** Um an den Modulprüfungen teilnehmen zu können, müssen sich die Studierenden online im Studierendenportal zu den jeweiligen Erfolgskontrollen anmelden. In Ausnahmefällen kann eine Anmeldung schriftlich im Studierendenservice oder in einer anderen vom Studierendenservice autorisierten Einrichtung erfolgen. Für die Erfolgskontrollen können durch die Prüfenden Anmeldefristen festgelegt werden. Die Anmeldung der Masterarbeit ist im Modulhandbuch geregelt.

**(2)** Sofern Wahlmöglichkeiten bestehen, müssen Studierende, um zu einer Prüfung in einem bestimmten Modul zugelassen zu werden, vor der ersten Prüfung in diesem Modul mit der Anmeldung zu der Prüfung eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach abgeben. Auf Antrag des/der Studierenden an den Prüfungsausschuss kann die Wahl oder die Zuordnung nachträglich geändert werden. Sofern bereits ein Prüfungsverfahren in einem Modul begonnen wurde, ist die Änderung der Wahl oder der Zuordnung erst nach Beendigung des Prüfungsverfahrens zulässig.

**(3)** Zu einer Erfolgskontrolle ist zuzulassen, wer

1. in den Masterstudiengang Technische Volkswirtschaftslehre am KIT eingeschrieben ist; die Zulassung beurlaubter Studierender ist auf Prüfungsleistungen beschränkt; und

2. nachweist, dass er die im Modulhandbuch für die Zulassung zu einer Erfolgskontrolle festgelegten Voraussetzungen erfüllt und

3. nachweist, dass er in dem Masterstudiengang Technische Volkswirtschaftslehre den Prüfungsanspruch nicht verloren hat.

**(4)** Nach Maßgabe von § 30 Abs. 5 LHG kann die Zulassung zu einzelnen Pflichtveranstaltungen beschränkt werden. Der/die Prüfende entscheidet über die Auswahl unter den Studierenden, die sich rechtzeitig bis zu dem von dem/der Prüfenden festgesetzten Termin angemeldet haben unter Berücksichtigung des Studienfortschritts dieser Studierenden und unter Beachtung von § 13 Abs. 1 Satz 1 und 2, sofern ein Abbau des Überhangs durch andere oder zusätzliche Veranstaltungen nicht möglich ist. Für den Fall gleichen Studienfortschritts sind durch die KIT-Fakultäten weitere Kriterien festzulegen. Das Ergebnis wird den Studierenden rechtzeitig bekannt gegeben.

**(5)** Die Zulassung ist zu versagen, wenn die in Absatz 3 und 4 genannten Voraussetzungen nicht erfüllt sind. Die Zulassung kann versagt werden, wenn die betreffende Erfolgskontrolle bereits in einem grundständigen Bachelorstudiengang am KIT erbracht wurde, der Zulassungsvoraussetzung für diesen Masterstudiengang gewesen ist. Dies gilt nicht für Mastervorzugsleistungen. Zu diesen ist eine Zulassung nach Maßgabe von Satz 1 ausdrücklich zu genehmigen.

### § 6 Durchführung von Erfolgskontrollen

**(1)** Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

**(2)** Die Art der Erfolgskontrolle (§ 4 Abs. 2 Nr. 1 bis 3, Abs. 3) wird von der/dem Prüfenden der betreffenden Lehrveranstaltung in Bezug auf die Lerninhalte der Lehrveranstaltung und die

Lernziele des Moduls festgelegt. Die Art der Erfolgskontrolle, ihre Häufigkeit, Reihenfolge und Gewichtung sowie gegebenenfalls die Bildung der Modulnote müssen mindestens sechs Wochen vor Vorlesungsbeginn im Modulhandbuch bekannt gemacht werden. Im Einvernehmen von Prüfendem und Studierender bzw. Studierendem können die Art der Prüfungsleistung sowie die Prüfungssprache auch nachträglich geändert werden; im ersten Fall ist jedoch § 4 Abs. 4 zu berücksichtigen. Bei der Prüfungsorganisation sind die Belange Studierender mit Behinderung oder chronischer Erkrankung gemäß § 13 Abs. 1 zu berücksichtigen. § 13 Abs. 1 Satz 3 und 4 gelten entsprechend.

**(3)** Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfungsleistung auch mündlich, oder eine mündlich durchzuführende Prüfungsleistung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfungsleistung bekannt gegeben werden.

**(4)** Bei Lehrveranstaltungen in englischer Sprache (§ 3 Abs. 6) können die entsprechenden Erfolgskontrollen in dieser Sprache abgenommen werden. § 6 Abs. 2 gilt entsprechend.

**(5)** *Schriftliche Prüfungen* (§ 4 Abs. 2 Nr. 1) sind in der Regel von einer/einem Prüfenden nach § 18 Abs. 2 oder 3 zu bewerten. Sofern eine Bewertung durch mehrere Prüfende erfolgt, ergibt sich die Note aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 7 Abs. 2 Satz 2 definierten Notenstufen, so ist auf die nächstliegende Notenstufe auf- oder abzurunden. Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Prüfungen dauern mindestens 60 und höchstens 300 Minuten.

**(6)** *Mündliche Prüfungen* (§ 4 Abs. 2 Nr. 2) sind von mehreren Prüfenden (Kollegialprüfung) oder von einer/einem Prüfenden in Gegenwart einer oder eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört die/der Prüfende die anderen an der Kollegialprüfung mitwirkenden Prüfenden an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 60 Minuten pro Studierenden.

Die wesentlichen Gegenstände und Ergebnisse der *mündlichen Prüfung* sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist den Studierenden im Anschluss an die mündliche Prüfung bekannt zu geben.

Studierende, die sich in einem späteren Semester der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen und nach Zustimmung des Prüflings als Zuhörerinnen und Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse.

**(7)** Für *Prüfungsleistungen anderer Art* (§ 4 Abs. 2 Nr. 3) sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Prüfungsleistung dem/der Studierenden zurechenbar ist. Die wesentlichen Gegenstände und Ergebnisse der Erfolgskontrolle sind in einem Protokoll festzuhalten.

Bei *mündlich* durchgeführten *Prüfungsleistungen anderer Art* muss neben der/dem Prüfenden ein/e Beisitzende/r anwesend sein, die/der zusätzlich zum/zur Prüfenden das Protokoll zeichnet.

*Schriftliche Arbeiten* im Rahmen einer *Prüfungsleistung anderer Art* haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde." Trägt die Arbeit diese Erklärung nicht, wird sie nicht angenommen. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

### § 6 a Erfolgskontrollen im Antwort-Wahl-Verfahren

Das Modulhandbuch regelt, ob und in welchem Umfang Erfolgskontrollen im Wege des *Antwort-Wahl-Verfahrens* abgelegt werden können

### § 6 b Computergestützte Erfolgskontrollen

**(1)** Erfolgskontrollen können computergestützt durchgeführt werden. Dabei wird die Antwort bzw. Lösung der/des Studierenden elektronisch übermittelt und, sofern möglich, automatisiert ausgewertet. Die Prüfungsinhalte sind von einer/einem Prüfenden zu erstellen.

**(2)** Vor der computergestützten Erfolgskontrolle hat die/der Prüfende sicherzustellen, dass die elektronischen Daten eindeutig identifiziert und unverwechselbar und dauerhaft den Studierenden zugeordnet werden können. Der störungsfreie Verlauf einer computergestützten Erfolgskontrolle ist durch entsprechende technische Betreuung zu gewährleisten, insbesondere ist die Erfolgskontrolle in Anwesenheit einer fachlich sachkundigen Person durchzuführen. Alle Prüfungsaufgaben müssen während der gesamten Bearbeitungszeit zur Bearbeitung zur Verfügung stehen.

**(3)** Im Übrigen gelten für die Durchführung von computergestützten Erfolgskontrollen die §§ 6 bzw. 6 a.

### § 7 Bewertung von Studien- und Prüfungsleistungen

**(1)** Das Ergebnis einer Prüfungsleistung wird von den jeweiligen Prüfenden in Form einer Note festgesetzt.

**(2)** Folgende Noten sollen verwendet werden:

| | | |
|---|---|---|
| sehr gut (very good) | : | hervorragende Leistung, |
| gut (good) | : | eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt, |
| befriedigend (satisfactory) | : | eine Leistung, die durchschnittlichen Anforderungen entspricht, |
| ausreichend (sufficient) | : | eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt, |
| nicht ausreichend (failed) | : | eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt. |

Zur differenzierten Bewertung einzelner Prüfungsleistungen sind nur folgende Noten zugelassen:

| | | |
|---|---|---|
| 1,0; 1,3 | : | sehr gut |
| 1,7; 2,0; 2,3 | : | gut |
| 2,7; 3,0; 3,3 | : | befriedigend |
| 3,7; 4,0 | : | ausreichend |
| 5,0 | : | nicht ausreichend |

**(3)** Studienleistungen werden mit „bestanden" oder mit „nicht bestanden" gewertet.

**(4)** Bei der Bildung der gewichteten Durchschnitte der Modulnoten, der Fachnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

**(5)** Jedes Modul und jede Erfolgskontrolle darf in demselben Studiengang nur einmal gewertet werden.

**(6)** Eine Prüfungsleistung ist bestanden, wenn die Note mindestens „ausreichend" (4,0) ist.

**(7)** Die Modulprüfung ist bestanden, wenn alle erforderlichen Erfolgskontrollen bestanden sind. Die Modulprüfung und die Bildung der Modulnote sollen im Modulhandbuch geregelt werden. Sofern das Modulhandbuch keine Regelung über die Bildung der Modulnote enthält, errechnet sich die Modulnote aus einem nach den Leistungspunkten der einzelnen Teilmodule gewichteter Notendurchschnitt. Die differenzierten Noten (Absatz 2) sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden.

**(8)** Die Ergebnisse der Erfolgskontrollen sowie die erworbenen Leistungspunkte werden durch den Studierendenservice des KIT verwaltet.

**(9)** Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

**(10)** Die Gesamtnote der Masterprüfung, die Fachnoten und die Modulnoten lauten:

|       |       | bis | 1,5 | = | sehr gut |
| von   | 1,6   | bis | 2,5 | = | gut |
| von   | 2,6   | bis | 3,5 | = | befriedigend |
| von   | 3,6   | bis | 4,0 | = | ausreichend |

### § 8 Wiederholung von Erfolgskontrollen, endgültiges Nichtbestehen

**(1)** Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nr. 1) einmal wiederholen. Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend" (5,0) bewertet, so findet eine mündliche Nachprüfung im zeitlichen Zusammenhang mit dem Termin der nicht bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als „ausreichend" (4,0) sein.

