Karlsruher Institut für Technologie

# Module Handbook
# Industrial Engineering and Management (M.Sc.)

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76128 Karlsruhe
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**VII Appendix: Study- and Examination Regulation SPO 2007 (2007/03/06 in german) 847**

# 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 exists 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

Every module and every course is allowed to be credited only once. The decision whether the course is assigned to one module or the other (e.g. if a course is selectable in two or more modules) is made by the student at the time of signing in for the corresponding exam. The module is **succeeded**, if the general exam of the module and/or if all of its relevant partial exams have been passed (grade min 4.0). In order to that the minimum requirement of credits of this module have been met.

### General exams and partial exams

The module exam can be taken in a general exam or several partial exams. If the module exam is offered as a general exam, the entire content of the module will be reviewed in a single exam. If the module exam exists of partial exams, the content of each course will be reviewed in corresponding partial exams. The registration for the examinations takes place online via the self-service function for students. The following functions can be accessed on
https://campus.studium.kit.edu/exams/index.php:

- Sign in and sign off exams
- Retrieve examination results
- Print transcript of records

For further and more detailed information also 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** 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 comitee 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

## 3 Contact

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

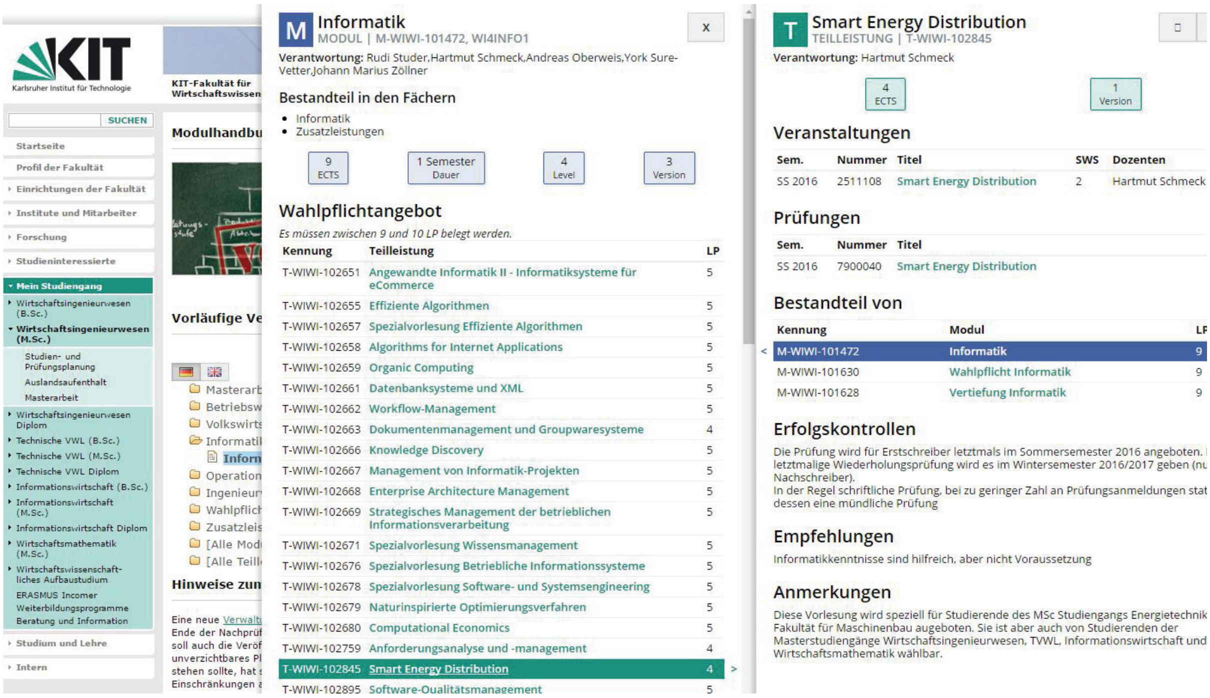
Ralf Hilser
Anabela Relvas
Phone +49 721 608-43768
E-Mail: pruefungssekretariat@wiwi.kit.edu

The team of the study program coordination informs and advises students interested in the planning of their studies:

Rebekka Braun
Phone +49 721 608-45623
E-Mail: rebekka.braun@kit.edu
Barbara Müller
Phone +49 721 608-46221
E-Mail: barbara.mueller@kit.edu

Editorial responsibility:

Dr. André Wiesner
Phone: +49 721 608-44061
Email: modul@kit.edu




Screenshot of the webbased module handbook

# Part II
# The Master's degree program in Industrial Engineering and Management

## 1 Qualification objectives

Graduates of the interdisciplinary Master's program in Industrial Engineering have advanced and in-depth knowledge in business administration, economics, computer science, operations research and engineering. This mainly has its focus on business administration and engineering. The areas of specialization depend on individual interests. Additional knowledge in statistics, law or sociology is also offered depending on one's interests.

They have generalized or specialized expertise in the different disciplines.

The graduates are in a position to define, describe and interpret the specifics, limits, terminologies and doctrines in 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 and approach issues from different angles.

They are able to select and combine appropriate courses of action for research-related topics. They can then transfer and apply these to specific problems.

They can separately analyze extensive problems such as information and current challenges and review, compare and evaluate these using appropriate methods and concepts.

They evaluate the complexity and risks, identify 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 in a team.

Karlsruhe's industrial engineers are characterized by their interdisciplinary thinking as well as their innovation and management capability. They are particularly qualified for industrial occupations, service sector or in public administration as well as a downstream scientific career (PhD).

## 2 SPO 2015

The Master's degree program in Industrial Engineering and Management (M.Sc.) has 4 terms and consists of 120 credits (CP) including Master's thesis. The master programme further deepens or complements the scientific qualifications acquired in the bachelor programme. 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 two elective modules of the following disciplines: Business science, economics, informatics, operations research, engineering science, statistics, law and sociology. In principle, both elective modules are also available in one discipline. Thereby it is 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.

<table>
<tr><th>Term</th><th>Credits</th><th>Business Administration</th><th>Economics</th><th>Informatics</th><th>Operations Research</th><th>Engineering</th><th>Electives</th><th>Master Thesis</th></tr>
<tr><td>1</td><td>28,5</td><td rowspan="2">BUS<br>9 CP</td><td rowspan="2">ECON<br>9 CP</td><td rowspan="2">INFO<br>9 CP</td><td rowspan="2">OR<br>9 CP</td><td rowspan="2">ENG<br>9 CP</td><td>Seminar Module<br>9 CP</td><td rowspan="3"></td></tr>
<tr><td>2</td><td>30</td><td>Elect. Module 1<br>9 CP</td></tr>
<tr><td>3</td><td>31,5</td><td>BUS<br>9 CP</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td>ENG<br>9 CP</td><td>Elect. Module 2<br>9 CP</td></tr>
<tr><td>4</td><td>30</td><td></td><td></td><td></td><td>Master Thesis<br>30 CP</td></tr>
<tr><td></td><td>120</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Structure of the Master Programme SPO2015 (Recommendation)

# 3 SPO 2007

The structure of the Master's degree program in Industrial Engineering and Management (M.Sc.) 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 minor specificities, summarized in illustration 3.

| 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, Engineering and **Electives**. |
| 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. |

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

| Industrial Engineering and Management (M.Sc.) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Semester | Compulsory | | | | | | | | Elective | |
| 1 | BA | BA | EC | INFO | OR | ENG | ENG | Seminar + KS | Elective | Elective |
| 2, 3 | 9 CP | 9 CP | 9 CP | 9 CP | 9 CP | 9 CP | 9 CP | 6 + 3 CP | 9 CP | 9 CP |
| 4 | Master Thesis 30 CP | | | | | | | | | |
| | **120 CP** (8 compulsory modules + 2 elective modules + Master Thesis) | | | | | | | | | |

Structure of the Master's degree program in Industrial Engineering and Management SPO 2007 (recommended)

**Soft skills**

1. Team work, social communication and creativity techniques
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 programme, 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-101650 | Module Master Thesis (S. 35) | 30 | Martin Ruckes |

## 2 Business Administration

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101410 | Business & Service Engineering (S. 98) | 9 | Christof Weinhardt |
| M-WIWI-101512 | Computational Finance (S. 59) | 9 | Maxim Ulrich |
| M-WIWI-101510 | Cross-functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 57) | 9 | Andreas Geyer-Schulz |
| M-WIWI-103117 | Data Science: Data-Driven Information Systems (S. 40) | 9 | Christof Weinhardt,Alexander Mädche |
| M-WIWI-103118 | Data Science: Data-Driven User Modeling (S. 92) | 9 | Christof Weinhardt |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 52) | 9 | Martin Klarmann |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 96) | 9 | Stefan Nickel,Wolf Fichtner |
| M-WIWI-101409 | Electronic Markets (S. 73) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 49) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 71) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 84) | 9 | Orestis Terzidis |
| M-WIWI-101482 | Finance 1 (S. 44) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101483 | Finance 2 (S. 78) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101480 | Finance 3 (S. 38) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-103120 | Financial Economics (S. 37) | 9 | Maxim Ulrich |
| M-WIWI-103121 | Financial Technology for Risk and Asset Management (S. 101) | 9 | Maxim Ulrich |
| M-WIWI-101471 | Industrial Production II (S. 47) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 42) | 9 | Frank Schultmann |
| M-WIWI-101411 | Information Engineering (S. 61) | 9 | Christof Weinhardt |
| M-WIWI-101507 | Innovation Management (S. 65) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 82) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 69) | 9 | Ute Werner |
| M-WIWI-101498 | Management Accounting (S. 51) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 90) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 94) | 9 | Martin Klarmann |
| M-WIWI-103122 | Quantitative Risk Management (S. 104) | 9 | Maxim Ulrich |
| M-WIWI-103123 | Quantitative Valuation (S. 77) | 9 | Maxim Ulrich |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 55) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 80) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 75) | 9 | Christof Weinhardt,Hansjörg Fromm |
| M-WIWI-101503 | Service Design Thinking (S. 86) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-102754 | Service Economics and Management (S. 63) | 9 | Christof Weinhardt,Gerhard Satzger |

| | | | |
|---|---|---|---|
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 67) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 102) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-101649 | Services Marketing (S. 88) | 9 | Ju-Young Kim |
| M-WIWI-101509 | Strategic Decision Making and Organization (S. 54) | 9 | Hagen Lindstädt |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 45) | 9 | Bruno Neibecker |

# 3 Economics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 124) | 9 | Berthold Wigger |
| M-WIWI-101497 | Agglomeration and Innovation (S. 127) | 9 | Ingrid Ott |
| M-WIWI-101453 | Applied Strategic Decisions (S. 120) | 9 | Johannes Philipp Reiß |
| M-WIWI-101504 | Collective Decision Making (S. 112) | 9 | Clemens Puppe |
| M-WIWI-101481 | Economic Policy II (S. 126) | 9 | Jan Kowalski |
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 110) | 9 | Kay Mitusch |
| M-WIWI-101468 | Environmental Economics (S. 115) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 122) | 9 | Johannes Philipp Reiß |
| M-WIWI-101496 | Growth and Agglomeration (S. 114) | 9 | Ingrid Ott |
| M-WIWI-101478 | Innovation and growth (S. 108) | 9 | Ingrid Ott |
| M-WIWI-101514 | Innovation Economics (S. 106) | 9 | Ingrid Ott |
| M-WIWI-101462 | Macroeconomic Theory (S. 113) | 9 | Marten Hillebrand |
| M-WIWI-101500 | Microeconomic Theory (S. 105) | 9 | Clemens Puppe |
| M-WIWI-101406 | Network Economics (S. 118) | 9 | Kay Mitusch |
| M-WIWI-101485 | Transport infrastructure policy and regional development (S. 116) | 9 | Kay Mitusch |

# 4 Informatics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101472 | Informatics (S. 128) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter,Johann Marius Zöllner |

# 5 Operations Research

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101473 | Mathematical Programming (S. 130) | 9 | Oliver Stein |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 138) | 9 | Stefan Nickel |
| M-WIWI-101415 | Operations Research in Supply Chain Management and Health Care Management (S. 134) | 9 | Stefan Nickel |

| | | | |
|---|---|---|---|
| M-WIWI-102805 | Service Operations (S. 136) | 9 | Stefan Nickel |
| M-WIWI-101454 | Stochastic Modelling and Optimization (S. 132) | 9 | Karl-Heinz Waldmann |

# 6 Engineering Sciences

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-BGU-100998 | Design, Construction, Operation and Maintenance of Highways (S. 154) | 9 | Ralf Roos |
| M-BGU-101000 | Environmental Management (S. 188) | 9 | Erhard Hoffmann,Stephan Fuchs |
| M-BGU-101064 | Fundamentals of Transportation (S. 171) | 9 | Peter Vortisch |
| M-BGU-100999 | Highway Engineering (S. 189) | 9 | Ralf Roos |
| M-BGU-101884 | Lean Management in Construction (S. 208) | 9 | Shervin Haghsheno |
| M-BGU-101110 | Process Engineering in Construction (S. 148) | 9 | Shervin Haghsheno |
| M-BGU-101113 | Project in Public Transportation (S. 159) | 9 | Eberhard Hohnecker |
| M-BGU-101888 | Project Management in Construction (S. 167) | 9 | Shervin Haghsheno |
| M-BGU-101111 | Public Transportation Operations (S. 177) | 9 | Eberhard Hohnecker |
| M-BGU-101066 | Safety, Computing and Law in Highway Engineering (S. 206) | 9 | Ralf Roos |
| M-BGU-101112 | Track Guided Transport Systems / Engineering (S. 145) | 9 | Eberhard Hohnecker |
| M-BGU-101065 | Transportation Modelling and Traffic Management (S. 140) | 9 | Peter Vortisch |
| M-BGU-101001 | Water Supply and Sanitation (S. 187) | 9 | Stephan Fuchs |
| M-CIWVT-101120 | Principles of Food Process Engineering (S. 180) | 9 | Volker Gaukel |
| M-CIWVT-101119 | Specialization in Food Process Engineering (S. 174) | 9 | Volker Gaukel |
| M-CIWVT-101121 | Water Chemistry and Water Technology I (S. 151) | 9 | Harald Horn |
| M-CIWVT-101122 | Water Chemistry and Water Technology II (S. 183) | 9 | Harald Horn |
| M-ETIT-101157 | Control Engineering II (S. 204) | 9 | Sören Hohmann |
| M-ETIT-101164 | Generation and transmission of renewable power (S. 175) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101163 | High-Voltage Technology (S. 156) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101158 | Sensor Technology I (S. 184) | 9 | Wolfgang Menesklou |
| M-ETIT-101159 | Sensor Technology II (S. 203) | 9 | Wolfgang Menesklou |
| M-MACH-101298 | Automated Manufacturing Systems (S. 202) | 9 | Jürgen Fleischer |
| M-MACH-101266 | Automotive Engineering (S. 142) | 9 | Frank Gauterin |
| M-MACH-101290 | BioMEMS (S. 185) | 9 | Volker Saile |
| M-MACH-101275 | Combustion Engines I (S. 147) | 9 | Thomas Koch,Heiko Kubach |
| M-MACH-101303 | Combustion Engines II (S. 157) | 9 | Heiko Kubach |
| M-MACH-101296 | Energy and Process Technology I (S. 162) | 9 | Heiner Wirbser |
| M-MACH-101297 | Energy and Process Technology II (S. 207) | 9 | Heiner Wirbser |
| M-MACH-101282 | Global Production and Logistics (S. 194) | 9 | Volker Schulze |
| M-MACH-101264 | Handling Characteristics of Motor Vehicles (S. 205) | 9 | Frank Gauterin |
| M-MACH-101272 | Integrated Production Planning (S. 179) | 9 | Volker Schulze |
| M-MACH-101263 | Introduction to Logistics (S. 163) | 9 | Kai Furmans |
| M-MACH-101280 | Logistics in Value Chain Networks (S. 192) | 9 | Kai Furmans |
| M-MACH-101286 | Machine Tools and Industrial Handling (S. 153) | 9 | Jürgen Fleischer |
| M-MACH-101276 | Manufacturing Technology (S. 150) | 9 | Volker Schulze |
| M-MACH-101277 | Material Flow in Logistic Systems (S. 141) | 9 | Kai Furmans |
| M-MACH-101278 | Material Flow in Networked Logistic Systems (S. 198) | 9 | Kai Furmans |

| | | | |
|---|---|---|---|
| M-MACH-101291 | Microfabrication (S. 160) | 9 | Jan Gerrit Korvink |
| M-MACH-101292 | Microoptics (S. 190) | 9 | Jan Gerrit Korvink |
| M-MACH-101287 | Microsystem Technology (S. 181) | 9 | Jan Gerrit Korvink |
| M-MACH-101267 | Mobile Machines (S. 200) | 9 | Marcus Geimer |
| M-MACH-101294 | Nanotechnology (S. 176) | 9 | Jan Gerrit Korvink |
| M-MACH-101295 | Optoelectronics and Optical Communication (S. 158) | 9 | Jan Gerrit Korvink |
| M-MACH-101284 | Specialization in Production Engineering (S. 152) | 9 | Volker Schulze |
| M-MACH-101268 | Specific Topics in Materials Science (S. 168) | 9 | Michael Hoffmann |
| M-MACH-101279 | Technical Logistics (S. 196) | 9 | Kai Furmans |
| M-MACH-101265 | Vehicle Development (S. 170) | 9 | Frank Gauterin |
| M-MACH-101283 | Virtual Engineering A (S. 165) | 9 | Jivka Ovtcharova |
| M-MACH-101281 | Virtual Engineering B (S. 143) | 9 | Jivka Ovtcharova |
| M-WIWI-101404 | Extracurricular Module in Engineering (S. 155) | 9 | Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften |
| M-WIWI-101642 | Natural Hazards and Risk Management 1 (S. 172) | 9 | Michael Kunz |
| M-WIWI-101644 | Natural Hazards and Risk Management 2 (S. 173) | 9 | Michael Kunz |

# 7 Compulsory Elective Modules

## 7.1 Seminars

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101808 | Seminar Module (S. 210) | 9 | Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften |

## 7.2 Compulsory Modules 1

### 7.2.1 Business Administration

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101410 | Business & Service Engineering (S. 98) | 9 | Christof Weinhardt |
| M-WIWI-101512 | Computational Finance (S. 59) | 9 | Maxim Ulrich |
| M-WIWI-101510 | Cross-functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 57) | 9 | Andreas Geyer-Schulz |
| M-WIWI-103117 | Data Science: Data-Driven Information Systems (S. 40) | 9 | Christof Weinhardt,Alexander Mädche |
| M-WIWI-103118 | Data Science: Data-Driven User Modeling (S. 92) | 9 | Christof Weinhardt |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 52) | 9 | Martin Klarmann |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 96) | 9 | Stefan Nickel,Wolf Fichtner |
| M-WIWI-101409 | Electronic Markets (S. 73) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 49) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 71) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 84) | 9 | Orestis Terzidis |
| M-WIWI-101482 | Finance 1 (S. 44) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101483 | Finance 2 (S. 78) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101480 | Finance 3 (S. 38) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-103120 | Financial Economics (S. 37) | 9 | Maxim Ulrich |

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|---|---|---|---|
| M-WIWI-103121 | Financial Technology for Risk and Asset Management (S. 101) | 9 | Maxim Ulrich |
| M-WIWI-101471 | Industrial Production II (S. 47) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 42) | 9 | Frank Schultmann |
| M-WIWI-101411 | Information Engineering (S. 61) | 9 | Christof Weinhardt |
| M-WIWI-101507 | Innovation Management (S. 65) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 82) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 69) | 9 | Ute Werner |
| M-WIWI-101498 | Management Accounting (S. 51) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 90) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 94) | 9 | Martin Klarmann |
| M-WIWI-103122 | Quantitative Risk Management (S. 104) | 9 | Maxim Ulrich |
| M-WIWI-103123 | Quantitative Valuation (S. 77) | 9 | Maxim Ulrich |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 55) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 80) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 75) | 9 | Christof Weinhardt,Hansjörg Fromm |
| M-WIWI-101503 | Service Design Thinking (S. 86) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-102754 | Service Economics and Management (S. 63) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 67) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 102) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-101649 | Services Marketing (S. 88) | 9 | Ju-Young Kim |
| M-WIWI-101509 | Strategic Decision Making and Organization (S. 54) | 9 | Hagen Lindstädt |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 45) | 9 | Bruno Neibecker |

### 7.2.2 Economics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 124) | 9 | Berthold Wigger |
| M-WIWI-101497 | Agglomeration and Innovation (S. 127) | 9 | Ingrid Ott |
| M-WIWI-101453 | Applied Strategic Decisions (S. 120) | 9 | Johannes Philipp Reiß |
| M-WIWI-101504 | Collective Decision Making (S. 112) | 9 | Clemens Puppe |
| M-WIWI-101481 | Economic Policy II (S. 126) | 9 | Jan Kowalski |
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 110) | 9 | Kay Mitusch |
| M-WIWI-101468 | Environmental Economics (S. 115) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 122) | 9 | Johannes Philipp Reiß |
| M-WIWI-101496 | Growth and Agglomeration (S. 114) | 9 | Ingrid Ott |
| M-WIWI-101478 | Innovation and growth (S. 108) | 9 | Ingrid Ott |
| M-WIWI-101514 | Innovation Economics (S. 106) | 9 | Ingrid Ott |
| M-WIWI-101462 | Macroeconomic Theory (S. 113) | 9 | Marten Hillebrand |
| M-WIWI-101500 | Microeconomic Theory (S. 105) | 9 | Clemens Puppe |
| M-WIWI-101406 | Network Economics (S. 118) | 9 | Kay Mitusch |
| M-WIWI-101485 | Transport infrastructure policy and regional development (S. 116) | 9 | Kay Mitusch |