**(2)** Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nr. 2) einmal wiederholen.

**(3)** Wiederholungsprüfungen nach Absatz 1 und 2 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten entsprechen. Ausnahmen kann der zuständige Prüfungsausschuss auf Antrag zulassen.

**(4)** Prüfungsleistungen anderer Art (§ 4 Absatz 2 Nr. 3) können einmal wiederholt werden.

**(5)** Studienleistungen können mehrfach wiederholt werden.

**(6)** Die Prüfungsleistung ist endgültig nicht bestanden, wenn die mündliche Nachprüfung im Sinne des Absatzes 1 mit „nicht ausreichend" (5,0) bewertet wurde. Die Prüfungsleistung ist ferner endgültig nicht bestanden, wenn die mündliche Prüfung im Sinne des Absatzes 2 oder die Prüfungsleistung anderer Art gemäß Absatz 4 zweimal mit „nicht bestanden" bewertet wurde.

**(7)** Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

**(8)** Eine zweite Wiederholung derselben Prüfungsleistung gemäß § 4 Abs. 2 ist nur in Ausnahmefällen auf Antrag des/der Studierenden zulässig („Antrag auf Zweitwiederholung"). Der Antrag ist schriftlich beim Prüfungsausschuss in der Regel bis zwei Monate nach Bekanntgabe der Note zu stellen.

Über den ersten Antrag eines/einer Studierenden auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet ein Mitglied des Präsidiums. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses ein Mitglied des Präsidiums. Wird der Antrag genehmigt, hat die Zweitwiederholung spätestens zum übernächsten Prüfungstermin zu erfolgen. Absatz 1 Satz 2 und 3 gelten entsprechend.

**(9)** Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

**(10)** Die Masterarbeit kann bei einer Bewertung mit „nicht ausreichend" (5,0) einmal wiederholt werden. Eine zweite Wiederholung der Masterarbeit ist ausgeschlossen.

### § 9 Verlust des Prüfungsanspruchs

Ist eine nach dieser Studien- und Prüfungsordnung erforderliche Studien- oder Prüfungsleistung endgültig nicht bestanden oder die Masterprüfung bis zum Ende des Prüfungszeitraums des siebten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Masterstudiengang Technische Volkswirtschaftslehre, es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist. Die Entscheidung über eine Fristverlängerung und über Ausnahmen von der Fristregelung trifft der Prüfungsausschuss unter Beachtung der in § 32 Abs. 6 LHG genannten Tätigkeiten auf Antrag des/der Studierenden. Der Antrag ist schriftlich in der Regel bis sechs Wochen vor Ablauf der Frist zu stellen.

### § 10 Abmeldung; Versäumnis, Rücktritt

**(1)** Studierende können ihre Anmeldung zu *schriftlichen Prüfungen* ohne Angabe von Gründen bis zur Ausgabe der Prüfungsaufgaben widerrufen (Abmeldung). Eine Abmeldung kann online im Studierendenportal bis 24 Uhr des Vortages der Prüfung oder in begründeten Ausnahmefällen beim Studierendenservice innerhalb der Geschäftszeiten erfolgen. Erfolgt die Abmeldung gegenüber dem/der Prüfenden hat diese/r Sorge zu tragen, dass die Abmeldung im Campus Management System verbucht wird.

**(2)** Bei *mündlichen Prüfungen* muss die Abmeldung spätestens drei Werktage vor dem betreffenden Prüfungstermin gegenüber dem/der Prüfenden erklärt werden. Der Rücktritt von einer mündlichen Prüfung weniger als drei Werktage vor dem betreffenden Prüfungstermin ist nur unter den Voraussetzungen des Absatzes 5 möglich. Der Rücktritt von mündlichen Nachprüfungen im Sinne von § 9 Abs. 1 ist grundsätzlich nur unter den Voraussetzungen von Absatz 5 möglich.

**(3)** Die Abmeldung von *Prüfungsleistungen anderer Art* sowie von *Studienleistungen* ist im Modulhandbuch geregelt.

**(4)** Eine Erfolgskontrolle gilt als mit „nicht ausreichend" (5,0) bewertet, wenn die Studierenden einen Prüfungstermin ohne triftigen Grund versäumen oder wenn sie nach Beginn der Erfolgskontrolle ohne triftigen Grund von dieser zurücktreten. Dasselbe gilt, wenn die Masterarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der/die Studierende hat die Fristüberschreitung nicht zu vertreten.

**(5)** Der für den Rücktritt nach Beginn der Erfolgskontrolle oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des/der Studierenden oder eines allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes verlangt werden.

### § 11 Täuschung, Ordnungsverstoß

**(1)** Versuchen Studierende das Ergebnis ihrer Erfolgskontrolle durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend" (5,0) bewertet.

**(2)** Studierende, die den ordnungsgemäßen Ablauf einer Erfolgskontrolle stören, können von der/dem Prüfenden oder der Aufsicht führenden Person von der Fortsetzung der Erfolgskontrolle ausgeschlossen werden. In diesem Fall gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend" (5,0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss diese Studierenden von der Erbringung weiterer Erfolgskontrollen ausschließen.

**(3)** Näheres regelt die Allgemeine Satzung des KIT zur Redlichkeit bei Prüfungen und Praktika in der jeweils gültigen Fassung.

**§ 12 Mutterschutz, Elternzeit, Wahrnehmung von Familienpflichten**

**(1)** Auf Antrag sind die Mutterschutzfristen, wie sie im jeweils gültigen Gesetz zum Schutz der erwerbstätigen Mutter (Mutterschutzgesetz - MuSchG) festgelegt sind, entsprechend zu berücksichtigen. Dem Antrag sind die erforderlichen Nachweise beizufügen. Die Mutterschutzfristen unterbrechen jede Frist nach dieser Prüfungsordnung. Die Dauer des Mutterschutzes wird nicht in die Frist eingerechnet.

**(2)** Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweils gültigen Gesetzes (Bundeselterngeld- und Elternzeitgesetz - BEEG) auf Antrag zu berücksichtigen. Der/die Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem an die Elternzeit angetreten werden soll, dem Prüfungsausschuss, unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum die Elternzeit in Anspruch genommen werden soll. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einer Arbeitnehmerin bzw. einem Arbeitnehmer den Anspruch auf Elternzeit auslösen würden, und teilt dem/der Studierenden das Ergebnis sowie die neu festgesetzten Prüfungszeiten unverzüglich mit. Die Bearbeitungszeit der Masterarbeit kann nicht durch Elternzeit unterbrochen werden. Die gestellte Arbeit gilt als nicht vergeben. Nach Ablauf der Elternzeit erhält der/die Studierende ein neues Thema, das innerhalb der in § 14 festgelegten Bearbeitungszeit zu bearbeiten ist.

**(3)** Der Prüfungsausschuss entscheidet auf Antrag über die flexible Handhabung von Prüfungsfristen entsprechend den Bestimmungen des Landeshochschulgesetzes, wenn Studierende Familienpflichten wahrzunehmen haben. Absatz 2 Satz 4 bis 6 gelten entsprechend.

**§ 13 Studierende mit Behinderung oder chronischer Erkrankung**

**(1)** Bei der Gestaltung und Organisation des Studiums sowie der Prüfungen sind die Belange von Studierenden mit Behinderung oder chronischer Erkrankung zu berücksichtigen. Insbesondere ist Studierenden mit Behinderung oder chronischer Erkrankung bevorzugter Zugang zu teilnahmebegrenzten Lehrveranstaltungen zu gewähren und die Reihenfolge für das Absolvieren bestimmter Lehrveranstaltungen entsprechend ihrer Bedürfnisse anzupassen. Studierende sind gemäß Bundesgleichstellungsgesetz (BGG) und Sozialgesetzbuch Neuntes Buch (SGB IX) behindert, wenn ihre körperliche Funktion, geistige Fähigkeit oder seelische Gesundheit mit hoher Wahrscheinlichkeit länger als sechs Monate von dem für das Lebensalter typischen Zustand abweichen und daher ihre Teilhabe am Leben in der Gesellschaft beeinträchtigt ist. Der Prüfungsausschuss entscheidet auf Antrag der/des Studierenden über das Vorliegen der Voraussetzungen nach Satz 2 und 3. Die/der Studierende hat die entsprechenden Nachweise vorzulegen.

**(2)** Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen Zeit oder Form abzulegen, kann der Prüfungsausschuss gestatten, die Erfolgskontrollen in einem anderen Zeitraum oder einer anderen Form zu erbringen. Insbesondere ist behinderten Studierenden zu gestatten, notwendige Hilfsmittel zu benutzen.

**(3)** Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, die Lehrveranstaltungen regelmäßig zu besuchen oder die gemäß § 19 erforderlichen Studien- und Prüfungsleistungen zu erbringen, kann der Prüfungsausschuss auf Antrag gestatten, dass einzelne Studien- und Prüfungsleistungen nach Ablauf der in dieser Studien- und Prüfungsordnung vorgesehenen Fristen absolviert werden können.

**§ 14 Modul Masterarbeit**

**(1)** Voraussetzung für die Zulassung zum Modul Masterarbeit ist, dass die/der Studierende Modulprüfungen im Umfang von mindestens 60 LP erfolgreich abgelegt hat.

Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

**(2)** Die Masterarbeit kann von Hochschullehrer/innen und leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG vergeben werden. Darüber hinaus kann der Prüfungsausschuss

weitere Prüfende gemäß § 17 Abs. 2 und 3 zur Vergabe des Themas berechtigen. Den Studierenden ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. Soll die Masterarbeit außerhalb der KIT-Fakultät für Wirtschaftswissenschaften angefertigt werden, so bedarf dies der Genehmigung durch den Prüfungsausschuss. Die Masterarbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag der einzelnen Studierenden aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach Absatz 4 erfüllt. In Ausnahmefällen sorgt die/der Vorsitzende des Prüfungsausschusses auf Antrag der oder des Studierenden dafür, dass die/der Studierende innerhalb von vier Wochen ein Thema für die Masterarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über die/den Vorsitzende/n des Prüfungsausschusses.

**(3)** Thema, Aufgabenstellung und Umfang der Masterarbeit sind von dem Betreuer bzw. der Betreuerin so zu begrenzen, dass sie mit dem in Absatz 4 festgelegten Arbeitsaufwand bearbeitet werden kann.