### 7.2.3 Informatics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101630 | Electives in Informatics (S. 213) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter,Johann Marius Zöllner |
| M-WIWI-101628 | Emphasis in Informatics (S. 215) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter |

### 7.2.4 Operations Research

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101473 | Mathematical Programming (S. 130) | 9 | Oliver Stein |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 138) | 9 | Stefan Nickel |
| M-WIWI-101415 | Operations Research in Supply Chain Management and Health Care Management (S. 134) | 9 | Stefan Nickel |
| M-WIWI-102805 | Service Operations (S. 136) | 9 | Stefan Nickel |
| M-WIWI-101454 | Stochastic Modelling and Optimization (S. 132) | 9 | Karl-Heinz Waldmann |

### 7.2.5 Engineering Sciences

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-BGU-100998 | Design, Construction, Operation and Maintenance of Highways (S. 154) | 9 | Ralf Roos |
| M-BGU-101000 | Environmental Management (S. 188) | 9 | Erhard Hoffmann,Stephan Fuchs |
| M-BGU-101064 | Fundamentals of Transportation (S. 171) | 9 | Peter Vortisch |
| M-BGU-100999 | Highway Engineering (S. 189) | 9 | Ralf Roos |
| M-BGU-101884 | Lean Management in Construction (S. 208) | 9 | Shervin Haghsheno |
| M-BGU-101110 | Process Engineering in Construction (S. 148) | 9 | Shervin Haghsheno |
| M-BGU-101113 | Project in Public Transportation (S. 159) | 9 | Eberhard Hohnecker |
| M-BGU-101888 | Project Management in Construction (S. 167) | 9 | Shervin Haghsheno |
| M-BGU-101111 | Public Transportation Operations (S. 177) | 9 | Eberhard Hohnecker |
| M-BGU-101066 | Safety, Computing and Law in Highway Engineering (S. 206) | 9 | Ralf Roos |
| M-BGU-101112 | Track Guided Transport Systems / Engineering (S. 145) | 9 | Eberhard Hohnecker |
| M-BGU-101065 | Transportation Modelling and Traffic Management (S. 140) | 9 | Peter Vortisch |
| M-BGU-101001 | Water Supply and Sanitation (S. 187) | 9 | Stephan Fuchs |
| M-CIWVT-101120 | Principles of Food Process Engineering (S. 180) | 9 | Volker Gaukel |
| M-CIWVT-101119 | Specialization in Food Process Engineering (S. 174) | 9 | Volker Gaukel |
| M-CIWVT-101121 | Water Chemistry and Water Technology I (S. 151) | 9 | Harald Horn |
| M-CIWVT-101122 | Water Chemistry and Water Technology II (S. 183) | 9 | Harald Horn |
| M-ETIT-101157 | Control Engineering II (S. 204) | 9 | Sören Hohmann |

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|---|---|---|---|
| M-ETIT-101164 | Generation and transmission of renewable power (S. 175) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101163 | High-Voltage Technology (S. 156) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101158 | Sensor Technology I (S. 184) | 9 | Wolfgang Menesklou |
| M-ETIT-101159 | Sensor Technology II (S. 203) | 9 | Wolfgang Menesklou |
| M-MACH-101298 | Automated Manufacturing Systems (S. 202) | 9 | Jürgen Fleischer |
| M-MACH-101266 | Automotive Engineering (S. 142) | 9 | Frank Gauterin |
| M-MACH-101290 | BioMEMS (S. 185) | 9 | Volker Saile |
| M-MACH-101275 | Combustion Engines I (S. 147) | 9 | Thomas Koch,Heiko Kubach |
| M-MACH-101303 | Combustion Engines II (S. 157) | 9 | Heiko Kubach |
| M-MACH-101296 | Energy and Process Technology I (S. 162) | 9 | Heiner Wirbser |
| M-MACH-101297 | Energy and Process Technology II (S. 207) | 9 | Heiner Wirbser |
| M-MACH-101282 | Global Production and Logistics (S. 194) | 9 | Volker Schulze |
| M-MACH-101264 | Handling Characteristics of Motor Vehicles (S. 205) | 9 | Frank Gauterin |
| M-MACH-101272 | Integrated Production Planning (S. 179) | 9 | Volker Schulze |
| M-MACH-101263 | Introduction to Logistics (S. 163) | 9 | Kai Furmans |
| M-MACH-101280 | Logistics in Value Chain Networks (S. 192) | 9 | Kai Furmans |
| M-MACH-101286 | Machine Tools and Industrial Handling (S. 153) | 9 | Jürgen Fleischer |
| M-MACH-101276 | Manufacturing Technology (S. 150) | 9 | Volker Schulze |
| M-MACH-101277 | Material Flow in Logistic Systems (S. 141) | 9 | Kai Furmans |
| M-MACH-101278 | Material Flow in Networked Logistic Systems (S. 198) | 9 | Kai Furmans |
| M-MACH-101291 | Microfabrication (S. 160) | 9 | Jan Gerrit Korvink |
| M-MACH-101292 | Microoptics (S. 190) | 9 | Jan Gerrit Korvink |
| M-MACH-101287 | Microsystem Technology (S. 181) | 9 | Jan Gerrit Korvink |
| M-MACH-101267 | Mobile Machines (S. 200) | 9 | Marcus Geimer |
| M-MACH-101294 | Nanotechnology (S. 176) | 9 | Jan Gerrit Korvink |
| M-MACH-101295 | Optoelectronics and Optical Communication (S. 158) | 9 | Jan Gerrit Korvink |
| M-MACH-101284 | Specialization in Production Engineering (S. 152) | 9 | Volker Schulze |
| M-MACH-101268 | Specific Topics in Materials Science (S. 168) | 9 | Michael Hoffmann |
| M-MACH-101279 | Technical Logistics (S. 196) | 9 | Kai Furmans |
| M-MACH-101265 | Vehicle Development (S. 170) | 9 | Frank Gauterin |
| M-MACH-101283 | Virtual Engineering A (S. 165) | 9 | Jivka Ovtcharova |
| M-MACH-101281 | Virtual Engineering B (S. 143) | 9 | Jivka Ovtcharova |
| M-WIWI-101404 | Extracurricular Module in Engineering (S. 155) | 9 | Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften |
| M-WIWI-101642 | Natural Hazards and Risk Management 1 (S. 172) | 9 | Michael Kunz |
| M-WIWI-101644 | Natural Hazards and Risk Management 2 (S. 173) | 9 | Michael Kunz |

### 7.2.6 Statistics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101637 | Analytics and Statistics (S. 217) | 9 | Oliver Grothe |
| M-WIWI-101638 | Econometrics and Statistics I (S. 219) | 9 | Melanie Schienle |
| M-WIWI-101639 | Econometrics and Statistics II (S. 220) | 9 | Melanie Schienle |

## 7.3 Compulsory Modules 2

### 7.3.1 Business Administration

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101410 | Business & Service Engineering (S. 98) | 9 | Christof Weinhardt |

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|---|---|---|---|
| M-WIWI-101512 | Computational Finance (S. 59) | 9 | Maxim Ulrich |
| M-WIWI-101510 | Cross-functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 57) | 9 | Andreas Geyer-Schulz |
| M-WIWI-103117 | Data Science: Data-Driven Information Systems (S. 40) | 9 | Christof Weinhardt,Alexander Mädche |
| M-WIWI-103118 | Data Science: Data-Driven User Modeling (S. 92) | 9 | Christof Weinhardt |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 52) | 9 | Martin Klarmann |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 96) | 9 | Stefan Nickel,Wolf Fichtner |
| M-WIWI-101409 | Electronic Markets (S. 73) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 49) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 71) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 84) | 9 | Orestis Terzidis |
| M-WIWI-101482 | Finance 1 (S. 44) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101483 | Finance 2 (S. 78) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101480 | Finance 3 (S. 38) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-103120 | Financial Economics (S. 37) | 9 | Maxim Ulrich |
| M-WIWI-103121 | Financial Technology for Risk and Asset Management (S. 101) | 9 | Maxim Ulrich |
| M-WIWI-101471 | Industrial Production II (S. 47) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 42) | 9 | Frank Schultmann |
| M-WIWI-101411 | Information Engineering (S. 61) | 9 | Christof Weinhardt |
| M-WIWI-101507 | Innovation Management (S. 65) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 82) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 69) | 9 | Ute Werner |
| M-WIWI-101498 | Management Accounting (S. 51) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 90) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 94) | 9 | Martin Klarmann |
| M-WIWI-103122 | Quantitative Risk Management (S. 104) | 9 | Maxim Ulrich |
| M-WIWI-103123 | Quantitative Valuation (S. 77) | 9 | Maxim Ulrich |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 55) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 80) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 75) | 9 | Christof Weinhardt,Hansjörg Fromm |
| M-WIWI-101503 | Service Design Thinking (S. 86) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-102754 | Service Economics and Management (S. 63) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 67) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 102) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-101649 | Services Marketing (S. 88) | 9 | Ju-Young Kim |
| M-WIWI-101509 | Strategic Decision Making and Organization (S. 54) | 9 | Hagen Lindstädt |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 45) | 9 | Bruno Neibecker |

### 7.3.2 Economics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 124) | 9 | Berthold Wigger |
| M-WIWI-101497 | Agglomeration and Innovation (S. 127) | 9 | Ingrid Ott |
| M-WIWI-101453 | Applied Strategic Decisions (S. 120) | 9 | Johannes Philipp Reiß |
| M-WIWI-101504 | Collective Decision Making (S. 112) | 9 | Clemens Puppe |

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|---|---|---|---|
| M-WIWI-101481 | Economic Policy II (S. 126) | 9 | Jan Kowalski |
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 110) | 9 | Kay Mitusch |
| M-WIWI-101468 | Environmental Economics (S. 115) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 122) | 9 | Johannes Philipp Reiß |
| M-WIWI-101496 | Growth and Agglomeration (S. 114) | 9 | Ingrid Ott |
| M-WIWI-101478 | Innovation and growth (S. 108) | 9 | Ingrid Ott |
| M-WIWI-101514 | Innovation Economics (S. 106) | 9 | Ingrid Ott |
| M-WIWI-101462 | Macroeconomic Theory (S. 113) | 9 | Marten Hillebrand |
| M-WIWI-101406 | Network Economics (S. 118) | 9 | Kay Mitusch |
| M-WIWI-101485 | Transport infrastructure policy and regional development (S. 116) | 9 | Kay Mitusch |

### 7.3.3 Informatics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101630 | Electives in Informatics (S. 213) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter,Johann Marius Zöllner |
| M-WIWI-101628 | Emphasis in Informatics (S. 215) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter |

### 7.3.4 Operations Research

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101473 | Mathematical Programming (S. 130) | 9 | Oliver Stein |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 138) | 9 | Stefan Nickel |
| M-WIWI-101415 | Operations Research in Supply Chain Management and Health Care Management (S. 134) | 9 | Stefan Nickel |
| M-WIWI-102805 | Service Operations (S. 136) | 9 | Stefan Nickel |
| M-WIWI-101454 | Stochastic Modelling and Optimization (S. 132) | 9 | Karl-Heinz Waldmann |

### 7.3.5 Engineering Sciences

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-BGU-100998 | Design, Construction, Operation and Maintenance of Highways (S. 154) | 9 | Ralf Roos |
| M-BGU-101000 | Environmental Management (S. 188) | 9 | Erhard Hoffmann,Stephan Fuchs |
| M-BGU-101064 | Fundamentals of Transportation (S. 171) | 9 | Peter Vortisch |
| M-BGU-100999 | Highway Engineering (S. 189) | 9 | Ralf Roos |
| M-BGU-101884 | Lean Management in Construction (S. 208) | 9 | Shervin Haghsheno |
| M-BGU-101110 | Process Engineering in Construction (S. 148) | 9 | Shervin Haghsheno |
| M-BGU-101113 | Project in Public Transportation (S. 159) | 9 | Eberhard Hohnecker |

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| M-BGU-101888 | Project Management in Construction (S. 167) | 9 | Shervin Haghsheno |
| M-BGU-101111 | Public Transportation Operations (S. 177) | 9 | Eberhard Hohnecker |
| M-BGU-101066 | Safety, Computing and Law in Highway Engineering (S. 206) | 9 | Ralf Roos |
| M-BGU-101112 | Track Guided Transport Systems / Engineering (S. 145) | 9 | Eberhard Hohnecker |
| M-BGU-101065 | Transportation Modelling and Traffic Management (S. 140) | 9 | Peter Vortisch |
| M-BGU-101001 | Water Supply and Sanitation (S. 187) | 9 | Stephan Fuchs |
| M-CIWVT-101120 | Principles of Food Process Engineering (S. 180) | 9 | Volker Gaukel |
| M-CIWVT-101119 | Specialization in Food Process Engineering (S. 174) | 9 | Volker Gaukel |
| M-CIWVT-101121 | Water Chemistry and Water Technology I (S. 151) | 9 | Harald Horn |
| M-CIWVT-101122 | Water Chemistry and Water Technology II (S. 183) | 9 | Harald Horn |
| M-ETIT-101157 | Control Engineering II (S. 204) | 9 | Sören Hohmann |
| M-ETIT-101164 | Generation and transmission of renewable power (S. 175) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101163 | High-Voltage Technology (S. 156) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101158 | Sensor Technology I (S. 184) | 9 | Wolfgang Menesklou |
| M-ETIT-101159 | Sensor Technology II (S. 203) | 9 | Wolfgang Menesklou |
| M-MACH-101298 | Automated Manufacturing Systems (S. 202) | 9 | Jürgen Fleischer |
| M-MACH-101266 | Automotive Engineering (S. 142) | 9 | Frank Gauterin |
| M-MACH-101290 | BioMEMS (S. 185) | 9 | Volker Saile |
| M-MACH-101275 | Combustion Engines I (S. 147) | 9 | Thomas Koch,Heiko Kubach |
| M-MACH-101303 | Combustion Engines II (S. 157) | 9 | Heiko Kubach |
| M-MACH-101296 | Energy and Process Technology I (S. 162) | 9 | Heiner Wirbser |
| M-MACH-101297 | Energy and Process Technology II (S. 207) | 9 | Heiner Wirbser |
| M-MACH-101282 | Global Production and Logistics (S. 194) | 9 | Volker Schulze |
| M-MACH-101264 | Handling Characteristics of Motor Vehicles (S. 205) | 9 | Frank Gauterin |
| M-MACH-101272 | Integrated Production Planning (S. 179) | 9 | Volker Schulze |
| M-MACH-101263 | Introduction to Logistics (S. 163) | 9 | Kai Furmans |
| M-MACH-101280 | Logistics in Value Chain Networks (S. 192) | 9 | Kai Furmans |
| M-MACH-101286 | Machine Tools and Industrial Handling (S. 153) | 9 | Jürgen Fleischer |
| M-MACH-101276 | Manufacturing Technology (S. 150) | 9 | Volker Schulze |
| M-MACH-101277 | Material Flow in Logistic Systems (S. 141) | 9 | Kai Furmans |
| M-MACH-101278 | Material Flow in Networked Logistic Systems (S. 198) | 9 | Kai Furmans |
| M-MACH-101291 | Microfabrication (S. 160) | 9 | Jan Gerrit Korvink |
| M-MACH-101292 | Microoptics (S. 190) | 9 | Jan Gerrit Korvink |
| M-MACH-101287 | Microsystem Technology (S. 181) | 9 | Jan Gerrit Korvink |
| M-MACH-101267 | Mobile Machines (S. 200) | 9 | Marcus Geimer |
| M-MACH-101294 | Nanotechnology (S. 176) | 9 | Jan Gerrit Korvink |
| M-MACH-101295 | Optoelectronics and Optical Communication (S. 158) | 9 | Jan Gerrit Korvink |
| M-MACH-101284 | Specialization in Production Engineering (S. 152) | 9 | Volker Schulze |
| M-MACH-101268 | Specific Topics in Materials Science (S. 168) | 9 | Michael Hoffmann |
| M-MACH-101279 | Technical Logistics (S. 196) | 9 | Kai Furmans |
| M-MACH-101265 | Vehicle Development (S. 170) | 9 | Frank Gauterin |
| M-MACH-101283 | Virtual Engineering A (S. 165) | 9 | Jivka Ovtcharova |
| M-MACH-101281 | Virtual Engineering B (S. 143) | 9 | Jivka Ovtcharova |
| M-WIWI-101404 | Extracurricular Module in Engineering (S. 155) | 9 | Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften |
| M-WIWI-101642 | Natural Hazards and Risk Management 1 (S. 172) | 9 | Michael Kunz |
| M-WIWI-101644 | Natural Hazards and Risk Management 2 (S. 173) | 9 | Michael Kunz |

### 7.3.6 Statistics

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-WIWI-101637 | Analytics and Statistics (S. 217) | 9 | Oliver Grothe |
| M-WIWI-101638 | Econometrics and Statistics I (S. 219) | 9 | Melanie Schienle |
| M-WIWI-101639 | Econometrics and Statistics II (S. 220) | 9 | Melanie Schienle |

### 7.3.7 Law

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-INFO-101191 | Commercial Law (S. 222) | 9 | Thomas Dreier |
| M-INFO-101242 | Governance, Risk & Compliance (S. 223) | 9 | Thomas Dreier |
| M-INFO-101215 | Intellectual Property Law (S. 226) | 9 | Thomas Dreier |
| M-INFO-101216 | Private Business Law (S. 225) | 9 | Thomas Dreier |
| M-INFO-101217 | Public Business Law (S. 224) | 9 | Matthias Bäcker |

### 7.3.8 Sociology

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-GEISTSOZ-101169 | Sociology (S. 227) | 9 | Gerd Nollmann |

# 8 Additional Examinations

| Identifier | Module | ECTS | Responsibility |
|---|---|---|---|
| M-BGU-100998 | Design, Construction, Operation and Maintenance of Highways (S. 154) | 9 | Ralf Roos |
| M-BGU-101000 | Environmental Management (S. 188) | 9 | Erhard Hoffmann,Stephan Fuchs |
| M-BGU-101064 | Fundamentals of Transportation (S. 171) | 9 | Peter Vortisch |
| M-BGU-100999 | Highway Engineering (S. 189) | 9 | Ralf Roos |
| M-BGU-101884 | Lean Management in Construction (S. 208) | 9 | Shervin Haghsheno |
| M-BGU-101110 | Process Engineering in Construction (S. 148) | 9 | Shervin Haghsheno |
| M-BGU-101113 | Project in Public Transportation (S. 159) | 9 | Eberhard Hohnecker |
| M-BGU-101888 | Project Management in Construction (S. 167) | 9 | Shervin Haghsheno |
| M-BGU-101111 | Public Transportation Operations (S. 177) | 9 | Eberhard Hohnecker |
| M-BGU-101066 | Safety, Computing and Law in Highway Engineering (S. 206) | 9 | Ralf Roos |
| M-BGU-101112 | Track Guided Transport Systems / Engineering (S. 145) | 9 | Eberhard Hohnecker |
| M-BGU-101065 | Transportation Modelling and Traffic Management (S. 140) | 9 | Peter Vortisch |
| M-BGU-101001 | Water Supply and Sanitation (S. 187) | 9 | Stephan Fuchs |
| M-CIWVT-101120 | Principles of Food Process Engineering (S. 180) | 9 | Volker Gaukel |

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|---|---|---|---|
| M-CIWVT-101119 | Specialization in Food Process Engineering (S. 174) | 9 | Volker Gaukel |
| M-CIWVT-101121 | Water Chemistry and Water Technology I (S. 151) | 9 | Harald Horn |
| M-CIWVT-101122 | Water Chemistry and Water Technology II (S. 183) | 9 | Harald Horn |
| M-ETIT-101157 | Control Engineering II (S. 204) | 9 | Sören Hohmann |
| M-ETIT-101164 | Generation and transmission of renewable power (S. 175) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101163 | High-Voltage Technology (S. 156) | 9 | Thomas Leibfried,Bernd Hoferer |
| M-ETIT-101158 | Sensor Technology I (S. 184) | 9 | Wolfgang Menesklou |
| M-ETIT-101159 | Sensor Technology II (S. 203) | 9 | Wolfgang Menesklou |
| M-MACH-101298 | Automated Manufacturing Systems (S. 202) | 9 | Jürgen Fleischer |
| M-MACH-101266 | Automotive Engineering (S. 142) | 9 | Frank Gauterin |
| M-MACH-101290 | BioMEMS (S. 185) | 9 | Volker Saile |
| M-MACH-101275 | Combustion Engines I (S. 147) | 9 | Thomas Koch,Heiko Kubach |
| M-MACH-101303 | Combustion Engines II (S. 157) | 9 | Heiko Kubach |
| M-MACH-101296 | Energy and Process Technology I (S. 162) | 9 | Heiner Wirbser |
| M-MACH-101297 | Energy and Process Technology II (S. 207) | 9 | Heiner Wirbser |
| M-MACH-101282 | Global Production and Logistics (S. 194) | 9 | Volker Schulze |
| M-MACH-101264 | Handling Characteristics of Motor Vehicles (S. 205) | 9 | Frank Gauterin |
| M-MACH-101272 | Integrated Production Planning (S. 179) | 9 | Volker Schulze |
| M-MACH-101263 | Introduction to Logistics (S. 163) | 9 | Kai Furmans |
| M-MACH-101280 | Logistics in Value Chain Networks (S. 192) | 9 | Kai Furmans |
| M-MACH-101286 | Machine Tools and Industrial Handling (S. 153) | 9 | Jürgen Fleischer |
| M-MACH-101276 | Manufacturing Technology (S. 150) | 9 | Volker Schulze |
| M-MACH-101277 | Material Flow in Logistic Systems (S. 141) | 9 | Kai Furmans |
| M-MACH-101278 | Material Flow in Networked Logistic Systems (S. 198) | 9 | Kai Furmans |
| M-MACH-101291 | Microfabrication (S. 160) | 9 | Jan Gerrit Korvink |
| M-MACH-101292 | Microoptics (S. 190) | 9 | Jan Gerrit Korvink |
| M-MACH-101287 | Microsystem Technology (S. 181) | 9 | Jan Gerrit Korvink |
| M-MACH-101267 | Mobile Machines (S. 200) | 9 | Marcus Geimer |
| M-MACH-101294 | Nanotechnology (S. 176) | 9 | Jan Gerrit Korvink |
| M-MACH-101295 | Optoelectronics and Optical Communication (S. 158) | 9 | Jan Gerrit Korvink |
| M-MACH-101284 | Specialization in Production Engineering (S. 152) | 9 | Volker Schulze |
| M-MACH-101268 | Specific Topics in Materials Science (S. 168) | 9 | Michael Hoffmann |
| M-MACH-101279 | Technical Logistics (S. 196) | 9 | Kai Furmans |
| M-MACH-101265 | Vehicle Development (S. 170) | 9 | Frank Gauterin |
| M-MACH-101283 | Virtual Engineering A (S. 165) | 9 | Jivka Ovtcharova |
| M-MACH-101281 | Virtual Engineering B (S. 143) | 9 | Jivka Ovtcharova |
| M-WIWI-101511 | Advanced Topics in Public Finance (S. 124) | 9 | Berthold Wigger |
| M-WIWI-101497 | Agglomeration and Innovation (S. 127) | 9 | Ingrid Ott |
| M-WIWI-101637 | Analytics and Statistics (S. 217) | 9 | Oliver Grothe |
| M-WIWI-101453 | Applied Strategic Decisions (S. 120) | 9 | Johannes Philipp Reiß |
| M-WIWI-101410 | Business & Service Engineering (S. 98) | 9 | Christof Weinhardt |
| M-WIWI-101504 | Collective Decision Making (S. 112) | 9 | Clemens Puppe |
| M-WIWI-101512 | Computational Finance (S. 59) | 9 | Maxim Ulrich |
| M-WIWI-101510 | Cross-functional Management Accounting (S. 100) | 9 | Marcus Wouters |
| M-WIWI-101470 | Data Science: Advanced CRM (S. 57) | 9 | Andreas Geyer-Schulz |
| M-WIWI-103117 | Data Science: Data-Driven Information Systems (S. 40) | 9 | Christof Weinhardt,Alexander Mädche |
| M-WIWI-103118 | Data Science: Data-Driven User Modeling (S. 92) | 9 | Christof Weinhardt |
| M-WIWI-101647 | Data Science: Evidence-based Marketing (S. 52) | 9 | Martin Klarmann |
| M-WIWI-102808 | Digital Service Systems in Industry (S. 96) | 9 | Stefan Nickel,Wolf Fichtner |
| M-WIWI-101638 | Econometrics and Statistics I (S. 219) | 9 | Melanie Schienle |
| M-WIWI-101639 | Econometrics and Statistics II (S. 220) | 9 | Melanie Schienle |
| M-WIWI-101481 | Economic Policy II (S. 126) | 9 | Jan Kowalski |

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|---|---|---|---|
| M-WIWI-101502 | Economic Theory and its Application in Finance (S. 110) | 9 | Kay Mitusch |
| M-WIWI-101630 | Electives in Informatics (S. 213) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter,Johann Marius Zöllner |
| M-WIWI-101409 | Electronic Markets (S. 73) | 9 | Andreas Geyer-Schulz |
| M-WIWI-101628 | Emphasis in Informatics (S. 215) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter |
| M-WIWI-101451 | Energy Economics and Energy Markets (S. 49) | 9 | Wolf Fichtner |
| M-WIWI-101452 | Energy Economics and Technology (S. 71) | 9 | Wolf Fichtner |
| M-WIWI-101488 | Entrepreneurship (EnTechnon) (S. 84) | 9 | Orestis Terzidis |
| M-WIWI-101468 | Environmental Economics (S. 115) | 9 | Kay Mitusch |
| M-WIWI-101505 | Experimental Economics (S. 122) | 9 | Johannes Philipp Reiß |
| M-WIWI-101482 | Finance 1 (S. 44) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101483 | Finance 2 (S. 78) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-101480 | Finance 3 (S. 38) | 9 | Marliese Uhrig-Homburg,Martin Ruckes |
| M-WIWI-103120 | Financial Economics (S. 37) | 9 | Maxim Ulrich |
| M-WIWI-103121 | Financial Technology for Risk and Asset Management (S. 101) | 9 | Maxim Ulrich |
| M-WIWI-101496 | Growth and Agglomeration (S. 114) | 9 | Ingrid Ott |
| M-WIWI-101471 | Industrial Production II (S. 47) | 9 | Frank Schultmann |
| M-WIWI-101412 | Industrial Production III (S. 42) | 9 | Frank Schultmann |
| M-WIWI-101472 | Informatics (S. 128) | 9 | Rudi Studer,Hartmut Schmeck,Andreas Oberweis,York Sure-Vetter,Johann Marius Zöllner |
| M-WIWI-101411 | Information Engineering (S. 61) | 9 | Christof Weinhardt |
| M-WIWI-101478 | Innovation and growth (S. 108) | 9 | Ingrid Ott |
| M-WIWI-101514 | Innovation Economics (S. 106) | 9 | Ingrid Ott |
| M-WIWI-101507 | Innovation Management (S. 65) | 9 | Marion Weissenberger-Eibl |
| M-WIWI-101469 | Insurance Management I (S. 82) | 9 | Ute Werner |
| M-WIWI-101449 | Insurance Management II (S. 69) | 9 | Ute Werner |
| M-WIWI-101462 | Macroeconomic Theory (S. 113) | 9 | Marten Hillebrand |
| M-WIWI-101498 | Management Accounting (S. 51) | 9 | Marcus Wouters |
| M-WIWI-101446 | Market Engineering (S. 90) | 9 | Christof Weinhardt |
| M-WIWI-101490 | Marketing Management (S. 94) | 9 | Martin Klarmann |
| M-WIWI-101473 | Mathematical Programming (S. 130) | 9 | Oliver Stein |
| M-WIWI-101500 | Microeconomic Theory (S. 105) | 9 | Clemens Puppe |
| M-WIWI-101642 | Natural Hazards and Risk Management 1 (S. 172) | 9 | Michael Kunz |
| M-WIWI-101644 | Natural Hazards and Risk Management 2 (S. 173) | 9 | Michael Kunz |
| M-WIWI-101406 | Network Economics (S. 118) | 9 | Kay Mitusch |
| M-WIWI-102832 | Operations Research in Supply Chain Management (S. 138) | 9 | Stefan Nickel |
| M-WIWI-101415 | Operations Research in Supply Chain Management and Health Care Management (S. 134) | 9 | Stefan Nickel |
| M-WIWI-103122 | Quantitative Risk Management (S. 104) | 9 | Maxim Ulrich |
| M-WIWI-103123 | Quantitative Valuation (S. 77) | 9 | Maxim Ulrich |
| M-WIWI-101508 | Real Estate Economics and Sustainability (S. 55) | 9 | David Lorenz |
| M-WIWI-101487 | Sales Management (S. 80) | 9 | Martin Klarmann |
| M-WIWI-101506 | Service Analytics (S. 75) | 9 | Christof Weinhardt,Hansjörg Fromm |
| M-WIWI-101503 | Service Design Thinking (S. 86) | 9 | Christof Weinhardt,Gerhard Satzger |

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|---|---|---|---|
| M-WIWI-102754 | Service Economics and Management (S. 63) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-102806 | Service Innovation, Design & Engineering (S. 67) | 9 | Alexander Mädche,Gerhard Satzger |
| M-WIWI-101448 | Service Management (S. 102) | 9 | Christof Weinhardt,Gerhard Satzger |
| M-WIWI-102805 | Service Operations (S. 136) | 9 | Stefan Nickel |
| M-WIWI-101649 | Services Marketing (S. 88) | 9 | Ju-Young Kim |
| M-WIWI-101454 | Stochastic Modelling and Optimization (S. 132) | 9 | Karl-Heinz Waldmann |
| M-WIWI-101657 | Stochastic Modelling and Optimization (S. 229) | 9 | Karl-Heinz Waldmann |
| M-WIWI-101450 | Strategic Corporate Management and Organization (S. 228) | 9 | Hagen Lindstädt |
| M-WIWI-101509 | Strategic Decision Making and Organization (S. 54) | 9 | Hagen Lindstädt |
| M-WIWI-101489 | Strategy, Communication, and Data Analysis (S. 45) | 9 | Bruno Neibecker |
| M-WIWI-101485 | Transport infrastructure policy and regional development (S. 116) | 9 | Kay Mitusch |

# Part IV
# Modules

## M Module: Module Master Thesis [M-WIWI-101650]

**Responsibility:** Martin Ruckes

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

**Contained in:** Master Thesis

| ECTS | Language | Version |
|---|---|---|
| 30 | Deutsch | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103142 | Master Thesis (S. 507) | 30 | Martin Ruckes |

**Learning Control / Examinations**
The Master Thesis is a written exam which shows that the student can autonomously investigate a scientific problem in Industrial Engineering and Management. The Master Thesis is described in detail in § 11 of the examination regulation. The review is carried out by at least one examiner of the Department of Economics and Management, or, after approval by at least one examiner of another faculty. The examiner has to be involved in the degree programme. Involved in the degree programme are the persons that coordinate a module or a lecture of the degree programme.
The regular processing time takes six months. On a reasoned request of the student, the examination board can extend the processing time of a maximum of three month. If the Master Thesis is not completed in time, this exam is "failed", unless the student is not being responsible (eg maternity leave).
With consent of the examinor the thesis can be written in English as well. Other languages require besides the consent of the examiner the approval of the examination board. The issue of the Master Thesis may only returned once and only within the first month of processing time. A new topic has to be released within four weeks.

The module grade is the grade for the Master Thesis.

**Conditions**
Prerequisite for admission to the Master thesis is that 50 percent of the credit points has to be completed.
A written confirmation of the examinor about supervising the Master Thesis is required.
Please pay regard to the institute specific rules for supervising a Master Thesis.

The Master Thesis has to contain the following declaration: "I hereby declare that I produced this thesis without external assistance, and that no other than the listed references have been used as sources of information. Passages taken literally or analogously from published or non published sources is marked as this." If this declaration is not given, the Master Thesis will not be accepted.

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

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

# Module: Financial Economics [M-WIWI-103120]

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | Englisch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102878 | Computational Risk and Asset Management (S. 299) | 4,5 | Maxim Ulrich |
| T-WIWI-106194 | Macro-Finance (S. 485) | 4,5 | 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 apply statistical methods to estimate expected returns, risk and risk densities of different investment instruments. They will know how to apply maximum likelihood and expectation maximization algorithms to estimate linear and non-linear asset pricing models from the fixed-income, equity or option pricing literature. Besides a conceptual understanding, students will implement the estimation algorithms using modern software and learn about current innovations in the macro-finance literature, aiming to price bonds, equity and option markets with explicitly accounting for fundamental economic and monetary policy related risks under no-arbitrage.

### 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: Finance 3 (WI4BWLFBV11) [M-WIWI-101480]

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

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102647 | Asset Pricing (S. 248) | 4,5 | Marliese Uhrig-Homburg, Martin Ruckes |
| T-WIWI-102621 | Valuation (S. 799) | 4,5 | Martin Ruckes |
| T-WIWI-102643 | Derivatives (S. 324) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102644 | Fixed Income Securities (S. 388) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102645 | Credit Risk (S. 316) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102622 | Corporate Financial Policy (S. 314) | 4,5 | Martin Ruckes |
| T-WIWI-102623 | Financial Intermediation (S. 387) | 4,5 | Martin Ruckes |
| T-WIWI-102625 | Exchanges (S. 371) | 1,5 | Jörg Franke |
| T-WIWI-102626 | Business Strategies of Banks (S. 282) | 3 | Wolfgang Müller |
| T-WIWI-102646 | International Finance (S. 457) | 3 | Marliese Uhrig-Homburg |
| T-WIWI-102600 | eFinance: Information Engineering and Management for Securities Trading (S. 339) | 4,5 | Christof Weinhardt |
| T-WIWI-102900 | Financial Analysis (S. 385) | 4,5 | Torsten Luedecke |

### 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: Data Science: Data-Driven Information Systems [M-WIWI-103117]

**Responsibility:** Christof Weinhardt, Alexander Mädche

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-106187 | Business data strategy (S. 274) | 4,5 | Christof Weinhardt |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-105777 | Business Intelligence Systems (S. 277) | 4,5 | Alexander Mädche |
| T-WIWI-102809 | Service Analytics (S. 711) | 4,5 | Hansjörg Fromm, Thomas Setzer |
| T-WIWI-106207 | Practical Seminar: Data-Driven Information Systems (S. 601) | 4,5 | Christof Weinhardt, Alexander Mädche, Thomas Setzer |

**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 " Business Data Strategy" is compulsory and must be examined.

**Qualification Objectives**
The student

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

**Content**
The amount of business-related data availabe in modern enterprise information systems grows exponentially, and the

various data sources are more and more integrated, transformed, and analyzed jointly to gain valuable business insights, pro-actively control and manage business processes, to leverage planning and decision making, and to provide appropriate, potentially novel services to customers based on relationships and developments observed in the data.
Also, data sources are more and more connected and single business unit that used to operate on separate data pools are now becoming highly integrated, providing tremendeous business opportunities but also challenges regarding how the data should be represented, integrated, preprocessed, transformed, and finally used in analytics planning and decision processes.
The courses of this module equip the students with core skills to understands the strategic role of integrating, transforming, and analyzing large and complex enterprise data in modern business information systems. Students will be capable to designing, comparing, and evaluating strategic alternatives. Also, students will learn how to design, model, and control complex analytical processes, including various business functions of industrial and service companies including customers and markets. Students learn core skills to understand fundamental strategies for integrating analytic models and operative controlling mechanisms while ensuring the technical feasibility of the resulting information systems..
Furthermore, the student can distinguish different methods and concepts in the realm of data science and learns when to apply. She/he will know the means of characterizing and analyzing hetergeneous, high-dimensional data available data in data warehouses and external data sources to gain additional insights valuable for enterprise planning and decision making. Also, the students know how to capture uncertainty in the data and how to appropriately consider and visualize uncertainty in business information and business intelligence systems.
The module offers the opportunity to apply and deepen this knowledge in a seminar and hands-on tutorials that are offered with all lectures.
Texteintrag

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

**Remarks**
The course „Business Data Strategy“ can be chosen from winter term 2016 on.

## M Module: Industrial Production III (WI4BWLIIP6) [M-WIWI-101412]

**Responsibility:** Frank Schultmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102632 | Production and Logistics Management (S. 626) | 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. 344) | 3,5 | Ute Karl |
| T-WIWI-102882 | International Management in Engineering and Production (S. 458) | 3,5 | Henning Sasse |
| T-WIWI-103133 | Life Cycle Assessment (S. 477) | 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. 763) | 3,5 | Claus J. Bosch, Mathias Göbelt |
| T-WIWI-102826 | Risk Management in Industrial Supply Networks (S. 659) | 3,5 | Marcus Wiens |
| T-WIWI-102828 | Supply Chain Management in the Automotive Industry (S. 760) | 3,5 | Tilman Heupel, Hendrik Lang |
| T-WIWI-103134 | Project Management (S. 630) | 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: Finance 1 (WI4BWLFBV1) [M-WIWI-101482]

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

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102643 | Derivatives (S. 324) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102621 | Valuation (S. 799) | 4,5 | Martin Ruckes |
| T-WIWI-102647 | Asset Pricing (S. 248) | 4,5 | Marliese Uhrig-Homburg, 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
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: Strategy, Communication, and Data Analysis (WI4BWLMAR7) [M-WIWI-101489]

**Responsibility:** Bruno Neibecker

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102619 | Behavioral Approaches in Marketing (S. 263) | 4,5 | Bruno Neibecker |
| T-WIWI-102618 | Strategic and Innovative Decision Making in Marketing (S. 747) | 4,5 | Bruno Neibecker |
| T-WIWI-102635 | Information Technology and Business Information (S. 442) | 4,5 | Bruno Neibecker |
| T-WIWI-102883 | Pricing (S. 614) | 4,5 | Ju-Young Kim |

### 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 first decimal.

### 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: Industrial Production II (WI4BWLIIP2) [M-WIWI-101471]

**Responsibility:** Frank Schultmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102631 | Planning and Management of Industrial Plants (S. 581) | 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. 763) | 3,5 | Claus J. Bosch, Mathias Göbelt |
| T-WIWI-102826 | Risk Management in Industrial Supply Networks (S. 659) | 3,5 | Marcus Wiens |
| T-WIWI-102828 | Supply Chain Management in the Automotive Industry (S. 760) | 3,5 | Tilman Heupel, Hendrik Lang |
| T-WIWI-103134 | Project Management (S. 630) | 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. 344) | 3,5 | Ute Karl |
| T-WIWI-102882 | International Management in Engineering and Production (S. 458) | 3,5 | Henning Sasse |
| T-WIWI-103133 | Life Cycle Assessment (S. 477) | 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: Energy Economics and Energy Markets (WI4BWLIIP4) [M-WIWI-101451]

**Responsibility:** Wolf Fichtner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102690 | Basics of Liberalised Energy Markets (S. 259) | 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. 354) | 4 | Dogan Keles, Wolf Fichtner, Clemens Cremer |
| T-WIWI-102607 | Energy Policy (S. 352) | 3,5 | Martin Wietschel |
| T-WIWI-102692 | Gas-Markets (S. 408) | 3 | Andrej Marko Pustisek |
| T-WIWI-102693 | Simulation Game in Energy Economics (S. 720) | 3 | Massimo Genoese |
| T-WIWI-102712 | Regulation Theory and Practice (S. 654) | 4,5 | Kay Mitusch |
| T-WIWI-102794 | eEnergy: Markets, Services, Systems (S. 335) | 4,5 | Christof Weinhardt |
| T-WIWI-102889 | Quantitative Methods in Energy Economics (S. 645) | 4 | Dogan Keles, Patrick Plötz |

### 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 *Basics of Liberalised Energy Markets* [2581998] 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
*Basics of Liberalised Energy 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**
The course "Basics of Liberalised Energy Markets" [2581998] will be reduced to 3 credits in winter term 2015/2016.

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

## M Module: Management Accounting (WI4BWLIBU1) [M-WIWI-101498]

**Responsibility:** Marcus Wouters

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102800 | Management Accounting 1 (S. 486) | 4,5 | Marcus Wouters |
| T-WIWI-102801 | Management Accounting 2 (S. 487) | 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: Data Science: Evidence-based Marketing (WW4BWLMAR8) [M-WIWI-101647]

**Responsibility:** Martin Klarmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102811 | Market Research (S. 498) | 4,5 | Martin Klarmann |
| T-WIWI-103139 | Marketing Analytics (S. 499) | 4,5 | Martin Klarmann |

### 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
In order to attend Marketing Analytics [2572170], students are required to have passed the course Market Research [2571150].

### 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

**Remarks**
New module starting winter term 2015/2016.

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

## M Module: Strategic Decision Making and Organization (WI4BWLUO4) [M-WIWI-101509]

**Responsibility:** Hagen Lindstädt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102803 | Modeling Strategic Decision Making (S. 528) | 4,5 | Hagen Lindstädt |
| T-WIWI-102740 | Public Management (S. 639) | 4,5 | Berthold Wigger |
| T-WIWI-102883 | Pricing (S. 614) | 4,5 | Ju-Young Kim |

**Learning Control / Examinations**
The module will not be offered any more from winterterm 2016/2017. Students who are already assigned on the module can still finish it until summer term 2017 (only for repeater).

**Conditions**
None

**Qualification Objectives**
See German version.

**Recommendations**
None

**Remarks**
The course "Organization Theory" 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: Real Estate Economics and Sustainability (WI4BWLÖÖW1) [M-WIWI-101508]

**Responsibility:** David Lorenz

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102838 | Real Estate Economics and Sustainability Part 1: Basics and Valuation (S. 647) | 4,5 | |
| T-WIWI-102839 | Real Estate Economics and Sustainability Part 2: Reporting and Rating (S. 649) | 4,5 | David Lorenz |

### 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 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

**Remarks**

See German version.

**Workload**

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

# M Module: Data Science: Advanced CRM (WI4BWLISM1) [M-WIWI-101470]

**Responsibility:** Andreas Geyer-Schulz

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102847 | Recommender Systems (S. 651) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102848 | Personalization and Services (S. 568) | 4,5 | Andreas Sonnenbichler |
| T-WIWI-102642 | Social Network Analysis in CRM (S. 728) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102762 | Business Dynamics (S. 275) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-105778 | Service Analytics A (S. 713) | 4,5 | Hansjörg Fromm, Thomas Setzer |
| T-WIWI-103549 | Intelligent CRM Architectures (S. 455) | 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 course Social Network Analysis in CRM [2540518] is currently not offered.
The courses *Recommendersystems* and *Personalization and Services* will take place in an alternating way from summer term 14. Details on the cycle and on the exams can be found on http://www.em.uni-karlsruhe.de/studies/.
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: Computational Finance (WI4BWLFBV12) [M-WIWI-101512]

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102878 | Computational Risk and Asset Management (S. 299) | 4,5 | Maxim Ulrich |
| T-WIWI-103110 | Programming Internship: Solving Computational Risk and Asset Management Problems (S. 629) | 4,5 | Maxim Ulrich |

### Learning Control / Examinations
Successful completion of this module requires the successful completion of the lecture Computational Risk and Asset Management and the programming seminar: Solving Computational Risk and Asset Management Problems.