**(4)** Die Masterarbeit soll zeigen, dass die Studierenden in der Lage sind, ein Problem aus ihrem Studienfach selbstständig und in begrenzter Zeit nach wissenschaftlichen Methoden zu bearbeiten. Der Umfang der Masterarbeit entspricht 30 Leistungspunkten. Die maximale Bearbeitungsdauer beträgt sechs Monate. Thema und Aufgabenstellung sind an den vorgesehenen Umfang anzupassen. Der Prüfungsausschuss legt fest, in welchen Sprachen die Masterarbeit geschrieben werden kann. Auf Antrag des Studierenden kann der/die Prüfende genehmigen, dass die Masterarbeit in einer anderen Sprache als Deutsch geschrieben wird.

**(5)** Bei der Abgabe der Masterarbeit haben die Studierenden schriftlich zu versichern, dass sie die Arbeit selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt haben, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht und die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet haben. Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen. Die Erklärung kann wie folgt lauten: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig verfasst, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde sowie die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet zu haben." Bei Abgabe einer unwahren Versicherung wird die Masterarbeit mit „nicht ausreichend" (5,0) bewertet.

**(6)** Der Zeitpunkt der Ausgabe des Themas der Masterarbeit ist durch die Betreuerin/ den Betreuer und die/den Studierenden festzuhalten und dies beim Prüfungsausschuss aktenkundig zu machen. Der Zeitpunkt der Abgabe der Masterarbeit ist durch den/die Prüfende/n beim Prüfungsausschuss aktenkundig zu machen. Das Thema kann nur einmal und nur innerhalb des ersten Monats der Bearbeitungszeit zurückgegeben werden. Macht der oder die Studierende einen triftigen Grund geltend, kann der Prüfungsausschuss die in Absatz 4 festgelegte Bearbeitungszeit auf Antrag der oder des Studierenden um höchstens drei Monate verlängern. Wird die Masterarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend" (5,0) bewertet, es sei denn, dass die Studierenden dieses Versäumnis nicht zu vertreten haben.

**(7)** Die Masterarbeit wird von mindestens einem/einer Hochschullehrer/in oder einem/einer leitenden Wissenschaftler/in gemäß § 14 abs. 3 Ziff. 1 KITG und einem/einer weiteren Prüfenden bewertet. In der Regel ist eine/r der Prüfenden die Person, die die Arbeit gemäß Absatz 2 vergeben hat. Bei nicht übereinstimmender Beurteilung dieser beiden Personen setzt der Prüfungsausschuss im Rahmen der Bewertung dieser beiden Personen die Note der Masterarbeit fest; er kann auch einen weiteren Gutachter bestellen. Die Bewertung hat innerhalb von acht Wochen nach Abgabe der Masterarbeit zu erfolgen.

### § 15 Zusatzleistungen

**(1)** Es können auch weitere Leistungspunkte (Zusatzleistungen) im Umfang von höchstens 30 LP aus dem Gesamtangebot des KIT erworben werden. § 3 und § 4 der Prüfungsordnung bleiben davon unberührt. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt- und Modulnoten ein. Die bei der Festlegung der Modulnote nicht berücksichtigten LP werden als Zu-

satzleistungen im Transcript of Records aufgeführt und als Zusatzleistungen gekennzeichnet. Auf Antrag der/des Studierenden werden die Zusatzleistungen in das Masterzeugnis aufgenommen und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet.

**(2)** Die Studierenden haben bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

### § 16 Prüfungsausschuss

**(1)** Für den Masterstudiengang Technische Volkswirtschaftslehre wird ein Prüfungsausschuss gebildet. Er besteht aus fünf stimmberechtigten Mitgliedern: vier Hochschullehrer/innen / leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG / Privatdozentinnen bzw. -dozenten, einem/r akademischen Mitarbeiter/in nach § 52 LHG / wissenschaftlichen Mitarbeiter/innen gemäß § 14 Abs. 3 Ziff. 2 KITG und einer bzw. einem Studierenden mit beratender Stimme. Im Falle der Einrichtung eines gemeinsamen Prüfungsausschusses für den Bachelor- und den Masterstudiengang Technische Volkswirtschaftslehre erhöht sich die Anzahl der Studierenden auf zwei Mitglieder mit beratender Stimme, wobei je eine bzw. einer dieser Beiden aus dem Bachelor- und aus dem Masterstudiengang stammt. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

**(2)** Die/der Vorsitzende, ihre/sein Stellvertreter/in, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter/innen werden von dem KIT-Fakultätsrat bestellt, die akademischen Mitarbeiter/innen nach § 52 LHG, die wissenschaftlichen Mitarbeiter gemäß § 14 Abs. 3 Ziff. 2 KITG und die Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Die/der Vorsitzende und deren/dessen Stellvertreter/in müssen Hochschullehrer/innen oder leitende Wissenschaftler/innen § 14 Abs. 3 Ziff. 1 KITG sein. Die/der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch das jeweilige Prüfungssekretariat unterstützt.

**(3)** Der Prüfungsausschuss achtet auf die Einhaltung der Bestimmungen dieser Studien- und Prüfungsordnung und fällt die Entscheidungen in Prüfungsangelegenheiten. Er entscheidet über die Anerkennung von Studienzeiten sowie Studien- und Prüfungsleistungen und trifft die Feststellung gemäß § 18 Absatz 1 Satz 1. Er berichtet der KIT-Fakultät regelmäßig über die Entwicklung der Prüfungs- und Studienzeiten, einschließlich der Bearbeitungszeiten für die Masterarbeiten und die Verteilung der Modul- und Gesamtnoten. Er ist zuständig für Anregungen zur Reform der Studien- und Prüfungsordnung und zu Modulbeschreibungen. Der Prüfungsausschuss entscheidet mit der Mehrheit seiner Stimmen. Bei Stimmengleichheit entscheidet der Vorsitzende des Prüfungsausschusses.

**(4)** Der Prüfungsausschuss kann die Erledigung seiner Aufgaben für alle Regelfälle auf die/den Vorsitzende/n des Prüfungsausschusses übertragen. In dringenden Angelegenheiten, deren Erledigung nicht bis zu der nächsten Sitzung des Prüfungsausschusses warten kann, entscheidet die/der Vorsitzende des Prüfungsausschusses.

**(5)** Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. Die Mitglieder des Prüfungsausschusses, die Prüfenden und die Beisitzenden unterliegen der Verschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch die/den Vorsitzende/n zur Verschwiegenheit zu verpflichten.

**(6)** In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen KIT-Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses eine fachlich zuständige und von der betroffenen KIT-Fakultät zu nennende prüfungsberechtigte Person hinzuzuziehen.

**(7)** Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben. Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung schriftlich oder zur Niederschrift beim Präsidium des KIT einzulegen.

### § 17 Prüfende und Beisitzende

**(1)** Der Prüfungsausschuss bestellt die Prüfenden. Er kann die Bestellung der/dem Vorsitzenden übertragen.

**(2)** Prüfende sind Hochschullehr/innen sowie leitende Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG, habilitierte Mitglieder und akademische Mitarbeiter/innen gemäß § 52 LHG, welche einer KIT-Fakultät angehören und denen die Prüfungsbefugnis übertragen wurde; desgleichen kann wissenschaftlichen Mitarbeitern gemäß § 14 Abs. 3 Ziff. 2 KITG die Prüfungsbefugnis übertragen werden. Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat.

**(3)** Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zu Prüfenden bestellt werden, sofern eine KIT-Fakultät eine Prüfungsbefugnis erteilt hat und sie die gemäß Absatz 2 Satz 2 vorausgesetzte Qualifikation nachweisen können.

**(4)** Die Beisitzenden werden durch die Prüfenden benannt. Zu Beisitzenden darf nur bestellt werden, wer einen akademischen Abschluss in einem Masterstudiengang der Wirtschafts- oder Naturwissenschaften oder einen gleichwertigen akademischen Abschluss erworben hat.

### § 18 Anerkennung von Studien- und Prüfungsleistungen, Studienzeiten

**(1)** Studien- und Prüfungsleistungen sowie Studienzeiten, die in Studiengängen an staatlichen oder staatlich anerkannten Hochschulen und Berufsakademien der Bundesrepublik Deutschland oder an ausländischen staatlichen oder staatlich anerkannten Hochschulen erbracht wurden, werden auf Antrag der Studierenden anerkannt, sofern hinsichtlich der erworbenen Kompetenzen kein wesentlicher Unterschied zu den Leistungen oder Abschlüssen besteht, die ersetzt werden sollen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung vorzunehmen. Bezüglich des Umfangs einer zur Anerkennung vorgelegten Studienleistung (Anrechnung) werden die Grundsätze des ECTS herangezogen.

**(2)** Die Studierenden haben die für die Anerkennung erforderlichen Unterlagen vorzulegen. Studierende, die neu in den Masterstudiengang Technische Volkswirtschaftslehre immatrikuliert wurden, haben den Antrag mit den für die Anerkennung erforderlichen Unterlagen innerhalb eines Semesters nach Immatrikulation zu stellen. Bei Unterlagen, die nicht in deutscher oder englischer Sprache vorliegen, kann eine amtlich beglaubigte Übersetzung verlangt werden. Die Beweislast dafür, dass der Antrag die Voraussetzungen für die Anerkennung nicht erfüllt, liegt beim Prüfungsausschuss.

**(3)** Werden Leistungen angerechnet, die nicht am KIT erbracht wurden, werden sie im Zeugnis als „anerkannt" ausgewiesen. Liegen Noten vor, werden die Noten, soweit die Notensysteme vergleichbar sind, übernommen und in die Berechnung der Modulnoten und der Gesamtnote einbezogen. Sind die Notensysteme nicht vergleichbar, können die Noten umgerechnet werden. Liegen keine Noten vor, wird der Vermerk „bestanden" aufgenommen.

**(4)** Bei der Anerkennung von Studien- und Prüfungsleistungen, die außerhalb der Bundesrepublik Deutschland erbracht wurden, sind die von der Kultusministerkonferenz und der Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen der Hochschulpartnerschaften zu beachten.

**(5)** Außerhalb des Hochschulsystems erworbene Kenntnisse und Fähigkeiten werden angerechnet, wenn sie nach Inhalt und Niveau den Studien- und Prüfungsleistungen gleichwertig sind, die ersetzt werden sollen und die Institution, in der die Kenntnisse und Fähigkeiten erworben wurden, ein genormtes Qualitätssicherungssystem hat. Die Anrechnung kann in Teilen versagt werden, wenn mehr als 50 Prozent des Hochschulstudiums ersetzt werden soll.