### Conditions
None

### Qualification Objectives
The objective of this module is to become familiar with empirical and numerical algorithms necessary for quantitative asset and risk management.
The students will learn how to empirically estimate the return characteristics of assets (expected return, volatility, and cross-correlations) using simulated and real-world data and apply them to the strategic portfolio allocation concept of Markowitz.
Also they are capable to understand the intuition and algorithm behind empirical methods and obtain an understanding and working knowledge of important numerical concepts.

### Content
Markowitz portfolio optimization (empirical and numerical implementation)
Generating random numbers
Techniques for Monte Carlo Simulations
Time-Series methods (ARMA, predictions, impulse response functions, Wold decomposition, VAR, Granger causality, unit roots, cointegration)
Maximum-Likelihood and Kalman Filtering
CAPM, Fama/French and Fama/MacBeth regressions to estimate risk premia (i.e. expected returns on investment)
numerical root finding
numerical optimziation
numerical integration of ode's, pde's, and sde's .
analytical solution to simple ode's and sde's

### Recommendations
This module is self contained and does not have any pre-requisites. Knowledge of finance is helpful but not a must. All necessary financial, statistical and numerical concepts are introduced during the lecture. The programming seminar focuses on implementing and applying most of the tools to real-world problems. Lecture and programming seminar must be completed in the same semester.

**Remarks**
The courses of the module are held in English.
The module will not be offered any more in its old form (Computational Risk and Asset Management [2530371] with 9 credits) from winter term 2015/16. Students who are already assigned on the module can still finish it until winter term 2015/16 (repeaters only).

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

## M Module: Information Engineering (WI4BWLISM7) [M-WIWI-101411]

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102638 | Principles of Information Engineering and Management (S. 617) | 5 | Christof Weinhardt, Timm Teubner |

**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. 496) | 4,5 | Christof Weinhardt |
| T-WIWI-102706 | Special Topics in Information Engineering & Management (S. 734) | 4,5 | Christof Weinhardt |
| T-WIWI-102794 | eEnergy: Markets, Services, Systems (S. 335) | 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: Service Economics and Management (WI4BWLKSR3) [M-WIWI-102754]

**Responsibility:** Christof Weinhardt, Gerhard Satzger

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102881 | Business and IT Service Management (S. 273) | 4,5 | Gerhard Satzger |
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 496) | 4,5 | Christof Weinhardt |
| T-WIWI-106201 | Digital Transformation in Organizations (S. 329) | 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: Innovation Management (WI4BWLENT2) [M-WIWI-101507]

**Responsibility:** Marion Weissenberger-Eibl

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102893 | Innovation Management: Concepts, Strategies and Methods (S. 446) | 3 | Marion Weissenberger-Eibl |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 1 und 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102853 | Roadmapping (S. 661) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102858 | Technology Assessment (S. 773) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102854 | Technologies for Innovation Management (S. 772) | 3 | Daniel Jeffrey Koch |
| T-WIWI-102852 | Case Studies Seminar: Innovation Management (S. 285) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-102873 | Current Issues in Innovation Management (S. 317) | 3 | Marion Weissenberger-Eibl |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102864 | Entrepreneurship (S. 362) | 3 | Orestis Terzidis |
| T-WIWI-102866 | Design Thinking (S. 326) | 3 | Orestis Terzidis |
| T-WIWI-102833 | Entrepreneurial Leadership & Innovation Management (S. 360) | 3 | Carsten Linz, Orestis Terzidis |

**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: Service Innovation, Design & Engineering (WI4BWLKSR5) [M-WIWI-102806]

**Responsibility:** Alexander Mädche, Gerhard Satzger

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

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

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102641 | Service Innovation (S. 716) | 4,5 | Gerhard Satzger |
| T-WIWI-105773 | Digital Service Design (S. 328) | 4,5 | Alexander Mädche |
| T-WIWI-102639 | Business Models in the Internet: Planning and Implementation (S. 278) | 4,5 | Rico Knapper, Timm Teubner |
| T-WIWI-102799 | Practical Seminar Service Innovation (S. 597) | 4,5 | Gerhard Satzger |
| T-WIWI-105774 | Practical Seminar: Digital Service Design (S. 602) | 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), 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: Insurance Management II (WI4BWLFBV7) [M-WIWI-101449]

**Responsibility:** Ute Werner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 3 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102601 | Insurance Marketing (S. 449) | 4,5 | Edmund Schwake |
| T-WIWI-102648 | Insurance Production (S. 450) | 4,5 | Ute Werner |
| T-WIWI-102637 | Current Issues in the Insurance Industry (S. 318) | 2 | Wolf-Rüdiger Heilmann |
| T-WIWI-102636 | Insurance Risk Management (S. 451) | 2,5 | Harald Maser |
| T-WIWI-102649 | Risk Communication (S. 658) | 4,5 | Ute Werner |
| T-WIWI-102797 | P&C Insurance Simulation Game (S. 563) | 3 | Ute Werner |
| T-WIWI-102603 | Principles of Insurance Management (S. 619) | 4,5 | Ute Werner |
| T-WIWI-102841 | Modelling, Measuring and Managing of Extreme Risks (S. 529) | 2,5 | Ute Werner |

### 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 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: Energy Economics and Technology (WI4BWLIIP5) [M-WIWI-101452]

**Responsibility:** Wolf Fichtner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102650 | Energy and Environment (S. 347) | 4,5 | Ute Karl |
| T-WIWI-102633 | Strategical Aspects of Energy Economy (S. 752) | 3,5 | Armin Ardone |
| T-WIWI-102694 | Technological Change in Energy Economics (S. 770) | 3 | Martin Wietschel |
| T-WIWI-102695 | Heat Economy (S. 424) | 3 | Wolf Fichtner |
| T-WIWI-102830 | Energy Systems Analysis (S. 353) | 3 | Valentin Bertsch |
| T-WIWI-102793 | Efficient Energy Systems and Electric Mobility (S. 338) | 3,5 | Russell McKenna, Patrick Jochem |

**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**
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: Electronic Markets (WI4BWLISM2) [M-WIWI-101409]

**Responsibility:** Andreas Geyer-Schulz

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Language | Level | Version |
|---|---|---|---|
| 9 | Deutsch | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102821 | Markets and Organizations: Principles (S. 502) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 496) | 4,5 | Christof Weinhardt |
| T-WIWI-102713 | Telecommunication and Internet Economics (S. 774) | 4,5 | Kay Mitusch |
| T-WIWI-102762 | Business Dynamics (S. 275) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102886 | Business Administration in Information Engineering and Management (S. 271) | 5 | Andreas Geyer-Schulz |
| T-WIWI-105946 | Price Management (S. 611) | 4,5 | Paul Glenn, Andreas Geyer-Schulz |

**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 *Electronic Marktes: Principles* is not offered at the moment.
Thecourse *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: Service Analytics (WI4BWLKSR1) [M-WIWI-101506]

**Responsibility:** Christof Weinhardt, Hansjörg Fromm

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Language | Level | Version |
|---|---|---|---|
| 9 | Deutsch | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-105778 | Service Analytics A (S. 713) | 4,5 | Hansjörg Fromm, Thomas Setzer |
| T-WIWI-105779 | Service Analytics B - Enterprise Data Reduction and Prediction (S. 715) | 4,5 | Christof Weinhardt, Thomas Setzer |
| T-WIWI-102822 | Industrial Services (S. 437) | 4,5 | Hansjörg Fromm |
| T-WIWI-105777 | Business Intelligence Systems (S. 277) | 4,5 | Alexander Mädche |
| T-WIWI-102706 | Special Topics in Information Engineering & Management (S. 734) | 4,5 | Christof Weinhardt |
| T-WIWI-102899 | Modeling and Analyzing Consumer Behavior with R (S. 524) | 4,5 | Christof Weinhardt, Verena Dorner |

### 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

- 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.
From the summer term 2016 the following courses should not be taken in the module Service Analytics

- Special Topics in Information Engineering & Management [2540498]
- Modeling and Analyzing Consumer Behaviour with R [2540470].

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

## M Module: Quantitative Valuation [M-WIWI-103123]

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Englisch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102878 | Computational Risk and Asset Management (S. 299) | 4,5 | Maxim Ulrich |
| T-WIWI-106191 | Bayesian Methods for Financial Economics (S. 262) | 4,5 | 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 apply statistical methods to estimate expected returns, risk and risk densities of different asset classes. Students apply methods such as Maximum Likelihood and Expectation Maximization to estimate linear and nonlinear return forecasting models. Students learn how to program and implement the necessary methods to pursue their own research. Moreover, students obtain a hands-on introduction to the calculus and estimation of both discrete-time and continuous-time pricing models. The empirical estimation relies on Bayesian MCMC methods and is applied to estimate stochastic volatility, crash risks (jumps) and their respective risk premiums.

### 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: Finance 2 (WI4BWLFBV2) [M-WIWI-101483]

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

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102644 | Fixed Income Securities (S. 388) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102622 | Corporate Financial Policy (S. 314) | 4,5 | Martin Ruckes |
| T-WIWI-102645 | Credit Risk (S. 316) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102647 | Asset Pricing (S. 248) | 4,5 | Marliese Uhrig-Homburg, Martin Ruckes |
| T-WIWI-102621 | Valuation (S. 799) | 4,5 | Martin Ruckes |
| T-WIWI-102643 | Derivatives (S. 324) | 4,5 | Marliese Uhrig-Homburg |
| T-WIWI-102646 | International Finance (S. 457) | 3 | Marliese Uhrig-Homburg |
| T-WIWI-102626 | Business Strategies of Banks (S. 282) | 3 | Wolfgang Müller |
| T-WIWI-102625 | Exchanges (S. 371) | 1,5 | Jörg Franke |
| T-WIWI-102623 | Financial Intermediation (S. 387) | 4,5 | Martin Ruckes |
| T-WIWI-102600 | eFinance: Information Engineering and Management for Securities Trading (S. 339) | 4,5 | Christof Weinhardt |
| T-WIWI-102900 | Financial Analysis (S. 385) | 4,5 | Torsten Luedecke |

**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: Sales Management (WI4BWLMAR6) [M-WIWI-101487]

**Responsibility:** Martin Klarmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | 4 | 4 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102890 | Sales Management and Retailing (S. 667) | 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. 315) | 1,5 | Sven Feurer |
| T-WIWI-102891 | Price Negotiation and Sales Presentations (S. 613) | 1,5 | Martin Klarmann, Marc Schröder |
| T-WIWI-102834 | Case Studies in Sales and Pricing (S. 284) | 1,5 | Martin Klarmann |

**Ergänzungsangebot**
Non-Compulsory Block; You must choose at most 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102883 | Pricing (S. 614) | 4,5 | Ju-Young Kim |
| T-WIWI-102811 | Market Research (S. 498) | 4,5 | Martin Klarmann |

### 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.

Students can choose between the following courses:

- "Sales Management and Retailing"
- "Pricing"
- "Market Research" - this course has to be completed successfully by students interested in seminar or master thesis positions at the Marketing and Sales Research Group
- "Case Studies in Pricing
- "Sales Strategy and Control"
- "Country Manager Simulation"

**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: Insurance Management I (WI4BWLFBV6) [M-WIWI-101469]

**Responsibility:** Ute Werner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 3 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102603 | Principles of Insurance Management (S. 619) | 4,5 | Ute Werner |
| T-WIWI-102601 | Insurance Marketing (S. 449) | 4,5 | Edmund Schwake |
| T-WIWI-102648 | Insurance Production (S. 450) | 4,5 | Ute Werner |
| T-WIWI-102637 | Current Issues in the Insurance Industry (S. 318) | 2 | Wolf-Rüdiger Heilmann |
| T-WIWI-102636 | Insurance Risk Management (S. 451) | 2,5 | Harald Maser |
| T-WIWI-102797 | P&C Insurance Simulation Game (S. 563) | 3 | Ute Werner |
| T-WIWI-102649 | Risk Communication (S. 658) | 4,5 | Ute Werner |
| T-WIWI-102841 | Modelling, Measuring and Managing of Extreme Risks (S. 529) | 2,5 | Ute Werner |

**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 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-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**
See German version.

## M Module: Entrepreneurship (EnTechnon) (WI4BWLENT1) [M-WIWI-101488]

**Responsibility:** Orestis Terzidis

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 4 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102864 | Entrepreneurship (S. 362) | 3 | Orestis Terzidis |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 1 und 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102865 | Business Planning (S. 279) | 3 | Orestis Terzidis |
| T-WIWI-102866 | Design Thinking (S. 326) | 3 | Orestis Terzidis |
| T-WIWI-102833 | Entrepreneurial Leadership & Innovation Management (S. 360) | 3 | Carsten Linz, Orestis Terzidis |
| T-WIWI-102894 | Entrepreneurship Research (S. 364) | 3 | Orestis Terzidis |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102612 | Managing New Technologies (S. 492) | 5 | Thomas Reiß |
| T-WIWI-102893 | Innovation Management: Concepts, Strategies and Methods (S. 446) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-102639 | Business Models in the Internet: Planning and Implementation (S. 278) | 4,5 | Rico Knapper, Timm Teubner |
| T-WIWI-102851 | Developing Business Models for the Semantic Web (S. 327) | 3 | Rudi Studer |
| T-WIWI-102852 | Case Studies Seminar: Innovation Management (S. 285) | 3 | Marion Weissenberger-Eibl |
| T-WIWI-102853 | Roadmapping (S. 661) | 3 | Daniel Jeffrey Koch |

### Learning Control / Examinations
See German version.

### Conditions
None

### Qualification Objectives
See German version.

**Recommendations**
None

**Remarks**
The course T-WIWI-102832 - Business Plan Workshop is not available anymore.

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

## M Module: Service Design Thinking (WI4BWLKSR2) [M-WIWI-101503]

**Responsibility:** Christof Weinhardt, Gerhard Satzger

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102849 | Team Work in the Area of Service Oriented Architectures (S. 769) | 9 | Christof Weinhardt, Gerhard Satzger |

### 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
- 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.

### Recommendations
This course is held in English – proficiency in writing and communication is required.

**Remarks**
Due to the project nature of the course, the number of participants is limited. For further information see the course description.
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: Services Marketing (WW4BWLMAR9) [M-WIWI-101649]

**Responsibility:** Ju-Young Kim

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Einmalig | 1 Semester | Deutsch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103140 | Services Marketing (S. 719) | 3 | Ju-Young Kim |
| T-WIWI-103141 | Online Marketing (S. 546) | 4,5 | Ju-Young Kim |
| T-WIWI-102902 | Marketing Communication (S. 500) | 4,5 | Ju-Young Kim |
| T-WIWI-102883 | Pricing (S. 614) | 4,5 | Ju-Young Kim |
| T-WIWI-102834 | Case Studies in Sales and Pricing (S. 284) | 1,5 | Martin Klarmann |

### 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
None

### Qualification Objectives
Students

- gain knowledge about basic content and strategies of services marketing
- know about current topics (research and practice) in online marketing and learn how the transparency of the internet provides new opportunities to measure the success of marketing instruments
- get to know marketing communications objectives and strategies
- have a fundamental understanding of price management (in particular consumer behavior of pricing, pricing strategy, price determination)
- are able to implement their extensive sales and pricing knowledge in a practical context
- are able to implement their extensive marketing knowledge in a practical context
- have the knowledge to write a master thesis in Services Marketing

### Content
understanding of services marketing. Besides the classical offline services, the module also focuses on online services. The course "Services Marketing" starts with an overview of basic content and strategies in services marketing.
Within the course "Online Marketing" students learn about current topics (research and practice) in online marketing and learn how the transparency of the internet provides new opportunities to measure the success of marketing instruments.
In "Marketingkommunikation" students learn about marketing communication objectives and strategies.
The course "Pricing" builds a fundamental understanding of price management.

In the course “Case Studies in Sales and Pricing“ students work with case studies helping them to understand the bridge between theoretical and practical knowledge.

**Recommendations**

None

**Remarks**

new module starting winter term 2015/2016

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**

See German version.

## M Module: Market Engineering (WI4BWLISM3) [M-WIWI-101446]

**Responsibility:** Christof Weinhardt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 496) | 4,5 | Christof Weinhardt |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102613 | Auction Theory (S. 249) | 4,5 | Karl-Martin Ehrhart |
| T-WIWI-102600 | eFinance: Information Engineering and Management for Securities Trading (S. 339) | 4,5 | Christof Weinhardt |
| T-WIWI-102614 | Experimental Economics (S. 375) | 4,5 | Christof Weinhardt, Timm Teubner |
| T-WIWI-102794 | eEnergy: Markets, Services, Systems (S. 335) | 4,5 | Christof Weinhardt |
| T-WIWI-103131 | Regulatory Management and Grid Management - Economic Efficiency of Network Operation (S. 655) | 4,5 | |

### 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: Data Science: Data-Driven User Modeling [M-WIWI-103118]

**Responsibility:** Christof Weinhardt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102899 | Modeling and Analyzing Consumer Behavior with R (S. 524) | 4,5 | Christof Weinhardt, Verena Dorner |
| T-WIWI-102614 | Experimental Economics (S. 375) | 4,5 | Christof Weinhardt, Timm Teubner |
| T-WIWI-106214 | Practical Seminar: Crowd Analytics (S. 599) | 4,5 | Christof Weinhardt, Timm Teubner |

### Learning Control / Examinations
The assessment is carried out as partial exams 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
None

### Qualification Objectives
Students of this module

- learn methods for planning empirical studies, in particular laboratory experiments,
- acquire theoretical knowledge and practical skills in analysing empirical data,
- familiarize with different ways of modelling user behaviour, are able to critically discuss, and to evaluate them

### Content
Understanding and supporting user interactions with applications better plays an increasingly large role in the design of business applications. This applies both to interfaces for customers and to internal information systems. The data that is generated during user interactions can be channelled straight into business processes, for instance by analysing and decomposing purchase decisions, and by feeding this data into product design processes.
The Crowd Analytics section considers the analysis of data from online platforms, particularly of those following crowd- or peer-to-peer based business models. This includes platforms like Airbnb, Kickstarter and Amazon Mechanical Turk.
Theoretical models of user (decision) behaviour help analyzing the empirically observed user behaviour in a systematic fashion. Testing these models and their predictions in controlled experiments (primarily in the lab) in turn helps refine theory and to generate practically relevant design recommendations. Analyses are carried out using advanced analytic methods.
Students learn fundamental theoretical models for user behaviour in systems and apply them to cases. Students are also taught methods and skills for conceptualizing and planning empirical studies and for analyzing the resulting data.

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

**Remarks**
The course „Crowd Analytics“ can be chosen from winter term 2016 on.

## M Module: Marketing Management (WI4BWLMAR5) [M-WIWI-101490]

**Responsibility:** Martin Klarmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102812 | Product and Innovation Marketing (S. 624) | 3 | Martin Klarmann |
| T-WIWI-102811 | Market Research (S. 498) | 4,5 | Martin Klarmann |
| T-WIWI-102619 | Behavioral Approaches in Marketing (S. 263) | 4,5 | Bruno Neibecker |
| T-WIWI-102618 | Strategic and Innovative Decision Making in Marketing (S. 747) | 4,5 | Bruno Neibecker |
| T-WIWI-102835 | Marketing Strategy Business Game (S. 501) | 1,5 | Martin Klarmann |
| T-WIWI-102842 | Strategic Brand Management (S. 749) | 1,5 | Joachim Blickhäuser, Martin Klarmann |
| T-WIWI-102901 | Open Innovation - Concepts, Methods and Best Practices (S. 547) | 1,5 | Alexander Hahn |
| T-WIWI-102902 | Marketing Communication (S. 500) | 4,5 | Ju-Young Kim |

### 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 first decimal.

### Conditions
Only one of the following courses can be counted towards the final grade of the module:
Marketing Strategy Business Game, Business Plan Workshop, Open Innovation – Concepts, Methods and Best Practices or Strategic Brand Management.
Exception: In summer term 2016 exceptionally two of the courses can be chosen or, in case one course has already been chosen previously, a second course can be chosen.

### 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
- "Strategic and Behavioral Marketing"
- "Marketing Strategy Business Game"
- "Strategic Brand Management"
- "Open Innovation"

**Recommendations**

None

**Remarks**

The course T-WIWI-102832 - Business Plan Workshop is not available anymore.
The course "Open Innovation – Concepts, Methods and Best Practices" [2571199] has been added summer 2015.
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.
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: Digital Service Systems in Industry (WI4BWLKSR6) [M-WIWI-102808]

**Responsibility:** Stefan Nickel, Wolf Fichtner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 3 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102690 | Basics of Liberalised Energy Markets (S. 259) | 3 | Wolf Fichtner |
| T-WIWI-102872 | Challenges in Supply Chain Management (S. 288) | 4,5 | Robert Blackburn |
| T-WIWI-102822 | Industrial Services (S. 437) | 4,5 | Hansjörg Fromm |
| T-WIWI-106200 | Modeling and OR-Software: Advanced Topics (S. 526) | 4,5 | Stefan Nickel |
| T-WIWI-105776 | Practical Seminar Special Topics in SSME (S. 598) | 4,5 | Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Alexander Mädche, York Sure-Vetter, Gerhard Satzger |
| T-WIWI-106201 | Digital Transformation in Organizations (S. 329) | 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
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: Business & Service Engineering (WI4BWLISM4) [M-WIWI-101410]

**Responsibility:** Christof Weinhardt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 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. 278) | 4,5 | Rico Knapper, Timm Teubner |
| T-WIWI-102706 | Special Topics in Information Engineering & Management (S. 734) | 4,5 | Christof Weinhardt |
| T-WIWI-102847 | Recommender Systems (S. 651) | 4,5 | Andreas Geyer-Schulz |
| T-WIWI-102848 | Personalization and Services (S. 568) | 4,5 | Andreas Sonnenbichler |
| T-WIWI-102641 | Service Innovation (S. 716) | 4,5 | Gerhard Satzger |
| T-WIWI-102799 | Practical Seminar Service Innovation (S. 597) | 4,5 | Gerhard Satzger |
| T-WIWI-106201 | Digital Transformation in Organizations (S. 329) | 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: Cross-functional Management Accounting (WW4BWLIBU2) [M-WIWI-101510]

**Responsibility:** Marcus Wouters

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102885 | Advanced Management Accounting (S. 236) | 4,5 | Marcus Wouters |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102883 | Pricing (S. 614) | 4,5 | Ju-Young Kim |
| T-WIWI-102812 | Product and Innovation Marketing (S. 624) | 3 | Martin Klarmann |
| T-WIWI-102835 | Marketing Strategy Business Game (S. 501) | 1,5 | Martin Klarmann |
| T-WIWI-102621 | Valuation (S. 799) | 4,5 | Martin Ruckes |
| T-WIWI-102803 | Modeling Strategic Decision Making (S. 528) | 4,5 | Hagen Lindstädt |
| T-WIWI-105781 | Incentives in Organizations (S. 433) | 4,5 | Petra Nieken |

### 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.

### Recommendations
None

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

## M Module: Financial Technology for Risk and Asset Management [M-WIWI-103121]

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | Englisch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102878 | Computational Risk and Asset Management (S. 299) | 4,5 | Maxim Ulrich |
| T-WIWI-106195 | Machine Learning in Finance (S. 482) | 4,5 | Maxim Ulrich |
| T-WIWI-106193 | Engineering of Financial Software (S. 358) | 4,5 | 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 will be able to connect innovative financial research with modern information technology to build a prototype that solves some daunting tasks for professional end-users in the field of modern asset and risk management based on the knowledge they obtained in either 'Computational Risk and Asset Management' or 'Machine Learning in Finance'.

### 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: Service Management (WI4BWLISM6) [M-WIWI-101448]

**Responsibility:** Christof Weinhardt, Gerhard Satzger

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 3 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102881 | Business and IT Service Management (S. 273) | 4,5 | Gerhard Satzger |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102641 | Service Innovation (S. 716) | 4,5 | Gerhard Satzger |
| T-WIWI-105778 | Service Analytics A (S. 713) | 4,5 | Hansjörg Fromm, Thomas Setzer |
| T-WIWI-102822 | Industrial Services (S. 437) | 4,5 | Hansjörg Fromm |
| T-WIWI-102899 | Modeling and Analyzing Consumer Behavior with R (S. 524) | 4,5 | Christof Weinhardt, Verena Dorner |
| T-WIWI-106201 | Digital Transformation in Organizations (S. 329) | 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 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: Quantitative Risk Management [M-WIWI-103122]

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | Englisch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-106191 | Bayesian Methods for Financial Economics (S. 262) | 4,5 | Maxim Ulrich |
| T-WIWI-106195 | Machine Learning in Finance (S. 482) | 4,5 | 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 are able to apply Bayesian MCMC methods to estimate financial models. Moreover, students are able to apply machine learning algorithms to solve current finance problems.

### Content
See respective lecture

### Recommendations
None

### Remarks
New module starting summer term 2017. Further remarks see respective lecture.

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

## M Module: Microeconomic Theory (WI4VWL15) [M-WIWI-101500]

**Responsibility:** Clemens Puppe

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 2 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 1 courses and 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 238) | 4,5 | Kay Mitusch |
| T-WIWI-102861 | Advanced Game Theory (S. 232) | 4,5 | Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß |
| T-WIWI-102859 | Social Choice Theory (S. 727) | 4,5 | Clemens Puppe |
| T-WIWI-102613 | Auction Theory (S. 249) | 4,5 | Karl-Martin Ehrhart |
| T-WIWI-105781 | Incentives in Organizations (S. 433) | 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).

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

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

## M Module: Innovation Economics (WI4VWL19) [M-WIWI-101514]

**Responsibility:** Ingrid Ott

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 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. 447) | 4,5 | Ingrid Ott |
| T-WIWI-102812 | Product and Innovation Marketing (S. 624) | 3 | Martin Klarmann |
| T-WIWI-102789 | Seminar in Economic Policy (S. 684) | 3 | Ingrid Ott |
| T-WIWI-102906 | Methods in Economic Dynamics (S. 514) | 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 and growth (WI4VWLIWW1) [M-WIWI-101478]

**Responsibility:** Ingrid Ott

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102840 | Innovationtheory and -Policy (S. 447) | 4,5 | Ingrid Ott |
| T-WIWI-102785 | Theory of Endogenous Growth (S. 781) | 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: Economic Theory and its Application in Finance (WI4VWL14) [M-WIWI-101502]

**Responsibility:** Kay Mitusch

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 4 | 3 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102622 | Corporate Financial Policy (S. 314) | 4,5 | Martin Ruckes |
| T-WIWI-102623 | Financial Intermediation (S. 387) | 4,5 | Martin Ruckes |
| T-WIWI-102647 | Asset Pricing (S. 248) | 4,5 | Marliese Uhrig-Homburg, Martin Ruckes |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 1 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 238) | 4,5 | Kay Mitusch |
| T-WIWI-102861 | Advanced Game Theory (S. 232) | 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.

**Remarks**
The course T-WIWI-102609 - Advanced Topics in Economic Theory is currently not available. The course restarts in summer term 2018.

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

## M Module: Collective Decision Making (WI4VWL16) [M-WIWI-101504]

**Responsibility:** Clemens Puppe

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Wahlpflichtangebot**

Non-Compulsory Block; You must choose between 9 and 9,5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102617 | Mathematical Theory of Democracy (S. 511) | 4,5 | Andranik Melik-Tangian |
| T-WIWI-102859 | Social Choice Theory (S. 727) | 4,5 | Clemens Puppe |
| T-WIWI-102740 | Public Management (S. 639) | 4,5 | Berthold Wigger |

### 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: Macroeconomic Theory (WI4VWL8) [M-WIWI-101462]

**Responsibility:** Marten Hillebrand

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102785 | Theory of Endogenous Growth (S. 781) | 4,5 | Ingrid Ott |
| T-WIWI-102825 | Theory of Economic Growth (S. 780) | 4,5 | Marten Hillebrand |
| T-WIWI-102824 | Theory of Business Cycles (S. 779) | 4,5 | Marten Hillebrand |

### 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
See German version.

### Content
See German version

### Remarks
The module will not be offered any more from summer term 2016.

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

## M Module: Growth and Agglomeration (WI4VWL12) [M-WIWI-101496]

**Responsibility:** Ingrid Ott

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102785 | Theory of Endogenous Growth (S. 781) | 4,5 | Ingrid Ott |
| T-WIWI-103107 | Spatial Economics (S. 731) | 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: Environmental Economics (WI4VWL5) [M-WIWI-101468]

**Responsibility:** Kay Mitusch

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 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. 368) | 5 | Rainer Walz |
| T-WIWI-102616 | Environmental and Ressource Policy (S. 365) | 4 | Rainer Walz |
| T-WIWI-102650 | Energy and Environment (S. 347) | 4,5 | Ute Karl |
| T-WIWI-100007 | Transport Economics (S. 792) | 4,5 | Kay Mitusch, Eckhard Szimba |
| T-INFO-101348 | Environmental Law (S. 369) | 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: Transport infrastructure policy and regional development (WI4VWL11) [M-WIWI-101485]

**Responsibility:** Kay Mitusch

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-100007 | Transport Economics (S. 792) | 4,5 | Kay Mitusch, Eckhard Szimba |
| T-WIWI-103107 | Spatial Economics (S. 731) | 4,5 | Ingrid Ott |

### 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.

# Module: Network Economics (WI4VWL4) [M-WIWI-101406]

**Responsibility:** Kay Mitusch

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-100005 | Competition in Networks (S. 296) | 4,5 | Kay Mitusch |
| T-WIWI-100007 | Transport Economics (S. 792) | 4,5 | Kay Mitusch, Eckhard Szimba |
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 238) | 4,5 | Kay Mitusch |
| T-WIWI-102712 | Regulation Theory and Practice (S. 654) | 4,5 | Kay Mitusch |
| T-WIWI-102713 | Telecommunication and Internet Economics (S. 774) | 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.

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

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

## M Module: Applied Strategic Decisions (WI4VWL2) [M-WIWI-101453]

**Responsibility:** Johannes Philipp Reiß

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 4 | 2 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102861 | Advanced Game Theory (S. 232) | 4,5 | Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102613 | Auction Theory (S. 249) | 4,5 | Karl-Martin Ehrhart |
| T-WIWI-102614 | Experimental Economics (S. 375) | 4,5 | Christof Weinhardt, Timm Teubner |
| T-WIWI-102622 | Corporate Financial Policy (S. 314) | 4,5 | Martin Ruckes |
| T-WIWI-102623 | Financial Intermediation (S. 387) | 4,5 | Martin Ruckes |
| T-WIWI-102640 | Market Engineering: Information in Institutions (S. 496) | 4,5 | Christof Weinhardt |
| T-WIWI-102862 | Predictive Mechanism and Market Design (S. 606) | 4,5 | Johannes Philipp Reiß |
| T-WIWI-105781 | Incentives in Organizations (S. 433) | 4,5 | Petra Nieken |

**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: Experimental Economics (WI4VWL17) [M-WIWI-101505]

**Responsibility:** Johannes Philipp Reiß

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Language | Level | Version |
|---|---|---|---|
| 9 | Deutsch | 4 | 3 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102862 | Predictive Mechanism and Market Design (S. 606) | 4,5 | Johannes Philipp Reiß |
| T-WIWI-102863 | Topics in Experimental Economics (S. 784) | 4,5 | Johannes Philipp Reiß |
| T-WIWI-105781 | Incentives in Organizations (S. 433) | 4,5 | Petra Nieken |
| T-WIWI-102614 | Experimental Economics (S. 375) | 4,5 | Christof Weinhardt, Timm Teubner |

### 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 *Advanced Game Theory* is not offered before Winter 2014/15.
- The course *Predictive Mechanism and Market Design* is not offered each year.

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

## M Module: Advanced Topics in Public Finance (WI4VWL18) [M-WIWI-101511]

**Responsibility:** Berthold Wigger

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102740 | Public Management (S. 639) | 4,5 | Berthold Wigger |

**Ergänzungsangebot**

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102739 | Public Revenues (S. 641) | 4,5 | Berthold Wigger |
| T-WIWI-102790 | Specific Aspects in Taxation (S. 742) | 4,5 | Armin Bader, 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**
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”.
The module will be offered from winter term 2014/15.

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

## M Module: Economic Policy II (WI4VWL3) [M-WIWI-101481]

**Responsibility:** Jan Kowalski

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102896 | Economic Integration in Europe (S. 334) | 4,5 | Jan Kowalski |
| T-WIWI-102840 | Innovationtheory and -Policy (S. 447) | 4,5 | Ingrid Ott |
| T-WIWI-102897 | International Economic Policy (S. 456) | 4,5 | Jan Kowalski |

**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

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

# M Module: Agglomeration and Innovation (WI4VWL13) [M-WIWI-101497]

**Responsibility:** Ingrid Ott

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103107 | Spatial Economics (S. 731) | 4,5 | Ingrid Ott |
| T-WIWI-102840 | Innovationtheory and -Policy (S. 447) | 4,5 | Ingrid Ott |
| T-WIWI-102609 | Advanced Topics in Economic Theory (S. 238) | 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 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.

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

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

## M Module: Informatics (WI4INFO1) [M-WIWI-101472]

**Responsibility:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, 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 | Jedes Semester | 1 Semester | 4 | 3 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102658 | Algorithms for Internet Applications (S. 240) | 5 | Hartmut Schmeck |
| T-WIWI-102759 | Requirements Analysis and Requirements Management (S. 657) | 4 | Ralf Kneuper |
| T-WIWI-102651 | Applied Informatics II - IT Systems for eCommerce (S. 246) | 5 | York Sure-Vetter |
| T-WIWI-102680 | Computational Economics (S. 297) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102661 | Database Systems and XML (S. 322) | 5 | Andreas Oberweis |
| T-WIWI-102663 | Document Management and Groupware Systems (S. 332) | 4 | Stefan Klink |
| T-WIWI-102655 | Efficient Algorithms (S. 337) | 5 | Hartmut Schmeck |
| T-WIWI-102668 | Enterprise Architecture Management (S. 359) | 5 | Thomas Wolf |
| T-WIWI-102666 | Knowledge Discovery (S. 467) | 5 | Rudi Studer |
| T-WIWI-102667 | Management of IT-Projects (S. 490) | 5 | Roland Schätzle |
| T-WIWI-102697 | Business Process Modelling (S. 280) | 5 | Andreas Oberweis |
| T-WIWI-102679 | Nature-Inspired Optimisation Methods (S. 536) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102659 | Organic Computing (S. 560) | 5 | Hartmut Schmeck |
| T-WIWI-102874 | Semantic Web Technologies (S. 672) | 5 | Rudi Studer, Andreas Harth |
| T-WIWI-105801 | Service Oriented Computing (S. 718) | 5 | Barry Norton, Sudhir Agarwal, Rudi Studer |
| T-WIWI-102845 | Smart Energy Distribution (S. 726) | 4 | Hartmut Schmeck |
| T-WIWI-102895 | Software Quality Management (S. 729) | 5 | Andreas Oberweis |
| T-WIWI-102676 | Special Topics of Enterprise Information Systems (S. 738) | 5 | Andreas Oberweis |
| T-WIWI-102657 | Special Topics of Efficient Algorithms (S. 737) | 5 | Hartmut Schmeck |
| T-WIWI-102678 | Special Topics of Software- and Systemsengineering (S. 740) | 5 | Andreas Oberweis |
| T-WIWI-102671 | Special Topics of Knowledge Management (S. 739) | 5 | Rudi Studer |
| T-WIWI-102669 | Strategic Management of Information Technology (S. 750) | 5 | Thomas Wolf |
| T-WIWI-103112 | Web Science (S. 818) | 5 | York Sure-Vetter |
| T-WIWI-102662 | Workflow-Management (S. 828) | 5 | Andreas Oberweis |
| T-WIWI-103523 | Advanced Lab Informatics (S. 233) | 4 | Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner |

**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.

**Workload**

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

## M Module: Mathematical Programming (WI4OR6) [M-WIWI-101473]

**Responsibility:** Oliver Stein

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102719 | Mixed Integer Programming I (S. 518) | 4,5 | Oliver Stein |
| T-WIWI-102720 | Mixed Integer Programming II (S. 520) | 4,5 | Oliver Stein |
| T-WIWI-102733 | Mixed Integer Programming I and II (S. 519) | 9 | |
| T-WIWI-102726 | Global Optimization I (S. 412) | 4,5 | Oliver Stein |
| T-WIWI-102727 | Global Optimization II (S. 414) | 4,5 | Oliver Stein |
| T-WIWI-103638 | Global Optimization I and II (S. 413) | 9 | |
| T-WIWI-102723 | Graph Theory and Advanced Location Models (S. 420) | 4,5 | Stefan Nickel |
| T-WIWI-102856 | Convex Analysis (S. 311) | 4,5 | Oliver Stein |
| T-WIWI-103635 | Prerequisite for Nonlinear Optimization I (Master) (S. 608) | 0 | |
| T-WIWI-102724 | Nonlinear Optimization I (S. 538) | 4,5 | Oliver Stein |
| T-WIWI-103636 | Prerequisite for Nonlinear Optimization II (Master) (S. 609) | 0 | |
| T-WIWI-102725 | Nonlinear Optimization II (S. 542) | 4,5 | Oliver Stein |
| T-WIWI-103637 | Nonlinear Optimization I und II (S. 540) | 9 | |
| T-WIWI-102855 | Parametric Optimization (S. 565) | 4,5 | Oliver Stein |
| T-WIWI-102721 | Special Topics in Optimization I (S. 735) | 4,5 | Oliver Stein |
| T-WIWI-102722 | Special Topics in Optimization II (S. 736) | 4,5 | Oliver Stein |

**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

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming, location theory, and graph theory,
- 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, for location problems and for problems on graphs.

**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: Stochastic Modelling and Optimization (WI4OR7) [M-WIWI-101454]

**Responsibility:** Karl-Heinz Waldmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102628 | Optimization in a Random Environment (S. 558) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102730 | OR-Oriented Modeling and Analysis of Real Problems (Project) (S. 562) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102728 | Quality Control I (S. 642) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102729 | Quality Control II (S. 643) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102627 | Simulation I (S. 721) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102703 | Simulation II (S. 723) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102710 | Markov Decision Models I (S. 503) | 5 | Karl-Heinz Waldmann |
| T-WIWI-102711 | Markov Decision Models II (S. 504) | 4,5 | Karl-Heinz Waldmann |

### Learning Control / Examinations
The assessment is carried out as partial written 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 posses detailed knowledge in modelling, analyzing and optimizing stochastic systems in economy and engineering.

### Content
Markov Decision Models I: Markov Chains, Poisson Processes.
Markov Decision Models II: Queuing Systems, Stochastic Decision Processes
Simulation I: Generation of random numbers, Monte Carlo integration, Discrete event simulation, Discrete and continuous random variables, Statistical analysis of simulated data.
Simulation II: Variance reduction techniques, Simulation of stochastic processes, Case studies.
Quality Control I: Statistical Process Control, Acceptance Sampling, Design of experiments
Quality Control II: Reliability of complexe systems with and without repair, Maintenance
OR-orientied modeling and analysis of real problems: project-based modelling and analysis

### Remarks
The examination

- T-WIWI-102627 Simulation I will be offered latest until winter term 2016/2017 (for beginners).

- T-WIWI-102703 Simulation II will be offered latest until summer term 2017 (for beginners).
- T-WIWI-102710 Markov Decision Models I will be offered latest until summer term 2017 (for beginners).
- T-WIWI-102711 Markov Decision Models II will be offered latest until winter term 2016/2017 (for beginners).

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

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

# M Module: Operations Research in Supply Chain Management and Health Care Management (WI4OR5) [M-WIWI-101415]

**Responsibility:** Stefan Nickel

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 3 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 9 and 11,5 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102872 | Challenges in Supply Chain Management (S. 288) | 4,5 | Robert Blackburn |
| T-WIWI-102718 | Discrete-Event Simulation in Production and Logistics (S. 331) | 4,5 | Stefan Nickel |
| T-WIWI-102723 | Graph Theory and Advanced Location Models (S. 420) | 4,5 | Stefan Nickel |
| T-WIWI-102787 | Hospital Management (S. 432) | 4,5 | Stefan Nickel |
| T-WIWI-102715 | Operations Research in Supply Chain Management (S. 554) | 4,5 | Stefan Nickel |
| T-WIWI-102884 | Operations Research in Health Care Management (S. 552) | 4,5 | Stefan Nickel |
| T-WIWI-102716 | Practical Seminar: Health Care Management (with Case Studies) (S. 603) | 4,5 | Stefan Nickel |
| T-WIWI-103061 | Prerequisite for Facility Location and Strategic Supply Chain Management (S. 607) | 0 | Stefan Nickel |
| T-WIWI-102704 | Facility Location and Strategic Supply Chain Management (S. 378) | 4,5 | Stefan Nickel |
| T-WIWI-102860 | Supply Chain Management in the Process Industry (S. 761) | 4,5 | Stefan Nickel |
| T-WIWI-105940 | Prerequisite for Tactical and Operational Supply Chain Management (S. 610) | 0 | Stefan Nickel |
| T-WIWI-102714 | Tactical and Operational Supply Chain Management (S. 766) | 4,5 | Stefan Nickel |
| T-WIWI-106200 | Modeling and OR-Software: Advanced Topics (S. 526) | 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**
The course Challenges in Supply Chain Management can only be assigned if this module is assigned as an elective module.

**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 familiar with general procedures and characteristics of Health Care Management and the possibilities for adapting mathematical models for non-profit organizations,
- 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.

Health Care Management addresses specific Supply Chain Management problems in the health sector. Important applications arise in scheduling and internal logistics of hospitals.

**Recommendations**

Basic knowledge as conveyed in the module*Introduction toOperations 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.

The module will not be offered any more from summer term 2016. Students who are already assigned on the module can still finish it until summer term 2017 (repeaters only).