**(6)** Zuständig für Anerkennung und Anrechnung ist der Prüfungsausschuss. Im Rahmen der Feststellung, ob ein wesentlicher Unterschied im Sinne des Absatz 1 vorliegt, sind die zuständi-

gen Fachvertreter/innen zu hören. Der Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.

## II. Masterprüfung

### § 19 Umfang und Art der Masterprüfung

**(1)** Die Masterprüfung besteht aus den Modulprüfungen nach Absatz 2 sowie der Modul Masterarbeit.

**(2)** Es sind Modulprüfungen in folgenden Pflichtfächern abzulegen:

| | | |
|---|---|---|
| 1. Volkswirtschaftslehre: | Modul(e) im Umfang von | 18 LP, |
| 2. Betriebswirtschaftslehre: | Modul(e) im Umfang von | 9 LP, |
| 3. Informatik: | Modul(e) im Umfang von | 9 LP, |
| 4. Operations Research: | Modul(e) im Umfang von | 9 LP, |
| 5. Wahlpflichtbereich 1: | Modul(e) im Umfang von | 27 LP, |
| 6. Wahlpflichtbereich 2: | Modul(e) im Umfang von | 18 LP. |

Die Festlegung der zur Auswahl stehenden Module und deren Fachzuordnung werden im Modulhandbuch getroffen.

### § 20 Bestehen der Masterprüfung, Bildung der Gesamtnote

**(1)** Die Masterprüfung ist bestanden, wenn alle in § 19 genannten Modulprüfungen mindestens mit „ausreichend" bewertet wurden.

**(2)** Die Gesamtnote der Masterprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt der Fachnoten und dem Modul Masterarbeit.

**(3)** Haben Studierende die Masterarbeit mit der Note 1,0 und die Masterprüfung mit einem Durchschnitt von 1,1 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung" (with distinction) verliehen.

### § 21 Masterzeugnis, Masterurkunde, Diploma Supplement und Transcript of Records

**(1)** Über die Masterprüfung werden nach Bewertung der letzten Prüfungsleistung eine Masterurkunde und ein Zeugnis erstellt. Die Ausfertigung von Masterurkunde und Zeugnis soll nicht später als drei Monate nach Ablegen der letzten Prüfungsleistung erfolgen. Masterurkunde und Masterzeugnis werden in deutscher und englischer Sprache ausgestellt. Masterurkunde und Zeugnis tragen das Datum der erfolgreichen Erbringung der letzten Prüfungsleistung. Diese Dokumente werden den Studierenden zusammen ausgehändigt. In der Masterurkunde wird die Verleihung des akademischen Mastergrades beurkundet. Die Masterurkunde wird von dem Präsidenten und der KIT-Dekanin/ dem KIT-Dekan der KIT-Fakultät für Wirtschaftswissenschaften unterzeichnet und mit dem Siegel des KIT versehen.

**(2)** Das Zeugnis enthält die Fach- und Modulnoten sowie die den Modulen und Fächern zugeordnete Leistungspunkte und die Gesamtnote. Sofern gemäß § 7 Abs. 2 Satz 2 eine differenzierte Bewertung einzelner Prüfungsleitungen vorgenommen wurde, wird auf dem Zeugnis auch die entsprechende Dezimalnote ausgewiesen; § 7 Abs. 4 bleibt unberührt. Das Zeugnis ist von der KIT-Dekanin/ dem KIT-Dekan der KIT-Fakultät für Wirtschaftswissenschaften und von der/dem Vorsitzenden des Prüfungsausschusses zu unterzeichnen.

**(3)** Mit dem Zeugnis erhalten die Studierenden ein Diploma Supplement in deutscher und englischer Sprache, das den Vorgaben des jeweils gültigen ECTS Users' Guide entspricht, sowie ein Transcript of Records in deutscher und englischer Sprache.

**(4)** Das Transcript of Records enthält in strukturierter Form alle erbrachten Studien- und Prüfungsleistungen. Dies beinhaltet alle Fächer und Fachnoten samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten und zugeordneten Leistungspunkten sowie die den Modulen zugeordneten Erfolgskontrollen samt Noten und zugeordneten Leistungspunkten. Absatz 2 Satz 2 gilt entsprechend. Aus dem Transcript of Records soll die Zugehörigkeit von Lehrveranstaltungen zu den einzelnen Modulen deutlich erkennbar sein. Angerechnete Studien- und Prüfungsleistungen sind im Transcript of Records aufzunehmen. Alle Zusatzleistungen werden im Transcript of Records aufgeführt.

**(5)** Die Masterurkunde, das Masterzeugnis und das Diploma Supplement einschließlich des Transcript of Records werden vom Studierendenservice des KIT ausgestellt.

## III. Schlussbestimmungen

### § 22 Bescheinigung von Prüfungsleistungen

Haben Studierende die Masterprüfung endgültig nicht bestanden, wird ihnen auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Studien- und Prüfungsleistungen und deren Noten enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

### § 23 Aberkennung des Mastergrades

**(1)** Haben Studierende bei einer Prüfungsleistung getäuscht und wird diese Tatsache nach der Aushändigung des Zeugnisses bekannt, so können die Noten der Modulprüfungen, bei denen getäuscht wurde, berichtigt werden. Gegebenenfalls kann die Modulprüfung für „nicht ausreichend" (5,0) und die Masterprüfung für „nicht bestanden" erklärt werden.

**(2)** Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass die/der Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat die/der Studierende die Zulassung vorsätzlich zu Unrecht erwirkt, so kann die Modulprüfung für „nicht ausreichend" (5,0) und die Masterprüfung für „nicht bestanden" erklärt werden.

**(3)** Vor einer Entscheidung des Prüfungsausschusses ist Gelegenheit zur Äußerung zu geben.

**(4)** Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Mit dem unrichtigen Zeugnis ist auch die Masterurkunde einzuziehen, wenn die Masterprüfung aufgrund einer Täuschung für „nicht bestanden" erklärt wurde.

**(5)** Eine Entscheidung nach Absatz 1 und Absatz 2 Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Zeugnisses ausgeschlossen.

**(6)** Die Aberkennung des akademischen Grades richtet sich nach § 36 Abs. 7 LHG.

### § 24 Einsicht in die Prüfungsakten

**(1)** Nach Abschluss der Masterprüfung wird den Studierenden auf Antrag innerhalb eines Jahres Einsicht in das Prüfungsexemplar ihrer Masterarbeit, die darauf bezogenen Gutachten und in die Prüfungsprotokolle gewährt.

**(2)** Für die Einsichtnahme in die schriftlichen Modulprüfungen, schriftlichen Modulteilprüfungen bzw. Prüfungsprotokolle gilt eine Frist von einem Monat nach Bekanntgabe des Prüfungsergebnisses.

**(3)** Der/die Prüfende bestimmt Ort und Zeit der Einsichtnahme.

**(4)** Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

**§ 25 Inkrafttreten, Übergangsvorschriften**

**(1)** Diese Studien- und Prüfungsordnung tritt am 01. Oktober 2015 in Kraft und gilt für

1. Studierende, die ihr Studium im Masterstudiengang Technische Volkswirtschaftslehre am KIT im ersten Fachsemester aufnehmen, sowie

2. Studierende, die ihr Studium im Masterstudiengang Technische Volkswirtschaftslehre am KIT in einem höheren Fachsemester aufnehmen, sofern dieses Fachsemester nicht über dem Fachsemester liegt, das der erste Jahrgang nach Ziff. 1 erreicht.

**(2)** Die Studien- und Prüfungsordnung des KIT für den Masterstudiengang Technische Volkswirtschaftslehre vom 06. März 2007 (Amtliche Bekanntmachung des KIT Nr. 36 vom 11. Juni 2007), zuletzt geändert durch Satzung vom 27. März 2014 (Amtliche Bekanntmachung des KIT Nr. 19 vom 28. März 2014), behält Gültigkeit für

1. Studierende, die ihr Studium im Masterstudiengang Technische Volkswirtschaftslehre am KIT zuletzt im Sommersemester 2015 aufgenommen haben, sowie

2. Studierende, die ihr Studium im Masterstudiengang Technische Volkswirtschaftslehre am KIT ab dem Wintersemester 2015/16 in einem höheren Fachsemester aufnehmen, sofern das Fachsemester über dem liegt, das der erste Jahrgang nach Absatz 1 Ziff. 1, erreicht hat. Im Übrigen tritt sie außer Kraft.

**(3)** Studierende, die auf Grundlage der Studien- und Prüfungsordnung des KIT für den Masterstudiengang Technische Volkswirtschaftslehre vom 06. März 2007 (Amtliche Bekanntmachung des KIT Nr. 36 vom 11. Juni 2007), zuletzt geändert durch Satzung vom 27. März 2014 (Amtliche Bekanntmachung des KIT Nr. 19 vom 28. März 2014), ihr Studium am KIT aufgenommen haben, können Prüfungen auf Grundlage dieser Studien- und Prüfungsordnung letztmalig bis zum Ende des Prüfungszeitraum des Wintersemesters 2019/20 ablegen.

Karlsruhe, den 24. September 2015

*Professor Dr.-Ing. Holger Hanselka*
*(Präsident)*

# Prüfungs- und Studienordnung der Universität Karlsruhe (TH) für den Masterstudiengang Technische Volkswirtschaftslehre

Aufgrund von § 34 Absatz 1 Satz 1 des Landeshochschulgesetzes (LHG) vom 1. Januar 2005 hat der Senat der Universität Karlsruhe (TH) am 26.02.2007 die folgende Studien- und Prüfungsordnung für den Masterstudiengang Technische Volkswirtschaftslehre beschlossen.

Der Rektor hat seine Zustimmung am 06.03.2007 erteilt.

In dieser Satzung ist nur die männliche Sprachform gewählt worden. Alle personenbezogenen Aussagen gelten jedoch stets für Frauen und Männer gleichermaßen.

## Inhaltsverzeichnis

# I. Allgemeine Bestimmungen

### § 1 Geltungsbereich, Ziele

(1) Diese Masterprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Masterstudiengang Technische Volkswirtschaftslehre an der Universität Karlsruhe (TH).

(2) Im Masterstudium sollen die im Bachelorstudium erworbenen wissenschaftlichen Qualifikationen weiter vertieft oder ergänzt werden. Der Studierende soll in der Lage sein, die wissenschaftlichen Erkenntnisse und Methoden selbstständig anzuwenden und ihre Bedeutung und Reichweite für die Lösung komplexer wissenschaftlicher und gesellschaftlicher Problemstellungen zu bewerten.