**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: Service Operations (WI4BWLKSR4) [M-WIWI-102805]

**Responsibility:** Stefan Nickel

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

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

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose between 1 und 2 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102715 | Operations Research in Supply Chain Management (S. 554) | 4,5 | Stefan Nickel |
| T-WIWI-102884 | Operations Research in Health Care Management (S. 552) | 4,5 | Stefan Nickel |
| T-WIWI-102716 | Practical Seminar: Health Care Management (with Case Studies) (S. 603) | 4,5 | Stefan Nickel |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102718 | Discrete-Event Simulation in Production and Logistics (S. 331) | 4,5 | Stefan Nickel |
| T-WIWI-102860 | Supply Chain Management in the Process Industry (S. 761) | 4,5 | Stefan Nickel |
| T-WIWI-102787 | Hospital Management (S. 432) | 4,5 | Stefan Nickel |
| T-WIWI-102872 | Challenges in Supply Chain Management (S. 288) | 4,5 | Robert Blackburn |

### 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 three courses Operations Research in Supply Chain Management, Operations Research in Health Care Management or Practical seminar: Health Care Management has to be assigned.
The course Challenges in Supply Chain Management can only be assigned, if this module is assigned as an elective 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: Operations Research in Supply Chain Management (WI4OR11) [M-WIWI-102832]

**Responsibility:** Stefan Nickel

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102704 | Facility Location and Strategic Supply Chain Management (S. 378) | 4,5 | Stefan Nickel |
| T-WIWI-103061 | Prerequisite for Facility Location and Strategic Supply Chain Management (S. 607) | 0 | Stefan Nickel |
| T-WIWI-102714 | Tactical and Operational Supply Chain Management (S. 766) | 4,5 | Stefan Nickel |
| T-WIWI-105940 | Prerequisite for Tactical and Operational Supply Chain Management (S. 610) | 0 | Stefan Nickel |
| T-WIWI-102715 | Operations Research in Supply Chain Management (S. 554) | 4,5 | Stefan Nickel |
| T-WIWI-102718 | Discrete-Event Simulation in Production and Logistics (S. 331) | 4,5 | Stefan Nickel |
| T-WIWI-102723 | Graph Theory and Advanced Location Models (S. 420) | 4,5 | Stefan Nickel |
| T-WIWI-106200 | Modeling and OR-Software: Advanced Topics (S. 526) | 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
None

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

- The module [M-WIWI-101415] *Operations Research in Supply Chain Management and Health Care Management* must not have been started.

### 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: Transportation Modelling and Traffic Management (WI4INGBGU16) [M-BGU-101065]

**Responsibility:** Peter Vortisch

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**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. 513) | 3 | Peter Vortisch |
| T-BGU-101798 | Traffic Engineering (S. 788) | 3 | Peter Vortisch |
| T-BGU-101799 | Traffic Management and Transport Telematics (S. 791) | 3 | Peter Vortisch |
| T-BGU-101800 | Traffic Flow Simulation (S. 789) | 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. 793) | 3 | Martin Kagerbauer |
| T-BGU-100619 | Freight Transport (S. 391) | 3 | Bastian Chlond |
| T-BGU-100620 | Long-distance and Air Traffic (S. 481) | 3 | Bastian Chlond |
| T-BGU-101005 | Tendering, Planning and Financing in Public Transport (S. 777) | 3 | Peter Vortisch |
| T-BGU-100014 | Seminar in Transportation (S. 703) | 3 | Bastian Chlond, Peter Vortisch |
| T-WIWI-103174 | Seminar Mobility Services (Master) (S. 704) | 3 | Carola Stryja, Gerhard Satzger |
| T-BGU-103425 | Mobility Services and new Forms of Mobility (S. 522) | 3 | Martin Kagerbauer |
| T-BGU-103426 | Strategic Transport Planning (S. 751) | 3 | Volker Waßmuth |

### Learning Control / Examinations

*The assessment is carried out as partial exams (according to § 4(2), 2-3 of the examination regulation) of the core courses and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The overall grade of the module is the average of the grades for each course weighted by the credits.*
*The partial exams will take place jointly (if possible) at individually appointed dates.*

### Conditions

Two courses have to be chosen from the core courses. Core courses are: *Methods and Models in Transportation Planning*[6232701], *Traffic Engineering* [6232703], *Traffic Management and Transport Telematics* [6232802] and *Traffic Flow Simulation*[6232804]. To achieve the requiered ECTS Credits, additional courses have to be chosen from the remaining courses. From the two possible seminars, only one can be chosen.

### Qualification Objectives

See German version.

## M Module: Material Flow in Logistic Systems (WW4INGMB25) [M-MACH-101277]

**Responsibility:** Kai Furmans

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Einmalig | 1 Semester | 1 |

**Materialfluss in Logistiksystemen**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102151 | Material Flow in Logistic Systems (S. 508) | 6 | Kai Furmans |
| T-MACH-105174 | Warehousing and Distribution Systems (S. 812) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 239) | 4 | André Richter |
| T-MACH-105165 | Automotive Logistics (S. 258) | 4 | Kai Furmans |
| T-WIWI-103091 | Production and Logistics Controlling (S. 625) | 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
The course Material *Flow in Logistic Systems* [2117051] is compulsory and must be examined.

### 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.

### Remarks
If the course 2117051 "Materialfluss in Logistiksystemen" had been taken already, one of the modules [WW4INGMB26], [WW4INGMB27] and [WW4INGMB28] can be chosen.

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

# Module: Automotive Engineering (WI4INGMB5) [M-MACH-101266]

**Responsibility:** Frank Gauterin

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-100092 | Automotive Engineering (S. 253) | 6 | Hans-Joachim Unrau, Frank Gauterin |
| T-MACH-102117 | Automotive Engineering II (S. 257) | 3 | Hans-Joachim Unrau, Frank Gauterin |
| T-MACH-102156 | Project Workshop: Automotive Engineering (S. 636) | 4,5 | Martin Gießler, Frank Gauterin, Michael Frey |
| T-MACH-102116 | Fundamentals for Design of Motor-Vehicle Bodies I (S. 393) | 1,5 | Horst Dietmar Bardehle |
| T-MACH-102119 | Fundamentals for Design of Motor-Vehicle Bodies II (S. 395) | 1,5 | Horst Dietmar Bardehle |
| T-MACH-102093 | Fluid Power Systems (S. 389) | 5 | Stefan Haug, Martin Scherer, Marcus Geimer |
| T-MACH-102150 | BUS-Controls (S. 270) | 3 | Marcus Geimer, Felix Weber |
| T-MACH-102203 | Automotive Engineering I (S. 255) | 6 | Martin Gießler, Frank Gauterin |

## 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.

## Qualification Objectives
The student

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

## Content
See course descriptions.

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

## Workload
See German version.

## M Module: Virtual Engineering B (WI4INGMB30) [M-MACH-101281]

**Responsibility:** Jivka Ovtcharova

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102124 | Virtual Engineering II (S. 810) | 4 | Jivka Ovtcharova |

**Virtual Engineering B**
Non-Compulsory Block; You must choose at least 3 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102125 | Computer Integrated Planning of New Products (S. 301) | 4 | Roland Kläger |
| T-MACH-102149 | Virtual Reality Practical Course (S. 811) | 4 | Jivka Ovtcharova |
| T-MACH-102181 | PLM for Product Development in Mechatronics (S. 582) | 4 | Martin Eigner |
| T-MACH-102209 | Information Engineering (S. 439) | 3 | Jivka Ovtcharova |
| T-MACH-102153 | PLM-CAD Workshop (S. 583) | 4 | Jivka Ovtcharova |
| T-MACH-102185 | CATIA CAD Training Course (S. 286) | 2 | Jivka Ovtcharova |
| T-MACH-102187 | CAD-NX Training Course (S. 283) | 2 | Jivka Ovtcharova |
| T-MACH-105937 | Information management in production (S. 440) | 4 | Oliver Riedel |

### 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 *Virtual Engineering II* [2122378] is compulsory module and must be examined.

### 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.

**Recommendations**
We recommend to attend/visit the courses *Engineering I* [2121352] before *Virtual Engineering II* [2122378]

**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: Track Guided Transport Systems / Engineering (WI4INGBGU27) [M-BGU-101112]

**Responsibility:** Eberhard Hohnecker

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-100052 | Track Guided Transport Systems - Technical Design and Components (S. 786) | 6 | Eberhard Hohnecker |

**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-101848 | Infrastructure Dimensioning and Running Dynamics Based Railway Alignment (S. 443) | 3 | Eberhard Hohnecker |
| T-BGU-101849 | Infrastructure Equipment of Railway Tracks (S. 444) | 1,5 | Eberhard Hohnecker |
| T-BGU-101851 | Construction and Maintenance of Guided Track Infrastructure (S. 306) | 1,5 | Eberhard Hohnecker |
| T-MACH-102121 | Electrical Railway Traction Systems (S. 341) | 3 | Peter Gratzfeld |
| T-BGU-101825 | Environmental Aspects of Guided Transport Systems (S. 366) | 3 | Eberhard Hohnecker |
| T-BGU-101794 | Economic Efficiency of Guided Transport Systems (S. 333) | 1,5 | Eberhard Hohnecker |
| T-BGU-101793 | Law Aspects of Guided Transport Systems (S. 473) | 1,5 | Eberhard Hohnecker |
| T-BGU-101858 | Homework "Track Guided Transport Systems / Engineering" (S. 431) | 3 | Eberhard Hohnecker |

### Learning Control / Examinations
See German version.

### Conditions
See German version.

### Qualification Objectives
See German version.

### Content
See courses.

### Recommendations
See German version.

**Remarks**
New module starting summer term 2015.

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

## M Module: Combustion Engines I (WI4INGMB34) [M-MACH-101275]

**Responsibility:** Thomas Koch, Heiko Kubach

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

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102194 | Combustion Engines I (S. 293) | 5 | Thomas Koch, Heiko Kubach |
| T-MACH-105564 | Energy Conversion and Increased Efficiency in Internal Combustion Engines (S. 350) | 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: Process Engineering in Construction (WI4INGBGU22) [M-BGU-101110]

**Responsibility:** Shervin Haghsheno

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Level | Version |
|---|---|---|---|
| 9 | Jedes Wintersemester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-101844 | Process Engineering (S. 621) | 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. 307) | 3 | Sascha Gentes |
| T-BGU-101832 | Operation Methods for Foundation and Marine Construction (S. 550) | 1,5 | Harald Schneider |
| T-BGU-101801 | Operation Methods for Earthmoving (S. 549) | 1,5 | Heinrich Schlick |
| T-BGU-101846 | Tunnel Construction and Blasting Engineering (S. 795) | 3 | Shervin Haghsheno |
| T-BGU-101847 | Project Studies (S. 635) | 3 | Sascha Gentes |
| T-BGU-101850 | Disassembly Process Engineering (S. 330) | 3 | Sascha Gentes |

### 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 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 1 semester after the first try. The exam will be based on the content of the latest lecture.
Examination of courses Verfahrenstechnik [6241704] und Maschinentechnik [6241703] is carried out written. Combinations of courses Tiefbau [6241911], Erdbau [6241913], Tunnelbau und Sprengtechnik [6241910], Projektstudien [6241826] and Verfahrenstechniken der Demontage [6241828] are examined orally.

### 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.

# M Module: Manufacturing Technology (WI4INGMB23) [M-MACH-101276]

**Responsibility:** Volker Schulze

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102105 | Manufacturing Technology (S. 494) | 9 | Frederik Zanger, Volker Schulze |

### Learning Control / Examinations

The assessment is carried out as partial exams (according to Section 4(2), 1-3 SPO 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.
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 wbk. The term paper may not be convalidated in the seminar module.

### 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

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

## M Module: Water Chemistry and Water Technology I (WI4INGCV6) [M-CIWVT-101121]

**Responsibility:** Harald Horn

**Organisation:** KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | Deutsch/Englisch | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-CIWVT-101900 | Water Chemistry and Water Technology I (S. 814) | 6 | Harald Horn |
| T-CIWVT-103351 | Laboratory Work Water Chemistry (S. 469) | 4 | Harald Horn, Gudrun Abbt-Braun |

### 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: Specialization in Production Engineering (WI4INGMB22) [M-MACH-101284]

**Responsibility:** Volker Schulze

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102107 | Quality Management (S. 644) | 4 | Gisela Lanza |
| T-MACH-105166 | Materials and Processes for Body Leightweight Construction in the Automotive Industry (S. 509) | 4 | Stefan Kienzle, Dieter Steegmüller |
| T-MACH-105177 | Metal Forming (S. 512) | 3 | Florian Herlan |
| T-MACH-105185 | Control Technology (S. 309) | 4 | Christoph Gönnheimer |
| T-MACH-102148 | Gear Cutting Technology (S. 410) | 4 | Markus Klaiber |
| T-MACH-102189 | Production Technology and Management in Automotive Industry (S. 627) | 4 | Volker Michael Stauch |
| T-MACH-105188 | Integrative Strategies in Production and Development of High Performance Cars (S. 454) | 4 | Karl-Hubert Schlichtenmayer |
| T-MACH-105277 | Safe mechatronic systems (S. 662) | 4 | Markus Golder |

**Learning Control / Examinations**
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) 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. 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 wbk. The term paper may not be convalidated in the seminar module.

## M Module: Machine Tools and Industrial Handling (WI4INGMB32) [M-MACH-101286]

**Responsibility:** Jürgen Fleischer

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102158 | Machine Tools and Industrial Handling (S. 483) | 9 | Jürgen Fleischer |

**Learning Control / Examinations**
The assessment is carried out as an oral exam. The examination is offered every semester. Reexaminations are offered at every ordinary examination date.

**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.

## M Module: Design, Construction, Operation and Maintenance of Highways (WI4INGBGU1) [M-BGU-100998]

**Responsibility:** Ralf Roos

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-101670 | Design Basics in Highway Engineering (S. 325) | 3 | Ralf Roos |
| T-BGU-100051 | Infrastructure Management (S. 445) | 6 | Ralf Roos |

### Learning Control / Examinations

The assessment of the module consists of a written exam about the lecture *Design Basics in Highway Engineering* [19026] (according to §4(2), 1 of the examination regulation) and a conjoined oral exam about the lectures *Design and Construction Highways* [6233801] and *Operation and Maintenance Highways* [6233802] (according to §4(2), 2 of the examination regulation) (duration: 30 min.).
The exams are offered in each semester and may be resited to any ordinary ecxamination date.
The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

### Conditions

The selection of this module excludes the selection of the module "Highway Engineering" (WI4INGBGU2).

### Modeled Conditions

The following conditions must be met:

- The module [M-BGU-100999] *Highway Engineering* must not have been started.

### Qualification Objectives

See German version.

### Workload

See German version.

## M Module: Extracurricular Module in Engineering (WI4INGAPL) [M-WIWI-101404]

**Responsibility:** Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Einmalig | 1 Semester | 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. 570) | 3 | |
| T-WIWI-106292 | PH APL-ING-TL02 (S. 571) | 3 | |
| T-WIWI-106293 | PH APL-ING-TL03 (S. 572) | 3 | |
| T-WIWI-106294 | PH APL-ING-TL04 ub (S. 573) | 0 | |
| T-WIWI-106295 | PH APL-ING-TL05 ub (S. 574) | 0 | |
| T-WIWI-106296 | PH APL-ING-TL06 ub (S. 575) | 0 | |

### 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: High-Voltage Technology (WI4INGETIT6) [M-ETIT-101163]

**Responsibility:** Thomas Leibfried, Bernd Hoferer

**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Duration | Level | Version |
|---|---|---|---|
| 9 | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-101913 | High-Voltage Technology I (S. 426) | 4,5 | Rainer Badent |
| T-ETIT-101914 | High-Voltage Technology II (S. 427) | 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: Combustion Engines II (WI4INGMB35) [M-MACH-101303]

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-104609 | Combustion Engines II (S. 294) | 5 | 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. 403) | 4 | Egbert Lox |
| T-MACH-105173 | Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines (S. 242) | 4 | Marcus Gohl |
| T-MACH-105184 | Fuels and Lubricants for Combustion Engines (S. 392) | 4 | Bernhard Kehrwald |
| T-MACH-105167 | Analysis Tools for Combustion Diagnostics (S. 243) | 4 | Uwe Wagner |
| T-MACH-102197 | Gas Engines (S. 407) | 4 | Rainer Golloch |
| T-MACH-102199 | Model Based Application Methods (S. 523) | 4 | Frank Kirschbaum |
| T-MACH-105169 | Engine Measurement Techniques (S. 356) | 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.

## M Module: Optoelectronics and Optical Communication (WI4INGMBIMT6) [M-MACH-101295]

**Responsibility:** Jan Gerrit Korvink

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Optoelektronik und Optische Kommunikationstechnik**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102166 | Fabrication Processes in Microsystem Technology (S. 377) | 3 | Klaus Bade |
| T-MACH-102152 | Novel Actuators and Sensors (S. 544) | 4 | Manfred Kohl, Martin Sommer |
| T-ETIT-101938 | Communication Systems and Protocols (S. 295) | 5 | Jürgen Becker |
| T-ETIT-100741 | Laser Physics (S. 472) | 4 | Christian Koos |
| T-ETIT-100740 | Quantum Functional Devices and Semiconductor Technology (S. 646) | 3 | Christian Koos |
| T-ETIT-101945 | Optical Waveguides and Fibers (S. 557) | 4 | Christian Koos |
| T-ETIT-100639 | Optical Transmitters and Receivers (S. 556) | 4 | Wolfgang Freude |

### 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.

### Remarks
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.

## M Module: Project in Public Transportation (WI4INGBGU25) [M-BGU-101113]

**Responsibility:** Eberhard Hohnecker

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-100066 | Traffic Infrastructure (S. 790) | 6 | Eberhard Hohnecker |

**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-101825 | Environmental Aspects of Guided Transport Systems (S. 366) | 3 | Eberhard Hohnecker |
| T-BGU-101794 | Economic Efficiency of Guided Transport Systems (S. 333) | 1,5 | Eberhard Hohnecker |
| T-BGU-101824 | Operation Systems and Track Guided Infrastructure Capacity (S. 551) | 3 | Eberhard Hohnecker |
| T-BGU-101795 | Management in Public Transport (S. 489) | 3 | Eberhard Hohnecker |
| T-BGU-101793 | Law Aspects of Guided Transport Systems (S. 473) | 1,5 | Eberhard Hohnecker |
| T-BGU-101856 | Homework "Project in Public Transportation" (S. 429) | 3 | Eberhard Hohnecker |

### Learning Control / Examinations
See German version.

### Conditions
See German version.

### Qualification Objectives
See German version.

### Content
See courses.

### Recommendations
See German version.

### Remarks
Starting summer term 2015, this new module replaces the old module Project in Public Transportation [WW4INGBGU18]

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

## M Module: Microfabrication (WI4INGMBIMT2) [M-MACH-101291]

**Responsibility:** Jan Gerrit Korvink

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Mikrofertigung**
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. 605) | 3 | Arndt Last |
| T-MACH-102166 | Fabrication Processes in Microsystem Technology (S. 377) | 3 | Klaus Bade |
| T-MACH-102168 | Replication Technologies in Micro System Technology (S. 656) | 3 | Matthias Worgull |
| T-MACH-100530 | Physics for Engineers (S. 579) | 6 | Alexander Nesterov-Müller, Peter Gumbsch |
| T-MACH-102169 | Chemical, Physical and Material Scientific Aspects of Polymers in Microsystem Technologies (S. 291) | 3 | Matthias Worgull |
| T-MACH-105186 | Fundamentals of X-Ray Optics I (S. 405) | 3 | Arndt Last |
| T-MACH-102167 | Nanotribology and -Mechanics (S. 535) | 3 | Hendrik Hölscher, Martin Dienwiebel |
| T-MACH-102191 | Polymers in MEMS B: Physics, Microstructuring and Applications (S. 588) | 3 | Matthias Worgull |
| T-MACH-102192 | Polymers in MEMS A: Chemistry, Synthesis and Applications (S. 586) | 3 | Bastian Rapp |
| T-MACH-102200 | Polymers in MEMS C: Biopolymers and Bioplastics (S. 590) | 3 | Matthias Worgull, Bastian Rapp |
| T-MACH-105556 | Practical Course Polymers in MEMS (S. 595) | 3 | Matthias Worgull, Bastian Rapp |

**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

- 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.

**Remarks**
Starting summer term 2015, the course "Practical course Polymers in MEMS" [2142856] can be chosen in the module.
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.

## M Module: Energy and Process Technology I (WI4INGMBITS1) [M-MACH-101296]

**Responsibility:** Heiner Wirbser

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102211 | Energy and Process Technology I (S. 348) | 9 | Corina Schwitzke, Amin Velji, Heiner Wirbser, Hans-Jörg Bauer |

### 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: Introduction to Logistics (WI4INGMB20) [M-MACH-101263]

**Responsibility:** Kai Furmans

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Wahlblock**
Non-Compulsory Block; You must choose 1 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102092 | Industrial Application of Material Handling Systems in Sorting and Distribution Systems (S. 435) | 4 | Jörg Föller |
| T-MACH-102128 | Information Systems and Supply Chain Management (S. 441) | 4 | Christoph Kilger |
| T-MACH-102178 | Elements of Technical Logistics and Project (S. 343) | 6 | Vladimir Madzharov, Martin Mittwollen |
| T-MACH-105149 | Industrial Application of Technological Logistics Instancing Crane Systems (S. 436) | 4 | Markus Golder |
| T-MACH-105151 | Energy Efficient Intralogistic Systems (S. 351) | 4 | Meike Braun, Frank Schönung |
| T-MACH-105165 | Automotive Logistics (S. 258) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 239) | 4 | André Richter |
| T-MACH-105187 | IT-Fundamentals of Logistics (S. 465) | 4 | Frank Thomas |
| T-MACH-105174 | Warehousing and Distribution Systems (S. 812) | 4 | Kai Furmans |
| T-MACH-105171 | Safety Engineering (S. 665) | 4 | Hans-Peter Kany |
| T-WIWI-103091 | Production and Logistics Controlling (S. 625) | 3 | Helmut Wlcek |
| T-MACH-102159 | Elements and Systems of Technical Logistics (S. 342) | 4 | Vladimir Madzharov, Martin Mittwollen |
| T-MACH-105200 | Safe structures for machines in material handling (S. 664) | 4 | Markus Golder |
| T-MACH-105277 | Safe mechatronic systems (S. 662) | 4 | Markus Golder |

**Pflichtblock**
Non-Compulsory Block; You must choose 1 courses.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102151 | Material Flow in Logistic Systems (S. 508) | 6 | Kai Furmans |
| T-MACH-102163 | Basics of Technical Logistics (S. 261) | 6 | Jan Oellerich, 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**
It is obligatory to choose one of the following courses:
· Material Flow in Logistic Systems
· Basics of technical logistics

**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.

# M Module: Virtual Engineering A (WI4INGMB29) [M-MACH-101283]

**Responsibility:** Jivka Ovtcharova

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102123 | Virtual Engineering I (S. 809) | 6 | Jivka Ovtcharova |

**Virtual Engineering A**
Non-Compulsory Block; You must choose at least 3 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102125 | Computer Integrated Planning of New Products (S. 301) | 4 | Roland Kläger |
| T-MACH-102149 | Virtual Reality Practical Course (S. 811) | 4 | Jivka Ovtcharova |
| T-MACH-102153 | PLM-CAD Workshop (S. 583) | 4 | Jivka Ovtcharova |
| T-MACH-102181 | PLM for Product Development in Mechatronics (S. 582) | 4 | Martin Eigner |
| T-MACH-102209 | Information Engineering (S. 439) | 3 | Jivka Ovtcharova |
| T-MACH-105937 | Information management in production (S. 440) | 4 | Oliver Riedel |

### 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 *Virtual Engineering I* [2121352] is compulsory modules and must be examined.

### 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**
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: Project Management in Construction (bauiEX403-PROJMAN) [M-BGU-101888]

**Responsibility:** Shervin Haghsheno

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 2 Semester | Deutsch | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-103432 | Project Management in Construction and Real Estate Industry I (S. 632) | 3 | Shervin Haghsheno |
| T-BGU-103431 | Turnkey Construction II - Trades and Technology (S. 797) | 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. 725) | 1,5 | Shervin Haghsheno |
| T-BGU-103430 | Turnkey Construction I - Processes and Methods (S. 796) | 1,5 | Shervin Haghsheno |
| T-BGU-103428 | Supplementary Claim Management (S. 758) | 1,5 | Shervin Haghsheno |
| T-BGU-103429 | Building Laws (S. 269) | 3 | Shervin Haghsheno |
| T-BGU-103433 | Project Management in Construction and Real Estate Industry II (S. 633) | 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.
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 Nachtragsmanagement are examined orally.

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

# M Module: Specific Topics in Materials Science (WI4INGMB33) [M-MACH-101268]

**Responsibility:** Michael Hoffmann

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Spezielle Werkstoffkunde**

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102141 | Constitution and Properties of Wearresistant Materials (S. 304) | 4 | Sven Ulrich |
| T-MACH-100287 | Introduction to Ceramics (S. 461) | 6 | Michael Hoffmann |
| T-MACH-102099 | Experimental Lab Class in Welding Technology, in Groups (S. 376) | 4 | Jürgen Hoffmeister |
| T-MACH-102111 | Principles of Ceramic and Powder Metallurgy Processing (S. 615) | 4 | Rainer Oberacker |
| T-MACH-102154 | Laboratory Laser Materials Processing (S. 468) | 4 | Johannes Schneider |
| T-MACH-102102 | Physical Basics of Laser Technology (S. 577) | 5 | Johannes Schneider |
| T-MACH-102137 | Polymer Engineering I (S. 584) | 4 | Peter Elsner |
| T-MACH-102138 | Polymerengineering II (S. 585) | 4 | Peter Elsner |
| T-MACH-102103 | Superhard Thin Film Materials (S. 756) | 4 | Sven Ulrich |
| T-MACH-100531 | Systematic Materials Selection (S. 765) | 5 | Stefan Dietrich |
| T-MACH-102139 | Failure of Structural Materials: Fatigue and Creep (S. 382) | 4 | Patric Gruber, Oliver Kraft, Peter Gumbsch |
| T-MACH-102140 | Failure of Structural Materials: Deformation and Fracture (S. 380) | 4 | Daniel Weygand, Oliver Kraft, Peter Gumbsch |
| T-MACH-102157 | High Performance Powder Metallurgy Materials (S. 425) | 4 | Rainer Oberacker |
| T-MACH-102179 | Structural Ceramics (S. 755) | 4 | Michael Hoffmann |
| T-MACH-102182 | Ceramic Processing Technology (S. 287) | 4 | Joachim Binder |
| T-MACH-102170 | Structural and Phase Analysis (S. 754) | 4 | Susanne Wagner |
| T-MACH-105150 | Constitution and Properties of Protective Coatings (S. 302) | 4 | Sven Ulrich |
| T-MACH-105170 | Welding Technology (S. 819) | 4 | Majid Farajian |
| T-MACH-105164 | Laser in Automotive Engineering (S. 470) | 4 | Johannes Schneider |
| T-MACH-105157 | Foundry Technology (S. 390) | 4 | Christian Wilhelm |
| T-MACH-105178 | Practical Course Technical Ceramics (S. 596) | 1 | Rainer Oberacker |

**Learning Control / Examinations**
The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. 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 acquire special basic knowledge in selected areas of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

**Content**
See courses.

## M Module: Vehicle Development (WI4INGMB14) [M-MACH-101265]

**Responsibility:** Frank Gauterin

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Einmalig | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105156 | Vehicle Mechatronics I (S. 804) | 3 | Dieter Ammon |
| T-MACH-105160 | Fundamentals in the Development of Commercial Vehicles I (S. 397) | 1,5 | Jörg Zürn |
| T-MACH-105161 | Fundamentals in the Development of Commercial Vehicles II (S. 399) | 1,5 | Jörg Zürn |
| T-MACH-102207 | Tires and Wheel Development for Passenger Cars (S. 783) | 3 | Günter Leister |
| T-MACH-105162 | Fundamentals of Automobile Development I (S. 401) | 1,5 | Rolf Frech |
| T-MACH-105163 | Fundamentals of Automobile Development II (S. 402) | 1,5 | Rolf Frech |
| T-MACH-102156 | Project Workshop: Automotive Engineering (S. 636) | 4,5 | Martin Gießler, Frank Gauterin, Michael Frey |
| T-MACH-105172 | Simulation of Coupled Systems (S. 724) | 3 | Marcus Geimer |

### 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

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

### Content
See courses.

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

### Workload
See German version.

# M Module: Fundamentals of Transportation (WI4INGBGU15) [M-BGU-101064]

**Responsibility:** Peter Vortisch

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 2 Semester | 4 | 1 |

**Pflichtleistung**

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-101796 | Characteristics of Transportation Systems (S. 290) | 3 | Peter Vortisch |
| T-BGU-101671 | Transportation Systems (S. 794) | 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-100619 | Freight Transport (S. 391) | 3 | Bastian Chlond |
| T-BGU-100620 | Long-distance and Air Traffic (S. 481) | 3 | Bastian Chlond |
| T-BGU-101005 | Tendering, Planning and Financing in Public Transport (S. 777) | 3 | Peter Vortisch |
| T-BGU-100014 | Seminar in Transportation (S. 703) | 3 | Bastian Chlond, Peter Vortisch |
| T-WIWI-103174 | Seminar Mobility Services (Master) (S. 704) | 3 | Carola Stryja, Gerhard Satzger |
| T-BGU-103425 | Mobility Services and new Forms of Mobility (S. 522) | 3 | Martin Kagerbauer |
| T-BGU-103426 | Strategic Transport Planning (S. 751) | 3 | Volker Waßmuth |

**Learning Control / Examinations**

*The assessment is carried out as partial exams (according to § 4(2), 2-3 of the examination regulation) of the core course(s) and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The overall grade of the module is the average of the grades for each course weighted by the credits.*
*The partial exams will take place jointly (if possible) at individually appointed dates.*

**Conditions**

*One course has to be chosen from the core courses. Core courses are: Fundamentals of Transportation Planning and Traffic Engineering [0170405] and Characteristics of Transportation Systems [6232806]. To achieve the required ECTS Credits, additional courses have to be chosen from the remaining courses.*
*From the courses Seminar in Transportation [6232903] and Seminar Mobility Services [2595475] only one course can be chosen.*

**Qualification Objectives**

See German version.

## M Module: Natural Hazards and Risk Management 1 (WW4INGINTER7) [M-WIWI-101642]

**Responsibility:** Michael Kunz

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-PHYS-103118 | Engineering Geophysics for external students (S. 357) | 4 | Friedemann Wenzel |
| T-BGU-101859 | Morphodynamics (S. 531) | 3 | Franz Nestmann |
| T-BGU-101676 | Environmental Communication (S. 367) | 4 | Charlotte Kämpf |
| T-BGU-101805 | Water Resource Management and Engineering Hydrology (S. 816) | 3 | Jürgen Ihringer |
| T-BGU-102997 | River and Floodplain Ecology (S. 660) | 3 | Florian Wittmann |

### 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 (WW4INGINTER8) [M-WIWI-101644]

**Responsibility:** Michael Kunz

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-PHYS-103118 | Engineering Geophysics for external students (S. 357) | 4 | Friedemann Wenzel |
| T-BGU-101859 | Morphodynamics (S. 531) | 3 | Franz Nestmann |
| T-BGU-101676 | Environmental Communication (S. 367) | 4 | Charlotte Kämpf |
| T-BGU-101805 | Water Resource Management and Engineering Hydrology (S. 816) | 3 | Jürgen Ihringer |
| T-BGU-102997 | River and Floodplain Ecology (S. 660) | 3 | Florian Wittmann |

### 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: Specialization in Food Process Engineering (WI4INGCV4) [M-CIWVT-101119]

**Responsibility:** Volker Gaukel

**Organisation:** KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-CIWVT-101875 | Specialization in Food Process Engineering (S. 741) | 9 | Volker Gaukel |

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

**Qualification Objectives**
See German version.

**Content**
See courses.

# M Module: Generation and transmission of renewable power (WI4INGETIT7) [M-ETIT-101164]

**Responsibility:** Thomas Leibfried, Bernd Hoferer

**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-100830 | Power Network (S. 593) | 6 | Thomas Leibfried |
| T-ETIT-101941 | Power Transmission and Power Network Control (S. 594) | 5 | Thomas Leibfried |
| T-ETIT-100724 | Photovoltaics (S. 576) | 3 | N.N. |
| T-ETIT-101915 | High-Voltage Test Technique (S. 428) | 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.

**Remarks**
The course 23381 Windpower will not be offered any more from winter term 2014/15 on. The examination will be offered latest until sommer term 2015 (repeaters only).

## M Module: Nanotechnology (WI4INGMBIMT5) [M-MACH-101294]

**Responsibility:** Jan Gerrit Korvink

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102080 | Nanotechnology with Clusterbeams (S. 534) | 3 | Jürgen Gspann |
| T-MACH-102167 | Nanotribology and -Mechanics (S. 535) | 3 | Hendrik Hölscher, Martin Dienwiebel |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 605) | 3 | Arndt Last |
| T-MACH-102152 | Novel Actuators and Sensors (S. 544) | 4 | Manfred Kohl, Martin Sommer |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists (S. 268) | 3 | Hendrik Hölscher |
| T-MACH-105180 | Nanotechnology for Engineers and Natural Scientists (S. 533) | 4 | Hendrik Hölscher, Stefan Walheim, Martin Dienwiebel |
| T-ETIT-100740 | Quantum Functional Devices and Semiconductor Technology (S. 646) | 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.

**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.

**Remarks**
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.

## M Module: Public Transportation Operations (WI4INGBGU26) [M-BGU-101111]

**Responsibility:** Eberhard Hohnecker

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-100060 | Track Guided Transport Systems - Operational Logistics & Management (S. 785) | 6 | Eberhard Hohnecker |

**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-101825 | Environmental Aspects of Guided Transport Systems (S. 366) | 3 | Eberhard Hohnecker |
| T-BGU-101794 | Economic Efficiency of Guided Transport Systems (S. 333) | 1,5 | Eberhard Hohnecker |
| T-BGU-101793 | Law Aspects of Guided Transport Systems (S. 473) | 1,5 | Eberhard Hohnecker |
| T-BGU-100619 | Freight Transport (S. 391) | 3 | Bastian Chlond |
| T-BGU-101849 | Infrastructure Equipment of Railway Tracks (S. 444) | 1,5 | Eberhard Hohnecker |
| T-BGU-101851 | Construction and Maintenance of Guided Track Infrastructure (S. 306) | 1,5 | Eberhard Hohnecker |
| T-BGU-101857 | Homework "Public Transportation Operations" (S. 430) | 3 | Eberhard Hohnecker |

### Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.
The exams are offered each semester. The re-examinations are offered upon prior agreement with the interested participants and not later than the next regular examination date.

### Conditions
See German version.

### Qualification Objectives
See German version.

### Content
See courses.

### Recommendations
See German version.

**Remarks**
New module starting summer term 2015.

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

# M Module: Integrated Production Planning (WI4INGMB24) [M-MACH-101272]

**Responsibility:** Volker Schulze

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102106 | Integrated Production Planning (S. 452) | 9 | Gisela Lanza |

**Learning Control / Examinations**
The assessment is carried out as partial exams (according to Section 4(2), 1-3 SPO 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.
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 wbk. The term paper may not be convalidated in the seminar module.

**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. Further information can be found at the description of the lecture "Integrated Production Planning".

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

## M Module: Principles of Food Process Engineering (WI4INGCV3) [M-CIWVT-101120]

**Responsibility:** Volker Gaukel

**Organisation:** KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-CIWVT-101874 | Principles of Food Process Engineering (S. 616) | 9 | Volker Gaukel |

**Conditions**
none

**Qualification Objectives**
See German version.

## M Module: Microsystem Technology (WW3INGMBIMT1) [M-MACH-101287]

**Responsibility:** Jan Gerrit Korvink

**Organisation:** KIT-Fakultät für Maschinenbau
**Curricular Anchorage:** Compulsory Elective
**Contained in:** Engineering Sciences
Compulsory Elective Modules / Compulsory Modules 1 / Engineering Sciences
Compulsory Elective Modules / Compulsory Modules 2 / Engineering Sciences
Additional Examinations

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105182 | Introduction to Microsystem Technology I (S. 462) | 3 | Jan Gerrit Korvink, Andreas Guber |
| T-MACH-105183 | Introduction to Microsystem Technology II (S. 463) | 3 | Andreas Guber |
| T-MACH-100530 | Physics for Engineers (S. 579) | 6 | Alexander Nesterov-Müller, Peter Gumbsch |
| T-MACH-100967 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 265) | 3 | Andreas Guber |
| T-MACH-100968 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 267) | 3 | Andreas Guber |
| T-MACH-101910 | Microactuators (S. 515) | 3 | Manfred Kohl |
| T-MACH-102080 | Nanotechnology with Clusterbeams (S. 534) | 3 | Jürgen Gspann |
| T-MACH-102152 | Novel Actuators and Sensors (S. 544) | 4 | Manfred Kohl, Martin Sommer |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 605) | 3 | Arndt Last |
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 671) | 3 | Timo Mappes |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists (S. 268) | 3 | Hendrik Hölscher |
| T-ETIT-101907 | Optoelectronic Components (S. 559) | 4 | Wolfgang Freude |

**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 Introduction to Microsystem Technology I is cumpulsory.

**Qualification Objectives**

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

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

**Remarks**
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.

## M Module: Water Chemistry and Water Technology II (WI4INGCV7) [M-CIWVT-101122]

**Responsibility:** Harald Horn

**Organisation:** KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-CIWVT-101901 | Water Chemistry and Water Technology II (S. 815) | 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: Sensor Technology I (WI4INGETIT3) [M-ETIT-101158]

**Responsibility:** Wolfgang Menesklou

**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik

**Curricular Anchorage:** Compulsory Elective

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

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

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-101911 | Sensors (S. 709) | 3 | Wolfgang Menesklou |

**Wahlpflicht**
Non-Compulsory Block; You must choose 6 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-100706 | Sensors and Actuators Laboratory (S. 710) | 6 | Wolfgang Menesklou |
| T-ETIT-100709 | Sensor Systems (S. 708) | 3 | Wolfgang Menesklou |
| T-ETIT-100707 | Seminar Sensors (S. 705) | 3 | Wolfgang Menesklou |
| T-MACH-101910 | Microactuators (S. 515) | 3 | Manfred Kohl |

**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 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 *Sensor Technology* [23231] is obligatory and has to be attended. The elected courses must not be credited in the module *Sensorik II* [WI4INGETIT5] or other modules.
Before *Experimental Laboratories in Sensors and Actuators* [23232] the course *Sensor Technology* [23231] has to be completed successfully.

**Recommendations**
Knowledge of electrical engineering is assumed. Therefore it is recommended to attend the courses *Electrical Engineering II* [23224] beforehand.

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

## M Module: BioMEMS (WI4INGMBIMT1) [M-MACH-101290]

**Responsibility:** Volker Saile

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**BioMEMS**
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. 605) | 3 | Arndt Last |
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 671) | 3 | Timo Mappes |
| T-MACH-100966 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (S. 264) | 3 | Andreas Guber |
| T-MACH-100967 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 265) | 3 | Andreas Guber |
| T-MACH-100968 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 267) | 3 | Andreas Guber |
| T-MACH-101910 | Microactuators (S. 515) | 3 | Manfred Kohl |
| T-MACH-102168 | Replication Technologies in Micro System Technology (S. 656) | 3 | Matthias Worgull |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists (S. 268) | 3 | Hendrik Hölscher |
| T-MACH-102176 | Current Topics on BioMEMS (S. 319) | 3 | 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.

**Remarks**
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber

## M Module: Water Supply and Sanitation (bauiEX207-WATSUPSAN) [M-BGU-101001]

**Responsibility:** Stephan Fuchs

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 1 |

**Wahlpflicht**
Non-Compulsory Block; You must choose between 2 und 3 courses and between 9 and 10 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-100633 | Process Technologies in Storm Water Treatment (S. 622) | 3 | Stephan Fuchs |
| T-BGU-100634 | Process Technologies in Water Supply and Wastewater Disposal (S. 623) | 3 | Erhard Hoffmann |
| T-BGU-103564 | Urban Material Flows (S. 798) | 6 | Stephan Fuchs |
| T-BGU-101788 | Water Supply and Sanitation (S. 817) | 4,5 | Stephan Fuchs |

### Conditions
none

## M Module: Environmental Management (WI4INGBGU14) [M-BGU-101000]

**Responsibility:** Erhard Hoffmann, Stephan Fuchs

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-103647 | Applied Ecology and Water Quality (S. 244) | 3 | Stephan Fuchs |
| T-BGU-103648 | Mass Fluxes in River Basins (S. 506) | 3 | Stephan Fuchs |

**Wahlpflicht**
Non-Compulsory Block; You must choose 3 courses and 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-101089 | Field Training Water Quality (S. 384) | 3 | Stephan Fuchs |
| T-BGU-103649 | Modeling Mass Fluxes in River Basins (S. 527) | 3 | Stephan Fuchs |

**Conditions**
none

**Qualification Objectives**
The students develop system thinking and gain applicable knowledge and tools in regard to engineering methods.

## M Module: Highway Engineering (WI4INGBGU2) [M-BGU-100999]

**Responsibility:** Ralf Roos

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-100051 | Infrastructure Management (S. 445) | 6 | Ralf Roos |
| T-BGU-101860 | Special Topics in Highway Engineering and Environmental Impact Assessment (S. 733) | 3 | Ralf Roos |

**Learning Control / Examinations**

The assessment of the module consists of a conjoined oral exam about the lectures Special Topics in Highway Engineering [6233807] and *Environmental Impact Assessment* [6233804] (according to §4(2), 2 of the examination regulation) (duration: 15 min.) and a conjoined oral exam about the lectures *Design and Construction Highways* [6233801] and *Operation and Maintenance Highways* [6233802] (according to §4(2), 2 of the examination regulation) (duration: 30 min.).
The examination will take place on appointment. Resits are offered as needed.
The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

**Conditions**

The selection of this module excludes the selection of the module "Design, Construction, Operation and Maintenance of Highways" (WI4INGBGU1).

**Modeled Conditions**

The following conditions must be met:

- The module [M-BGU-100998] *Design, Construction, Operation and Maintenance of Highways* must not have been started.

**Qualification Objectives**

See German version.

**Recommendations**

The successful completion of the course *Design Basics in Highway Engineering* [19026] is assumed. This course may be attended in a previous study programme.

**Workload**

See German version.

## M Module: Microoptics (WI4INGMBIMT3) [M-MACH-101292]

**Responsibility:** Jan Gerrit Korvink

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-101910 | Microactuators (S. 515) | 3 | Manfred Kohl |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 605) | 3 | Arndt Last |
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 671) | 3 | Timo Mappes |
| T-MACH-105176 | Microoptics and Lithography (S. 517) | 3 | Timo Mappes |
| T-MACH-102174 | Fundamentals of X-Ray Optics II (S. 406) | 3 | Arndt Last |
| T-MACH-105186 | Fundamentals of X-Ray Optics I (S. 405) | 3 | Arndt Last |
| T-ETIT-100741 | Laser Physics (S. 472) | 4 | Christian Koos |
| T-ETIT-101945 | Optical Waveguides and Fibers (S. 557) | 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

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

### Content

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

In this module, an introduction to the basics of optics is provided; optical effects are presented with respect to their technical use.
Optical elements and instruments are presented. Fabrication processes of micro optical systems and elements, in particular lithography, are discussed.
In addition X-ray optics and X-ray imaging systems are presented as well as elements of optical telecommunication. A closer look on the physics behind lasers, being one of the most important technical light sources, is provided. As high end technology and clean room equipment is present in all the lectures of this module, the students will have a hands-on training with several experiments in micro optics.