### § 2 Akademischer Grad

Aufgrund der bestandenen Masterprüfung wird der akademische Grad „Master of Science" (abgekürzt: „M.Sc.") für den Masterstudiengang Technische Volkswirtschaftslehre verliehen.

### § 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Die Regelstudienzeit beträgt vier Semester. Sie umfasst Prüfungen und die Masterarbeit.

(2) Die im Studium zu absolvierenden Lehrinhalte sind auf Fächer verteilt. Die Fächer sind in Module gegliedert, die jeweils aus einer Lehrveranstaltung oder mehreren thematisch und zeitlich aufeinander bezogenen Lehrveranstaltungen bestehen. Studienplan oder Modulhandbuch beschreiben Art, Umfang und Zuordnung der Module zu einem Fach sowie die Möglichkeiten, Module untereinander zu kombinieren. Die Fächer und ihr Umfang werden in § 16 definiert.

(3) Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (Credits) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem ECTS (European Credit Transfer System). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Stunden.

(4) Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studienleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 120 Leistungspunkte.

(5) Die Leistungspunkte sind in der Regel gleichmäßig auf die Semester zu verteilen.

(6) Lehrveranstaltungen/Prüfungen können auch in englischer Sprache angeboten/abgenommen werden.

### § 4 Aufbau der Prüfungen

(1) Die Masterprüfung besteht aus einer Masterarbeit, Fachprüfungen und einem Seminarmodul. Jede der Fachprüfungen besteht aus einer oder mehreren Modulprüfungen. Eine Modulprüfung kann in mehrere Modulteilprüfungen untergliedert sein. Eine Modul(teil)prüfung besteht aus mindestens einer Erfolgskontrolle nach Absatz 2 Nr. 1 und 2. Ausgenommen hiervon sind Seminarmodule.

(2) Erfolgskontrollen sind:

1. schriftliche Prüfungen,

2. mündliche Prüfungen,

3. Erfolgskontrollen anderer Art.

Erfolgskontrollen anderer Art sind z. B. Vorträge, Marktstudien, Projekte, Fallstudien, Experimente, schriftliche Arbeiten, Berichte, Seminararbeiten und Klausuren, sofern sie nicht als schriftliche oder mündliche Prüfung in der Modul- oder Lehrveranstaltungsbeschreibung im Modulhandbuch ausgewiesen sind.

(3) In den Fachprüfungen (nach § 16 Absatz 2 Nr. 1 bis 6) sind mindestens 50 vom Hundert einer Modulprüfung in Form von schriftlichen oder mündlichen Prüfungen (Absatz 2 Nr. 1 und 2) abzulegen, die restliche Prüfung erfolgt durch Erfolgskontrollen anderer Art (Absatz 2 Nr. 3).

## § 5 Anmeldung und Zulassung zu den Prüfungen

(1) Die Zulassung zu den Prüfungen nach § 4 Absatz 2 Nr. 1 und 2 sowie zur Masterarbeit erfolgt im Studienbüro.

Um zu Prüfungen in einem Modul zugelassen zu werden, muss beim Studienbüro eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach, wenn diese Wahlmöglichkeit besteht, abgegeben werden.

(2) Die Zulassung darf nur abgelehnt werden, wenn der Studierende in einem mit Technischer Volkswirtschaftslehre vergleichbaren oder einem verwandten Studiengang bereits eine Diplomvorprüfung, Diplomprüfung, Bachelor- oder Masterprüfung endgültig nicht bestanden hat, sich in einem Prüfungsverfahren befindet oder den Prüfungsanspruch in einem solchen Studiengang verloren hat.

In Zweifelsfällen entscheidet der Prüfungsausschuss.

## § 6 Durchführung von Prüfungen und Erfolgskontrollen

(1) Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

(2) Die Art der Erfolgskontrollen (§ 4 Absatz 2 Nr. 1 bis 3) eines Moduls wird im Studienplan oder Modulhandbuch in Bezug auf die Lehrinhalte der betreffenden Lehrveranstaltungen und die Lehrziele des Moduls festgelegt. Die Art der Erfolgskontrollen, ihre Häufigkeit, Reihenfolge und Gewichtung, die Grundsätze zur Bildung der Modulteilprüfungsnoten und der Modulnote sowie Prüfer müssen mindestens sechs Wochen vor Semesterbeginn bekannt gegeben werden. Im Einvernehmen von Prüfer und Studierendem kann die Art der Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch § 4 Absatz 3 zu berücksichtigen.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfung auch mündlich oder eine mündlich durchzuführende Prüfung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfung bekannt gegeben werden.

Bei Einvernehmen zwischen Prüfer und Kandidat kann der Prüfungsausschuss in begründeten Ausnahmefällen auch kurzfristig die Änderung der Prüfungsform genehmigen.

Wird die Wiederholungsprüfung einer schriftlichen Prüfung in mündlicher Form abgelegt, entfällt die mündliche Nachprüfung nach § 8 Absatz 2.

(4) Macht ein Studierender glaubhaft, dass er wegen länger andauernder oder ständiger körperlicher Behinderung nicht in der Lage ist, die Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen Form abzulegen, entscheidet der Prüfungsausschuss über eine alternative Form der Erfolgskontrollen.

(5) Bei Lehrveranstaltungen in englischer Sprache werden die entsprechenden Erfolgskontrollen in der Regel in englischer Sprache abgenommen.

(6) Schriftliche Prüfungen (§ 4 Absatz 2 Nr. 1) sind in der Regel von zwei Prüfern nach § 14 Absatz 2 oder § 14 Absatz 3 zu bewerten. Die Note ergibt sich aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 7 Absatz 2 Satz 2 definierten Notenstufen, so ist auf die nächstliegende Notenstufe zu runden. Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Einzelprüfungen dauern in der Regel mindestens 60 und höchstens 240 Minuten.

(7) Mündliche Prüfungen (§ 4 Absatz 2 Nr. 2) sind von mehreren Prüfern (Kollegialprüfung) oder von einem Prüfer in Gegenwart eines Beisitzenden als Gruppen- oder Einzelprüfungen abzu-

nehmen und zu bewerten. Vor der Festsetzung der Note hört der Prüfer die anderen an der Kollegialprüfung mitwirkenden Prüfer an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 45 Minuten pro Studierendem.

(8) Die wesentlichen Gegenstände und Ergebnisse der mündlichen Prüfung in den einzelnen Fächern sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist dem Studierenden im Anschluss an die mündliche Prüfung bekannt zu geben.

(9) Studierende, die sich in einem späteren Prüfungszeitraum der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen als Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse. Aus wichtigen Gründen oder auf Antrag des Studierenden ist die Zulassung zu versagen.

(10) Für Erfolgskontrollen anderer Art sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Studienleistung dem Studierenden zurechenbar ist.

(11) Schriftliche Arbeiten im Rahmen einer Erfolgskontrolle anderer Art haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde." Trägt die Arbeit diese Erklärung nicht, wird diese Arbeit nicht angenommen.

(12) Bei mündlich durchgeführten Erfolgskontrollen anderer Art muss neben dem Prüfer ein Beisitzer anwesend sein, der zusätzlich zum Prüfer die Protokolle zeichnet.

## § 7 Bewertung von Prüfungen und Erfolgskontrollen

(1) Das Ergebnis einer Erfolgskontrolle wird von den jeweiligen Prüfern in Form einer Note festgesetzt.

(2) Im Masterzeugnis dürfen nur folgende Noten verwendet werden:

| 1 | = | sehr gut (very good) | = | hervorragende Leistung |
| 2 | = | gut (good) | = | eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt |
| 3 | = | befriedigend (satisfactory) | = | eine Leistung, die durchschnittlichen Anforderungen entspricht |
| 4 | = | ausreichend (sufficient) | = | eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt |
| 5 | = | nicht ausreichend (failed) | = | eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt |

Für die Masterarbeit und die Modulteilprüfungen sind zur differenzierten Bewertung nur folgende Noten zugelassen:

| 1 | = | 1.0, 1.3 | = | sehr gut |
| 2 | = | 1.7, 2.0, 2.3 | = | gut |
| 3 | = | 2.7, 3.0, 3.3 | = | befriedigend |
| 4 | = | 3.7, 4.0 | = | ausreichend |
| 5 | = | 4.7, 5.0 | = | nicht ausreichend |

Diese Noten müssen in den Protokollen und in den Anlagen (Transcript of Records und Diploma Supplement) verwendet werden.

(3) Für Erfolgskontrollen anderer Art kann die Benotung „bestanden" (passed) oder „nicht bestanden" (failed) vergeben werden.

(4) Bei der Bildung der gewichteten Durchschnitte der Fachnoten, Modulnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

(5) Jedes Modul, jede Lehrveranstaltung und jede Erfolgskontrolle darf jeweils nur einmal angerechnet werden.

(6) Erfolgskontrollen anderer Art dürfen in Modulteilprüfungen oder Modulprüfungen nur eingerechnet werden, wenn die Benotung nicht nach Absatz 3 erfolgt ist. Die zu dokumentierenden Erfolgskontrollen und die daran geknüpften Bedingungen werden im Studienplan oder Modulhandbuch festgelegt.

(7) Eine Modulteilprüfung ist bestanden, wenn die Note mindestens „ausreichend" (4.0) ist.

(8) Eine Modulprüfung ist dann bestanden, wenn die Modulnote mindestens „ausreichend" (4.0) ist. Die Modulprüfung und die Bildung der Modulnote werden im Studienplan oder Modulhandbuch geregelt. Die differenzierten Noten der betreffenden Erfolgskontrollen sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden. Enthält der Studienplan oder das Modulhandbuch keine Regelung darüber, wann eine Modulprüfung bestanden ist, so ist diese Modulprüfung dann bestanden, wenn alle dem Modul zugeordneten Modulteilprüfungen bestanden wurden.

(9) Eine Fachprüfung ist bestanden, wenn die für das Fach erforderliche Anzahl von Leistungspunkten über die im Studienplan oder Modulhandbuch definierten Modulprüfungen nachgewiesen wird.

Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

(10) Die Ergebnisse der Masterarbeit, der Modulprüfungen bzw. der Modulteilprüfungen, der Erfolgskontrollen anderer Art sowie die erworbenen Leistungspunkte werden durch das Studienbüro der Universität erfasst.

(11) Innerhalb der Regelstudienzeit, einschließlich der Urlaubssemester für das Studium an einer ausländischen Hochschule (Regelprüfungszeit), können in einem Fach auch mehr Leistungspunkte erworben werden als für das Bestehen der Fachprüfung erforderlich sind. In diesem Fall werden bei der Festlegung der Fachnote nur die Modulnoten berücksichtigt, die unter Abdeckung der erforderlichen Leistungspunkte die beste Fachnote ergeben.

Die in diesem Sinne für eine Fachprüfung nicht gewerteten Erfolgskontrollen und Leistungspunkte können im Rahmen der Zusatzfachprüfung nach § 12 nachträglich geltend gemacht werden.

(12) Die Gesamtnote der Masterprüfung, die Fachnoten und die Modulnoten lauten:

| bis 1,5 | = | sehr gut |
|---|---|---|
| 1.6 bis 2.5 | = | gut |
| 2.6 bis 3.5 | = | befriedigend |
| 3.6 bis 4.0 | = | ausreichend |

(13) Zusätzlich zu den Noten nach Absatz 2 werden ECTS-Noten für Fachprüfungen, Modulprüfungen und für die Masterprüfung nach folgender Skala vergeben:

| ECTS-Note | Quote | Definition |
|---|---|---|
| A | 10 | gehört zu den besten 10 % der Studierenden, die die Erfolgskontrolle bestanden haben |
| B | 25 | gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben |
| C | 30 | gehört zu den nächsten 30 % der Studierenden, die die Erfolgskontrolle bestanden haben |
| D | 25 | gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben |
| E | 10 | gehört zu den letzten 10 % der Studierenden, die die Erfolgskontrolle bestanden haben |
| FX | | nicht bestanden (failed) – es sind Verbesserungen erforderlich, bevor die Leistungen anerkannt werden |
| F | | nicht bestanden (failed) – es sind erhebliche Verbesserungen erforderlich |

Die Quote ist als der Prozentsatz der erfolgreichen Studierenden definiert, die diese Note in der Regel erhalten. Dabei ist von einer mindestens fünfjährigen Datenbasis über mindestens 30 Studierende auszugehen. Für die Ermittlung der Notenverteilungen, die für die ECTS-Noten erforderlich sind, ist das Studienbüro der Universität zuständig.


**§ 8 Erlöschen des Prüfungsanspruchs, Wiederholung von Prüfungen und Erfolgskontrollen**

(1) Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nr. 1) einmal wiederholen. Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend" bewertet, so findet eine mündliche Nachprüfung im zeitlichen Zusammenhang mit dem Termin der nicht bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als 4.0 (ausreichend) sein.

(2) Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nr. 2) einmal wiederholen.

(3) Wiederholungsprüfungen nach Absatz 1 und Absatz 2 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten entsprechen. Ausnahmen kann der Prüfungsausschuss auf Antrag zulassen. Fehlversuche an anderen Hochschulen sind anzurechnen.

(4) Die Wiederholung einer Erfolgskontrolle anderer Art (§ 4 Absatz 2 Nr. 3) wird im Modulhandbuch geregelt.

(5) Eine zweite Wiederholung derselben schriftlichen oder mündlichen Prüfung ist nur in Ausnahmefällen zulässig. Einen Antrag auf Zweitwiederholung hat der Studierende schriftlich beim Prüfungsausschuss zu stellen. Über den ersten Antrag auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet der Rektor. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses der Rektor. Absatz 1 Satz 2 und Satz 3 gilt entsprechend.

Bei nicht bestandener Erfolgskontrolle sind dem Kandidaten Umfang und Frist der Wiederholung in geeigneter Weise bekannt zu machen.

(6) Die Wiederholung einer bestandenen Erfolgskontrolle ist nicht zulässig.

(7) Eine Fachprüfung ist nicht bestanden, wenn mindestens ein Modul des Faches nicht bestanden ist.

(8) Die Masterarbeit kann bei einer Bewertung mit „nicht ausreichend" einmal wiederholt werden. Eine zweite Wiederholung der Masterarbeit ist ausgeschlossen.

(9) Ist gemäß § 34 Absatz 2 Satz 3 LHG die Masterprüfung bis zum Beginn der Vorlesungszeit des achten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang, es sei denn, dass der Studierende die Fristüberschreitung nicht zu vertreten hat. Die Entscheidung darüber trifft der Prüfungsausschuss.

(10) Der Prüfungsanspruch erlischt endgültig, wenn mindestens einer der folgenden Gründe vorliegt:

1.  Der Prüfungsausschuss lehnt einen Antrag auf Fristverlängerung nach Absatz 9 ab.

2.  Die Masterarbeit ist endgültig nicht bestanden.

3.  Eine Erfolgskontrolle nach § 4 Absatz 2 Nr. 1 und 2 ist in einem Fach endgültig nicht bestanden.

4.  Der Prüfungsausschuss hat dem Studierenden nach § 9 Absatz 5 den Prüfungsanspruch entzogen.

Eine Erfolgskontrolle ist dann endgültig nicht bestanden, wenn keine Wiederholungsmöglichkeit im Sinne von Absatz 2 mehr besteht oder gemäß Absatz 5 genehmigt wird. Dies gilt auch sinngemäß für die Masterarbeit.

### § 9 Versäumnis, Rücktritt, Täuschung, Ordnungsverstoß

(1) Der Studierende kann bei Erfolgskontrollen gemäß § 4 Absatz 2 Nr. 1 ohne Angabe von Gründen noch vor Ausgabe der Prüfungsaufgaben zurücktreten. Bei mündlichen Erfolgskontrollen muss der Rücktritt spätestens drei Werktage vor dem betreffenden Prüfungstermin erklärt werden. Die verbindlichen Regelungen zur ordentlichen Abmeldung werden gemäß § 6 Absatz 2 bekannt gegeben. Eine durch Widerruf abgemeldete Prüfung gilt als nicht angemeldet.

(2) Eine Modulprüfung wird mit „nicht ausreichend" bewertet, wenn der Studierende einen Prüfungstermin ohne triftigen Grund versäumt oder wenn er nach Beginn der Prüfung ohne triftigen Grund von der Prüfung zurücktritt. Dasselbe gilt, wenn die Masterarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der Studierende hat die Fristüberschreitung nicht zu vertreten.

(3) Der für den Rücktritt nach Beginn der Prüfung oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des Studierenden oder eines von ihm allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen, kann in Zweifelsfällen die Vorlage des Attestes eines vom Prüfungsausschuss benannten Arztes oder ein amtsärztliches Attest verlangt werden.

Die Anerkennung des Rücktritts ist ausgeschlossen, wenn bis zum Eintritt des Hinderungsgrundes bereits Prüfungsleistungen erbracht worden sind und nach deren Ergebnis die Prüfung nicht bestanden werden kann.

Wird der Grund anerkannt, wird ein neuer Termin anberaumt. Die bereits vorliegenden Prüfungsergebnisse sind in diesem Fall anzurechnen.

Bei Modulprüfungen, die aus mehreren Prüfungen bestehen, werden die Prüfungsleistungen dieses Moduls, die bis zu einem anerkannten Rücktritt bzw. einem anerkannten Versäumnis einer Prüfungsleistung dieses Moduls erbracht worden sind, angerechnet.

(4) Versucht der Studierende das Ergebnis einer Erfolgskontrolle durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend" (5.0) bewertet.

(5) Ein Studierender, der den ordnungsgemäßen Ablauf der Prüfung stört, kann vom jeweiligen Prüfer oder der aufsichtsführenden Person von der Fortsetzung der Modulprüfung ausgeschlossen werden. In diesem Fall wird die betreffende Prüfungsleistung mit „nicht ausreichend" (5.0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss den Studierenden von der Erbringung weiterer Prüfungsleistungen ausschließen.

(6) Der Studierende kann innerhalb einer Frist von einem Monat verlangen, dass Entscheidungen gemäß Absatz 4 und Absatz 5 vom Prüfungsausschuss überprüft werden. Belastende Entscheidungen des Prüfungsausschusses sind unverzüglich schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben.

(7) Näheres regelt die Allgemeine Satzung der Universität Karlsruhe (TH) zur Redlichkeit bei Prüfungen und Praktika.

### § 10 Mutterschutz, Elternzeit

(1) Auf Antrag sind die Mutterschutzfristen, wie sie im jeweils gültigen Gesetz zum Schutz der erwerbstätigen Mutter (MuSchG) festgelegt sind, entsprechend zu berücksichtigen. Dem Antrag sind die erforderlichen Nachweise beizufügen. Die Mutterschutzfristen unterbrechen jede Frist nach dieser Prüfungsordnung. Die Dauer des Mutterschutzes wird nicht in die Frist eingerechnet.

(2) Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweiligen gültigen Gesetzes (BErzGG) auf Antrag zu berücksichtigen. Der Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem er die Elternzeit antreten will, dem Prüfungsausschuss unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum er Elternzeit in Anspruch nehmen will. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einem Arbeitnehmer den Anspruch auf Elternzeit auslösen würden, und teilt dem Studierenden das Ergebnis sowie die neu festgesetzten Prüfungszeiten unverzüglich mit. Die Bearbeitungszeit der Masterarbeit kann nicht durch Elternzeit unterbrochen werden. Die gestellte Arbeit gilt als nicht vergeben. Nach Ablauf der Elternzeit erhält der Studierende ein neues Thema.

### § 11 Masterarbeit

(1) Voraussetzung für die Zulassung zur Masterarbeit ist, dass der Studierende sich in der Regel im 2. Studienjahr befindet und nicht mehr als vier der Fachprüfungen laut § 16 Absatz 2 Nr. 1 bis 6 noch nachzuweisen sind.

Vor Zulassung sind Betreuer, Thema und Anmeldedatum dem Prüfungsausschuss bekannt zu geben und im Falle einer Betreuung außerhalb der Fakultät für Wirtschaftswissenschaften durch den Prüfungsausschuss zu genehmigen.

Auf Antrag des Studierenden sorgt der Vorsitzende des Prüfungsausschusses dafür, dass der Studierende innerhalb von vier Wochen nach Antragstellung von einem Betreuer ein Thema für die Masterarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über den Vorsitzenden des Prüfungsausschusses.

(2) Thema, Aufgabenstellung und Umfang der Masterarbeit sind vom Betreuer so zu begrenzen, dass sie mit dem in Absatz 3 festgelegten Arbeitsaufwand bearbeitet werden kann.

(3) Der Masterarbeit werden 30 Leistungspunkte zugeordnet. Die empfohlene Bearbeitungsdauer beträgt sechs Monate. Die maximale Bearbeitungsdauer beträgt einschließlich einer Verlängerung neun Monate. Die Masterarbeit soll zeigen, dass der Studierende in der Lage ist, ein Problem aus seinem Fach selbstständig und in begrenzter Zeit nach wissenschaftlichen Methoden zu bearbeiten. Sie kann auch in englischer Sprache abgefasst werden.

(4) Die Masterarbeit kann von jedem Prüfer nach § 14 Absatz 2 vergeben und betreut werden. Soll die Masterarbeit außerhalb der Fakultät angefertigt werden, so bedarf dies der Genehmigung des Prüfungsausschusses gemäß Absatz 1. Dem Studierenden ist Gelegenheit zu geben,

für das Thema Vorschläge zu machen. Die Masterarbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag des einzelnen Studierenden aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach Absatz 3 erfüllt.

(5) Bei der Abgabe der Masterarbeit hat der Studierende schriftlich zu versichern, dass er die Arbeit selbstständig verfasst hat und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt hat, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht und die Satzung der Universität Karlsruhe (TH) zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet hat. Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen. Bei Abgabe einer unwahren Versicherung wird die Masterarbeit mit „nicht ausreichend" (5.0) bewertet.

(6) Der Zeitpunkt der Ausgabe des Themas der Masterarbeit und der Zeitpunkt der Abgabe der Masterarbeit sind beim Prüfungsausschuss aktenkundig zu machen. Das Thema kann nur einmal und nur innerhalb des ersten Monats der Bearbeitungszeit zurückgegeben werden. Ein neues Thema ist binnen vier Wochen zu stellen und auszugeben. Auf begründeten Antrag des Studierenden kann der Prüfungsausschuss die in Absatz 3 festgelegte Bearbeitungszeit um höchstens drei Monate verlängern. Wird die Masterarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend" bewertet, es sei denn, dass der Studierende dieses Versäumnis nicht zu vertreten hat. § 8 gilt entsprechend.

(7) Die Masterarbeit wird von einem Betreuer sowie in der Regel von einem weiteren Prüfer bewertet. Einer der beiden muss Juniorprofessor oder Professor sein. Bei nicht übereinstimmender Beurteilung der beiden Prüfer setzt der Prüfungsausschuss im Rahmen der Bewertung der beiden Prüfer die Note der Masterarbeit fest. Der Bewertungszeitraum soll acht Wochen nicht überschreiten.

## § 12 Zusatzmodule, Zusatzleistungen

(1) Der Studierende kann sich weiteren Prüfungen in Modulen unterziehen. § 3, § 4 und § 8 Absatz 10 der Prüfungsordnung bleiben davon unberührt.

(2) Maximal zwei Zusatzmodule mit jeweils mindestens neun Leistungspunkten werden auf Antrag des Studierenden in das Masterzeugnis aufgenommen und entsprechend gekennzeichnet.

Zusatzmodule müssen nicht im Studienplan oder Modulhandbuch definiert sein. Im Zweifelsfall entscheidet der Prüfungsausschuss.

Zusatzmodule werden bei der Festsetzung der Gesamtnote nicht mit einbezogen. Alle Zusatzleistungen werden im Transcript of Records automatisch aufgenommen und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein.

(3) Der Studierende hat bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

## § 13 Prüfungsausschuss

(1) Für den Masterstudiengang Technische Volkswirtschaftslehre wird ein Prüfungsausschuss gebildet. Er besteht aus fünf stimmberechtigten Mitgliedern: vier Professoren, Juniorprofessoren, Hochschul- oder Privatdozenten, einem Vertreter der Gruppe der wissenschaftlichen Mitarbeiter nach § 10 Absatz 1 Satz 2 Nr. 2 LHG und einem Vertreter der Studierenden mit beratender Stimme. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Der Vorsitzende, sein Stellvertreter, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter werden vom Fakultätsrat bestellt, die Mitglieder der Gruppe der wissenschaftlichen Mitarbeiter nach § 10 Absatz 1 Satz 2 Nr. 2 LHG und der Vertreter der Studierenden

auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Der Vorsitzende und dessen Stellvertreter müssen Professor oder Juniorprofessor sein. Der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch ein Prüfungssekretariat unterstützt.

(3) Der Prüfungsausschuss regelt die Auslegung und die Umsetzung der Prüfungsordnung in die Prüfungspraxis der Fakultät. Er achtet darauf, dass die Bestimmungen der Prüfungsordnung eingehalten werden. Er berichtet regelmäßig dem Fakultätsrat über die Entwicklung der Prüfungen und Studienzeiten sowie über die Verteilung der Fach- und Gesamtnoten und gibt Anregungen zur Reform des Studienplans und der Prüfungsordnung.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben in dringenden Angelegenheiten und für alle Regelfälle auf den Vorsitzenden des Prüfungsausschusses übertragen.

(5) Die Mitglieder des Prüfungsausschusses haben das Recht, an Prüfungen teilzunehmen. Die Mitglieder des Prüfungsausschusses, die Prüfer und die Beisitzenden unterliegen der Amtsverschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch den Vorsitzenden zur Verschwiegenheit zu verpflichten.

(6) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses ein fachlich zuständiger und von der betroffenen Fakultät zu nennender Professor, Juniorprofessor, Hochschul- oder Privatdozent hinzuzuziehen. Er hat in diesem Punkt Stimmrecht.

(7) Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung schriftlich oder zur Niederschrift an den Prüfungsausschuss zu richten. Hilft der Prüfungsausschuss dem Widerspruch nicht ab, ist er zur Entscheidung dem für die Lehre zuständigen Mitglied des Rektorats vorzulegen.

### § 14 Prüfer und Beisitzende

(1) Der Prüfungsausschuss bestellt die Prüfer und die Beisitzenden. Er kann die Bestellung dem Vorsitzenden übertragen.

(2) Prüfer sind Hochschullehrer und habilitierte Mitglieder sowie wissenschaftliche Mitarbeiter der jeweiligen Fakultät, denen die Prüfungsbefugnis übertragen wurde. Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat. Bei der Bewertung der Masterarbeit muss ein Prüfer Hochschullehrer sein.

(3) Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zum Prüfer bestellt werden, wenn die Fakultät ihnen eine diesbezügliche Prüfungsbefugnis erteilt hat.

(4) Zum Beisitzenden darf nur bestellt werden, wer einen dem jeweiligen Prüfungsgegenstand entsprechenden akademischen Abschluss erworben hat.

### § 15 Anrechnung von Studienzeiten, Anerkennung von Studienleistungen und Modulprüfungen

(1) Studienzeiten und gleichwertige Studienleistungen und Modulprüfungen, die in gleichen oder anderen Studiengängen an anderen Hochschulen erbracht wurden, werden auf Antrag angerechnet. Gleichwertigkeit ist festzustellen, wenn Leistungen in Inhalt, Umfang und in den Anforderungen denjenigen des Studiengangs im Wesentlichen entsprechen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung vorzunehmen. Bezüglich des Umfangs einer zur Anerkennung vorgelegten Studienleistung und Modulprüfung werden die Grundsätze des ECTS herangezogen; die inhaltliche Gleichwertigkeitsprüfung orientiert sich an den Qualifikationszielen des Moduls.

(2) Werden Leistungen angerechnet, so werden die Noten – soweit die Notensysteme vergleichbar sind – übernommen und in die Berechnung der Modulnoten und der Gesamtnote einbezogen. Falls es sich dabei um Leistungen handelt, die im Rahmen eines Auslandsstudiums erbracht werden, während der Studierende an der Universität Karlsruhe (TH) für Technische Volkswirtschaftslehre immatrikuliert ist, kann der Prüfungsausschuss für ausgewählte Sprachen die Dokumentation anerkannter Studienleistungen im Transcript of Records mit ihrer fremdsprachlichen Originalbezeichnung festlegen. Liegen keine Noten vor, wird die Leistung nicht anerkannt. Der Studierende hat die für die Anrechnung erforderlichen Unterlagen vorzulegen.

(3) Bei der Anrechnung von Studienzeiten und der Anerkennung von Studienleistungen und Modulprüfungen, die außerhalb der Bundesrepublik erbracht wurden, sind die von der Kultusministerkonferenz und der Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen der Hochschulpartnerschaften zu beachten.

(4) Absatz 1 gilt auch für Studienzeiten, Studienleistungen und Modulprüfungen, die in staatlich anerkannten Fernstudien und an anderen Bildungseinrichtungen, insbesondere an staatlichen oder staatlich anerkannten Berufsakademien erworben wurden.

(5) Die Anerkennung von Teilen der Masterprüfung kann versagt werden, wenn in einem Studiengang mehr als die Hälfte aller Erfolgskontrollen und/oder mehr als die Hälfte der erforderlichen Leistungspunkte und/oder die Masterarbeit anerkannt werden sollen.

(6) Zuständig für die Anrechnungen ist der Prüfungsausschuss. Vor Feststellungen über die Gleichwertigkeit sind die zuständigen Fachvertreter zu hören. Der Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.

## II. Masterprüfung

### § 16 Umfang und Art der Masterprüfung

(1) Die Masterprüfung besteht aus den Fachprüfungen nach Absatz 2, einem Seminarmodul nach Absatz 3 sowie der Masterarbeit nach § 11.

(2) Es sind Fachprüfungen im Umfang von neun Modulen mit je neun Leistungspunkten abzulegen. Die Module verteilen sich wie folgt auf die Fächer:

1.　　Volkswirtschaftslehre: zwei Module im Umfang von je 9 Leistungspunkten,

2.　　Betriebswirtschaftslehre: ein Modul im Umfang von 9 Leistungspunkten,

3.　　Informatik: ein Modul im Umfang von 9 Leistungspunkten,

4.　　Operations Research: ein Modul im Umfang von 9 Leistungspunkten,

5.　　Wahlbereich: vier Module im Umfang von je 9 Leistungspunkten aus den Fächern Betriebswirtschaftslehre, Volkswirtschaftslehre, Statistik, Ingenieurwissenschaften/Naturwissenschaften, Recht und Soziologie. Hierbei dürfen pro Fach höchstens zwei Module gewählt werden. Zusätzlich darf auf die Fächer Recht und Soziologie in Summe höchstens ein Modul entfallen.

(3)　Ferner sind im Rahmen des Seminarmoduls bestehend aus zwei Seminaren mindestens sechs Leistungspunkte nachzuweisen. Neben den hier im Umfang von drei Leistungspunkten vermittelten Schlüsselqualifikationen müssen zusätzliche Schlüsselqualifikationen im Umfang von mindestens drei Leistungspunkten erworben werden.

(4) Die Module, die ihnen zugeordneten Lehrveranstaltungen und Leistungspunkte sowie die Zuordnung der Module zu Fächern sind im Studienplan oder im Modulhandbuch geregelt.

Studienplan oder Modulhandbuch können auch Mehrfachmodule definieren, die aus 18 Leistungspunkten (Doppelmodul) bzw. 27 Leistungspunkten (Dreifachmodul) bestehen und für Fachprüfungen nach 1. bis 6. bei in Summe mindestens gleicher Leistungspunktezahl entsprechend anrechenbar sind. Auch die Mehrfachmodule mit ihren zugeordneten Lehrveranstaltungen, Leistungspunkten und Fächern bzw. Fächerkombinationen sind im Studienplan oder Modulhandbuch geregelt.

(5) Im Studienplan oder Modulhandbuch können darüber hinaus inhaltliche Schwerpunkte definiert werden, denen Module zugeordnet werden können.

Legen die Studierenden ihre Fachprüfungen nach Absatz 2 und 3 in Modulen ab, die nach Art und Umfang den im Studienplan oder Modulhandbuch definierten Anforderungen an diese inhaltlichen Schwerpunkte entsprechen, und wird darüber hinaus die Masterarbeit diesem inhaltlichen Schwerpunkt zugeordnet, so wird der inhaltliche Schwerpunkt auf Antrag des Studierenden in das Diploma Supplement aufgenommen.

### § 17 Bestehen der Masterprüfung, Bildung der Gesamtnote

(1) Die Masterprüfung ist bestanden, wenn alle in § 16 genannten Prüfungsleistungen mindestens mit „ausreichend" bewertet wurden.

(2) Die Gesamtnote der Masterprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt. Dabei werden die Fachprüfungen nach § 16 Absatz 2, das Seminarmodul nach § 16 Absatz 3 und die Masterarbeit nach § 11 mit ihren Leistungspunkten gewichtet.

(3) Hat der Studierende die Masterarbeit mit der Note 1.0 und die Masterprüfung mit einem Durchschnitt von 1.1 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung" (with distinction) verliehen.

### § 18 Masterzeugnis, Masterurkunde, Transcript of Records und Diploma Supplement

(1) Über die Masterprüfung wird nach Bewertung der letzten Prüfungsleistung eine Masterurkunde und ein Zeugnis erstellt. Die Ausfertigung von Masterurkunde und Zeugnis soll nicht später als sechs Wochen nach der Bewertung der letzten Prüfungsleistung erfolgen. Masterurkunde und Masterzeugnis werden in deutscher und englischer Sprache ausgestellt. Masterurkunde und Masterzeugnis tragen das Datum der letzten nachgewiesenen Prüfungsleistung. Sie werden dem Studierenden gleichzeitig ausgehändigt. In der Masterurkunde wird die Verleihung des akademischen Mastergrades beurkundet. Die Masterurkunde wird vom Rektor und vom Dekan unterzeichnet und mit dem Siegel der Universität versehen.

(2) Das Zeugnis enthält die in den Fachprüfungen, den Modulprüfungen sowie dem Seminarmodul und der Masterarbeit erzielten Noten, deren zugeordnete Leistungspunkte und ECTS-Noten und die Gesamtnote und die ihr entsprechende ECTS-Note. Das Zeugnis ist vom Dekan der Fakultät und vom Vorsitzenden des Prüfungsausschusses zu unterzeichnen.

(3) Weiterhin erhält der Studierende als Anhang ein Diploma Supplement in deutscher und englischer Sprache, das den Vorgaben des jeweils gültigen ECTS User's Guide entspricht. Das Diploma Supplement enthält eine Abschrift der Studiendaten des Studierenden (Transcript of Records) sowie auf Antrag des Studierenden einen möglichen inhaltlichen Schwerpunkt gemäß § 16 Absatz 4.

(4) Die Abschrift der Studiendaten (Transcript of Records) enthält in strukturierter Form alle erbrachten Prüfungsleistungen. Dies beinhaltet alle Fächer, Fachnoten und ihre entsprechende ECTS-Note samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten, entsprechender ECTS-Note und zugeordneten Leistungspunkten sowie die den Modulen zugeordneten Lehrveranstaltungen samt Noten und zugeordneten Leistungspunkten. Aus der Abschrift der Studiendaten soll die Zugehörigkeit von Lehrveranstaltungen zu den einzelnen Modulen und die Zugehörigkeit der Module zu den einzelnen Fächern sowie

bei entsprechendem Antrag des Studierenden zum möglichen inhaltlichen Schwerpunkt gemäß § 16 Absatz 4 deutlich erkennbar sein. Angerechnete Studienleistungen sind im Transcript of Records aufzunehmen.

(5) Die Masterurkunde, das Masterzeugnis und das Diploma Supplement einschließlich des Transcript of Records werden vom Studienbüro der Universität ausgestellt.

## III. Schlussbestimmungen

### § 19 Bescheid über Nicht-Bestehen, Bescheinigung von Prüfungsleistungen

(1) Der Bescheid über die endgültig nicht bestandene Masterprüfung wird dem Studierenden durch den Prüfungsausschuss in schriftlicher Form erteilt. Der Bescheid ist mit einer Rechtsbehelfsbelehrung zu versehen.

(2) Hat der Studierende die Masterprüfung endgültig nicht bestanden, wird ihm auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Prüfungsleistungen und deren Noten sowie die zur Prüfung noch fehlenden Prüfungsleistungen enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

### § 20 Aberkennung des Mastergrads

(1) Hat der Studierende bei einer Prüfungsleistung getäuscht und wird diese Tatsache nach der Aushändigung des Zeugnisses bekannt, so können die Noten der Modulprüfungen, bei denen getäuscht wurde, berichtigt werden. Gegebenenfalls kann die Modulprüfung für „nicht ausreichend" (5.0) und die Masterprüfung für „nicht bestanden" erklärt werden.

(2) Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass der Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat der Studierende die Zulassung vorsätzlich zu Unrecht erwirkt, so kann die Modulprüfung für „nicht ausreichend" (5.0) und die Masterprüfung für „nicht bestanden" erklärt werden.

(3) Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Mit dem unrichtigen Zeugnis ist auch die Masterurkunde einzuziehen, wenn die Masterprüfung auf Grund einer Täuschung für nicht bestanden erklärt wurde.

(5) Eine Entscheidung nach Absatz 1 und Absatz 2 Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Zeugnisses ausgeschlossen.

(6) Die Aberkennung des akademischen Grads richtet sich nach den gesetzlichen Vorschriften.

### § 21 Einsicht in die Prüfungsakten

(1) Nach Abschluss der Masterprüfung wird dem Studierenden auf Antrag innerhalb eines Jahres Einsicht in seine Masterarbeit, die darauf bezogenen Gutachten und in die Prüfungsprotokolle gewährt.

(2) Die Einsichtnahme in die schriftlichen Modulprüfungen bzw. Prüfungsprotokolle erfolgt zu einem durch den Prüfer festgelegten, angemessenen Termin innerhalb der Vorlesungszeit. Der Termin ist mit einem Vorlauf von mindestens 14 Tagen anzukündigen und angemessen bekannt zu geben.

(3) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

**§ 22 In-Kraft-Treten**

(1) Diese Studien- und Prüfungsordnung tritt am 1. Oktober 2007 in Kraft.

(2) Gleichzeitig tritt die Prüfungsordnung der Universität Karlsruhe (TH) für den Diplomstudiengang Technische Volkswirtschaftslehre vom 22. Dezember 1995, zuletzt geändert durch Satzung vom 17. September 1999 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 4 vom 9. März 2000) außer Kraft, behält jedoch ihre Gültigkeit bis zum 30. September 2013 für Prüflinge, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Studiengang Technische Volkswirtschaftslehre vom 22. Dezember 1995 ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben. Über eine Fristverlängerung darüber hinaus entscheidet der Prüfungsausschuss auf Antrag des Studierenden.

Über einen Antrag an den Prüfungsausschuss können Studierende, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Studiengang Technische Volkswirtschaftslehre vom 22. Dezember 1995 ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, ihr Studium auf Grundlage dieser Prüfungsordnung fortsetzen. Der Prüfungsausschuss stellt dabei fest, ob und wie die bisher erbrachten Prüfungsleistungen in den neuen Studienplan integriert werden können und nach welchen Bedingungen das Studium nach einem Wechsel fortgeführt werden kann.

Karlsruhe, den 06.03.2007

*Professor Dr. sc. tech. Horst Hippler*
*(Rektor)*

## Aufbau des Masterstudiengangs Technische Volkswirtschaftslehre

Die Regelstudienzeit im Masterstudiengang Technische Volkswirtschaftslehre beträgt vier Semester. Im Masterstudium sollen die im Bachelorstudium erworbenen wissenschaftlichen Qualifikationen weiter vertieft oder ergänzt werden. Der Studierende soll in die Lage versetzt werden, die wissenschaftlichen Erkenntnisse und Methoden selbstständig anzuwenden und ihre Bedeutung und Reichweite bei der Lösung komplexer wissenschaftlicher und gesellschaftlicher Problemstellungen zu bearbeiten.

Ferner sind im Rahmen des Seminarmoduls bestehend aus zwei Seminaren mindestens sechs Leistungspunkte nachzuweisen. Neben den hier im Umfang von drei Leistungspunkten vermittelten Schlüsselqualifikationen müssen zusätzliche Schlüsselqualifikationen im Umfang von mindestens drei Leistungspunkten erworben werden.

Die folgende Abbildung zeigt die Fach- und Modulstruktur und die Zuordnung der Leistungspunkte zu den Fächern. Im Wahlbereich sind aus den angegebenen Fächern vier Module zu wählen, pro Fach maximal zwei Module und in den Fächern Recht und Soziologie in Summe maximal ein Modul.

| Master | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pflichtmodule | | | | | Wahlpflichtmodule (4 aus 6) | | | | |
| Semester | VWL | VWL | BWL | INFO | OR | Seminar + SQ | STAT | VWL | BWL | Recht oder Soziol | ING/ Naturw. |
| 7. | | | | | | | | | | | |
| 8. | 9 | 9 | 9 | 9 | 9 | 6 + 3 | 9 | 9 | 9 | 9 | 9 |
| 9. | | | | | | | | | | | |
| 10. | Masterarbeit : | | | | | 30 | | | | | |
| Σ ( 6 Pflichtmodule + 4 Wahlpflichtmodule) : | | | | | 90 | | | | | | |
| Σ Master : | | | | | 120 | | | | | | |

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