**Remarks**
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.

## M Module: Logistics in Value Chain Networks (WW4INGMB28) [M-MACH-101280]

**Responsibility:** Kai Furmans

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Jedes Sommersemester | 2 Semester | 1 |

**Logistik in Wertschöpfungsnetzwerken**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102089 | Logistics - Organisation, Design and Control of Logistic Systems (S. 479) | 6 | Kai Furmans |
| T-MACH-102128 | Information Systems and Supply Chain Management (S. 441) | 4 | Christoph Kilger |
| T-MACH-105165 | Automotive Logistics (S. 258) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 239) | 4 | André Richter |
| T-MACH-105181 | Supply Chain Management (S. 759) | 6 | Knut Alicke |
| T-MACH-105174 | Warehousing and Distribution Systems (S. 812) | 4 | Kai Furmans |
| T-WIWI-103091 | Production and Logistics Controlling (S. 625) | 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

One of the lectures

- *Logistics – Organization, Design and Control of Logistic Systems* [2118078]
- *Supply Chain Management* [2117062]

is compulsory and must be examined. Also the course *Material flow in logistic systems* is mandatory. In case of combining this module with *Global Production and Logistics* [WW4INGMB31] the course *Material flow in logistic systems* is not compulsory.

### 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**

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

## M Module: Global Production and Logistics (WI4INGMB31) [M-MACH-101282]

**Responsibility:** Volker Schulze

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

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Globale Produktion und Logistik**
Non-Compulsory Block; You must choose at least 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105158 | Global Production and Logistics - Part 1: Global Production (S. 415) | 4 | Gisela Lanza |
| T-MACH-105159 | Global Production and Logistics - Part 2: Global Logistics (S. 417) | 4 | Kai Furmans |
| T-MACH-105165 | Automotive Logistics (S. 258) | 4 | Kai Furmans |
| T-MACH-102107 | Quality Management (S. 644) | 4 | Gisela Lanza |
| T-MACH-102128 | Information Systems and Supply Chain Management (S. 441) | 4 | Christoph Kilger |
| T-MACH-102189 | Production Technology and Management in Automotive Industry (S. 627) | 4 | Volker Michael Stauch |
| T-MACH-105188 | Integrative Strategies in Production and Development of High Performance Cars (S. 454) | 4 | Karl-Hubert Schlichtenmayer |
| T-WIWI-103091 | Production and Logistics Controlling (S. 625) | 3 | Helmut Wlcek |

### Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) 1-3 SPO 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.
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 or the wbk. The term paper may not be convalidated in the seminar module.

### Conditions
The courses Global Production and Logistics - Part 1: Global Productionen and Global Production and Logistics - Part 2: Global Logistics are compulsory.

### 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.

## M Module: Technical Logistics (WW4INGMB27) [M-MACH-101279]

**Responsibility:** Kai Furmans

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Einmalig | 2 Semester | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105174 | Warehousing and Distribution Systems (S. 812) | 4 | Kai Furmans |
| T-MACH-105171 | Safety Engineering (S. 665) | 4 | Hans-Peter Kany |
| T-MACH-105149 | Industrial Application of Technological Logistics Instancing Crane Systems (S. 436) | 4 | Markus Golder |
| T-MACH-102092 | Industrial Application of Material Handling Systems in Sorting and Distribution Systems (S. 435) | 4 | Jörg Föller |
| T-MACH-105151 | Energy Efficient Intralogistic Systems (S. 351) | 4 | Meike Braun, Frank Schönung |
| T-MACH-102163 | Basics of Technical Logistics (S. 261) | 6 | Jan Oellerich, Martin Mittwollen |
| T-MACH-102159 | Elements and Systems of Technical Logistics (S. 342) | 4 | Vladimir Madzharov, Martin Mittwollen |
| T-MACH-102160 | Selected Applications of Technical Logistics (S. 669) | 4 | Vladimir Madzharov, Martin Mittwollen |
| T-MACH-102161 | Selected Applications of Technical Logistics and Project (S. 670) | 6 | Vladimir Madzharov, Martin Mittwollen |
| T-MACH-102178 | Elements of Technical Logistics and Project (S. 343) | 6 | Vladimir Madzharov, Martin Mittwollen |
| T-MACH-105187 | IT-Fundamentals of Logistics (S. 465) | 4 | Frank Thomas |
| T-WIWI-103091 | Production and Logistics Controlling (S. 625) | 3 | Helmut Wlcek |
| T-MACH-105200 | Safe structures for machines in material handling (S. 664) | 4 | Markus Golder |
| T-MACH-105277 | Safe mechatronic systems (S. 662) | 4 | Markus Golder |

**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 lecture *basics of technical logistics* has to be chosen. If the lecture *Basics of technical logistics* has been succesfully examinated in another module, the lecture *elements and systems of technical logistics* can be choosen instead. If both lectures are examinated successfully, one can chose selected applications of technical logistics or selected applications of technical logistics and project instead.

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

## M Module: Material Flow in Networked Logistic Systems (WW4INGMB26) [M-MACH-101278]

**Responsibility:** Kai Furmans

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Version |
|---|---|---|---|
| 9 | Einmalig | 1 Semester | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105189 | Introduction in Human Factors Engineering (S. 460) | 6 | Kai Furmans |

**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. 812) | 4 | Kai Furmans |
| T-MACH-105175 | Airport Logistics (S. 239) | 4 | André Richter |
| T-MACH-105165 | Automotive Logistics (S. 258) | 4 | Kai Furmans |
| T-WIWI-103091 | Production and Logistics Controlling (S. 625) | 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 *Analytical Models for Material Flow* [2117060] is compulsory and must be examined.

### 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.

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

## M Module: Mobile Machines (WI4INGMB15) [M-MACH-101267]

**Responsibility:** Marcus Geimer

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Einmalig | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102093 | Fluid Power Systems (S. 389) | 5 | Stefan Haug, Martin Scherer, Marcus Geimer |
| T-MACH-105172 | Simulation of Coupled Systems (S. 724) | 3 | Marcus Geimer |
| T-MACH-102150 | BUS-Controls (S. 270) | 3 | Marcus Geimer, Felix Weber |
| T-MACH-105168 | Mobile Machines (S. 521) | 9 | Marcus Geimer |
| T-MACH-105160 | Fundamentals in the Development of Commercial Vehicles I (S. 397) | 1,5 | Jörg Zürn |
| T-MACH-105161 | Fundamentals in the Development of Commercial Vehicles II (S. 399) | 1,5 | Jörg Zürn |

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

### Conditions
None

### Qualification Objectives
The student

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

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

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

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

## M Module: Automated Manufacturing Systems (WI4INGMBWBK1) [M-MACH-101298]

**Responsibility:** Jürgen Fleischer

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102162 | Automated Manufacturing Systems (S. 250) | 9 | Jürgen Fleischer |

### Learning Control / Examinations

The assessment is carried out as partial exams (according to Section 4(2), 1-3 SPO 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. 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 wbk. The term paper may not be convalidated in the seminar module.

### 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.

### Workload

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

## M Module: Sensor Technology II (WI4INGETIT5) [M-ETIT-101159]

**Responsibility:** Wolfgang Menesklou

**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik

**Curricular Anchorage:** Compulsory Elective

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

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

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-ETIT-100706 | Sensors and Actuators Laboratory (S. 710) | 6 | Wolfgang Menesklou |
| T-ETIT-100709 | Sensor Systems (S. 708) | 3 | Wolfgang Menesklou |
| T-ETIT-100707 | Seminar Sensors (S. 705) | 3 | Wolfgang Menesklou |
| T-MACH-101910 | Microactuators (S. 515) | 3 | Manfred Kohl |

### 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 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 *Sensor Technology I* [WI4INGETIT3]. The module is passed only after the final partial exam of *Sensor Technology I* is additionally passed.

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

- The module [M-ETIT-101158] *Sensor Technology I* must have been started.

### Qualification Objectives
The student

- acquires fundamental principles in materials science and device technology of sensors.
- applies materials and sensors from the viewpoint of an application or development engineer.

### Content
The operating principles of the most important sensors are taught. The student will learn to use the acquired knowledge for key issues relating to select and use sensors. Sensor module I gives an overview of the basic sensor principles. Sensor module II goes into specific topics of sensors and actuators further.

### Recommendations
Knowledge of electrical engineering is assumed. Therefore it is recommended to attend the courses *Electrical Engineering II* [23224] beforehand.

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

# M Module: Control Engineering II (WI4INGETI2) [M-ETIT-101157]

**Responsibility:** Sören Hohmann

**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences
Compulsory Elective Modules / Compulsory Modules 1 / Engineering Sciences
Compulsory Elective Modules / Compulsory Modules 2 / 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. 252) | 3 | Sören Hohmann |
| T-ETIT-100666 | Control of Linear Multivariable Systems (S. 308) | 6 | Sören Hohmann |

## M Module: Handling Characteristics of Motor Vehicles (WI4INGMB6) [M-MACH-101264]

**Responsibility:** Frank Gauterin

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Einmalig | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-105152 | Handling Characteristics of Motor Vehicles I (S. 421) | 3 | Hans-Joachim Unrau |
| T-MACH-105153 | Handling Characteristics of Motor Vehicles II (S. 423) | 3 | Hans-Joachim Unrau |
| T-MACH-105154 | Vehicle Comfort and Acoustics I (S. 800) | 3 | Frank Gauterin |
| T-MACH-105155 | Vehicle Comfort and Acoustics II (S. 802) | 3 | Frank Gauterin |
| T-MACH-105156 | Vehicle Mechatronics I (S. 804) | 3 | Dieter Ammon |
| T-MACH-102156 | Project Workshop: Automotive Engineering (S. 636) | 4,5 | Martin Gießler, Frank Gauterin, Michael Frey |
| T-MACH-102177 | Global Vehicle Evaluation within Virtual Road Test (S. 419) | 3 | Bernhard Schick |
| T-MACH-102206 | Vehicle Ride Comfort & Acoustics I (S. 806) | 4 | Frank Gauterin |
| T-MACH-102205 | Vehicle Ride Comfort & Acoustics II (S. 808) | 4 | Frank Gauterin |

### 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.

### Qualification Objectives
The student

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

### Content
See courses.

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

### Workload
See German Version.

## M Module: Safety, Computing and Law in Highway Engineering (WI4INGBGU9) [M-BGU-101066]

**Responsibility:** Ralf Roos

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-101804 | IT-Based Road Design (S. 464) | 3 | Matthias Zimmermann |
| T-BGU-101674 | Safety Management in Highway Engineering (S. 666) | 3 | Matthias Zimmermann |
| T-BGU-100053 | Laws concerning Traffic and Roads (S. 475) | 3 | Dietmar Hönig |

### Conditions
The examination "Design Basics in Highway Engineering" has to be passed. This can be taken either in the module "Design, Construction, Operation and Maintenance of Highways" (WI4INGBGU1) or can be approved from a previous study (e.g. Civil Engineering BSc at KIT).

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

- The course [T-BGU-101670] *Design Basics in Highway Engineering* must have been passed.

### Qualification Objectives
See German version.

## M Module: Energy and Process Technology II (WI4INGMBITS2) [M-MACH-101297]

**Responsibility:** Heiner Wirbser

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Sommersemester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-MACH-102212 | Energy and Process Technology II (S. 349) | 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: Lean Management in Construction (bauiEX404-LEANMAN) [M-BGU-101884]

**Responsibility:** Shervin Haghsheno

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

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Wintersemester | 2 Semester | Deutsch | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-BGU-100148 | Lean Construction (S. 476) | 4,5 | Shervin Haghsheno |
| T-BGU-101007 | project paper Lean Construction (S. 634) | 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. 796) | 1,5 | Shervin Haghsheno |
| T-BGU-103431 | Turnkey Construction II - Trades and Technology (S. 797) | 3 | Shervin Haghsheno |
| T-BGU-103427 | Site Management (S. 725) | 1,5 | Shervin Haghsheno |
| T-BGU-103429 | Building Laws (S. 269) | 3 | Shervin Haghsheno |
| T-BGU-103432 | Project Management in Construction and Real Estate Industry I (S. 632) | 3 | Shervin Haghsheno |
| T-BGU-103433 | Project Management in Construction and Real Estate Industry II (S. 633) | 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.

**Conditions**

The course Lean Construction is compulsory and must be examined.

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

**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 / Seminars

| ECTS | Language | Version |
|---|---|---|
| 9 | Deutsch | 1 |

**Wahlpflichtangebot**
Non-Compulsory Block; You must choose 6 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103474 | Seminar in Business Administration A (Master) (S. 674) | 3 | Martin Klarmann, Marliese Uhrig-Homburg, Christof Weinhardt, Andreas Geyer-Schulz, Ju-Young Kim, Torsten Luedecke, Hagen Lindstädt, Thomas Lützkendorf, Stefan Nickel, Marcus Wouters, Petra Nieken, Wolf Fichtner, Alexander Mädche, Hansjörg Fromm, Thomas Setzer, Ute Werner, David Lorenz, Gerhard Satzger, Frank Schultmann, Bruno Neibecker, Orestis Terzidis, Marion Weissenberger-Eibl, Martin Ruckes, Maxim Ulrich, Peter Knauth |
| T-WIWI-103476 | Seminar in Business Administration B (Master) (S. 679) | 3 | Martin Klarmann, Marliese Uhrig-Homburg, Christof Weinhardt, Andreas Geyer-Schulz, Ju-Young Kim, Torsten Luedecke, Hagen Lindstädt, Thomas Lützkendorf, Stefan Nickel, Marcus Wouters, Petra Nieken, Wolf Fichtner, Alexander Mädche, Hansjörg Fromm, Thomas Setzer, Ute Werner, David Lorenz, Gerhard Satzger, Frank Schultmann, Bruno Neibecker, Orestis Terzidis, Marion Weissenberger-Eibl, Martin Ruckes, Maxim Ulrich, Peter Knauth |
| T-WIWI-103477 | Seminar in Economics B (Master) (S. 686) | 3 | Nora Szech, Kay Mitusch, Ingrid Ott, Jan Kowalski, Clemens Puppe, Johannes Philipp Reiß, Berthold Wigger, Johannes Brumm |

| | | | |
|---|---|---|---|
| T-WIWI-103478 | Seminar in Economics A (Master) (S. 685) | 3 | Nora Szech, Kay Mitusch, Ingrid Ott, Jan Kowalski, Clemens Puppe, Johannes Philipp Reiß, Berthold Wigger, Johannes Brumm |
| T-WIWI-103479 | Seminar in Informatics A (Master) (S. 688) | 3 | Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner |
| T-WIWI-103480 | Seminar in Informatics B (Master) (S. 693) | 3 | Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner |
| T-WIWI-103481 | Seminar in Operations Research A (Master) (S. 699) | 3 | Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel |
| T-WIWI-103482 | Seminar in Operations Research B (Master) (S. 700) | 3 | Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel |
| T-WIWI-103483 | Seminar in Statistics A (Master) (S. 701) | 3 | Melanie Schienle, Oliver Grothe |
| T-WIWI-103484 | Seminar in Statistics B (Master) (S. 702) | 3 | Melanie Schienle, Oliver Grothe |
| T-WIWI-103147 | Seminar in Engineering Science (Master) (S. 687) | 3 | Fachvertreter ingenieurwissenschaftlicher Fakultäten |
| T-INFO-101997 | Seminar: Legal Studies I (S. 706) | 3 | Thomas Dreier |
| T-INFO-105945 | Seminar: Legal Studies II (S. 707) | 3 | Thomas Dreier |
| T-MATH-105944 | Seminar in Mathematics (Master) (S. 698) | 3 | Günter Last, Martin Folkers |

**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. 821) | 1 | |
| T-WIWI-104681 | Wildcard Key Competences Seminar 2 (S. 231) | 2 | |
| T-WIWI-104682 | Wildcard Key Competences Seminar 3 (S. 822) | 3 | |
| T-WIWI-104683 | Wildcard Key Competences Seminar 4 (S. 823) | 1 | |
| T-WIWI-104684 | Wildcard Key Competences Seminar 5 (S. 824) | 2 | |
| T-WIWI-104685 | Wildcard Key Competences Seminar 6 (S. 825) | 3 | |
| T-WIWI-105955 | Wildcard Key Competences Seminar 7 (S. 826) | 4 | |
| T-WIWI-105956 | Wildcard Key Competences Seminar 8 (S. 827) | 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 or at the Department of Mathematics. 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: Electives in Informatics (WI4INFO3) [M-WIWI-101630]

**Responsibility:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102658 | Algorithms for Internet Applications (S. 240) | 5 | Hartmut Schmeck |
| T-WIWI-102759 | Requirements Analysis and Requirements Management (S. 657) | 4 | Ralf Kneuper |
| T-WIWI-102651 | Applied Informatics II - IT Systems for eCommerce (S. 246) | 5 | York Sure-Vetter |
| T-WIWI-102680 | Computational Economics (S. 297) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102661 | Database Systems and XML (S. 322) | 5 | Andreas Oberweis |
| T-WIWI-102663 | Document Management and Groupware Systems (S. 332) | 4 | Stefan Klink |
| T-WIWI-102655 | Efficient Algorithms (S. 337) | 5 | Hartmut Schmeck |
| T-WIWI-102668 | Enterprise Architecture Management (S. 359) | 5 | Thomas Wolf |
| T-WIWI-102666 | Knowledge Discovery (S. 467) | 5 | Rudi Studer |
| T-WIWI-102667 | Management of IT-Projects (S. 490) | 5 | Roland Schätzle |
| T-WIWI-102697 | Business Process Modelling (S. 280) | 5 | Andreas Oberweis |
| T-WIWI-102679 | Nature-Inspired Optimisation Methods (S. 536) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102659 | Organic Computing (S. 560) | 5 | Hartmut Schmeck |
| T-WIWI-102874 | Semantic Web Technologies (S. 672) | 5 | Rudi Studer, Andreas Harth |
| T-WIWI-105801 | Service Oriented Computing (S. 718) | 5 | Barry Norton, Sudhir Agarwal, Rudi Studer |
| T-WIWI-102845 | Smart Energy Distribution (S. 726) | 4 | Hartmut Schmeck |
| T-WIWI-102895 | Software Quality Management (S. 729) | 5 | Andreas Oberweis |
| T-WIWI-102676 | Special Topics of Enterprise Information Systems (S. 738) | 5 | Andreas Oberweis |
| T-WIWI-102657 | Special Topics of Efficient Algorithms (S. 737) | 5 | Hartmut Schmeck |
| T-WIWI-102678 | Special Topics of Software- and Systemsengineering (S. 740) | 5 | Andreas Oberweis |
| T-WIWI-102671 | Special Topics of Knowledge Management (S. 739) | 5 | Rudi Studer |
| T-WIWI-102669 | Strategic Management of Information Technology (S. 750) | 5 | Thomas Wolf |
| T-WIWI-103112 | Web Science (S. 818) | 5 | York Sure-Vetter |
| T-WIWI-102662 | Workflow-Management (S. 828) | 5 | Andreas Oberweis |
| T-WIWI-103523 | Advanced Lab Informatics (S. 233) | 4 | Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner |

**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**

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.

**Workload**

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

## M Module: Emphasis in Informatics (WI4INFO1) [M-WIWI-101628]

**Responsibility:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102658 | Algorithms for Internet Applications (S. 240) | 5 | Hartmut Schmeck |
| T-WIWI-102759 | Requirements Analysis and Requirements Management (S. 657) | 4 | Ralf Kneuper |
| T-WIWI-102651 | Applied Informatics II - IT Systems for eCommerce (S. 246) | 5 | York Sure-Vetter |
| T-WIWI-102680 | Computational Economics (S. 297) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102661 | Database Systems and XML (S. 322) | 5 | Andreas Oberweis |
| T-WIWI-102663 | Document Management and Groupware Systems (S. 332) | 4 | Stefan Klink |
| T-WIWI-102655 | Efficient Algorithms (S. 337) | 5 | Hartmut Schmeck |
| T-WIWI-102668 | Enterprise Architecture Management (S. 359) | 5 | Thomas Wolf |
| T-WIWI-102666 | Knowledge Discovery (S. 467) | 5 | Rudi Studer |
| T-WIWI-102667 | Management of IT-Projects (S. 490) | 5 | Roland Schätzle |
| T-WIWI-102697 | Business Process Modelling (S. 280) | 5 | Andreas Oberweis |
| T-WIWI-102679 | Nature-Inspired Optimisation Methods (S. 536) | 5 | Pradyumn Kumar Shukla |
| T-WIWI-102659 | Organic Computing (S. 560) | 5 | Hartmut Schmeck |
| T-WIWI-102874 | Semantic Web Technologies (S. 672) | 5 | Rudi Studer, Andreas Harth |
| T-WIWI-105801 | Service Oriented Computing (S. 718) | 5 | Barry Norton, Sudhir Agarwal, Rudi Studer |
| T-WIWI-102845 | Smart Energy Distribution (S. 726) | 4 | Hartmut Schmeck |
| T-WIWI-102895 | Software Quality Management (S. 729) | 5 | Andreas Oberweis |
| T-WIWI-102676 | Special Topics of Enterprise Information Systems (S. 738) | 5 | Andreas Oberweis |
| T-WIWI-102657 | Special Topics of Efficient Algorithms (S. 737) | 5 | Hartmut Schmeck |
| T-WIWI-102678 | Special Topics of Software- and Systemsengineering (S. 740) | 5 | Andreas Oberweis |
| T-WIWI-102671 | Special Topics of Knowledge Management (S. 739) | 5 | Rudi Studer |
| T-WIWI-102669 | Strategic Management of Information Technology (S. 750) | 5 | Thomas Wolf |
| T-WIWI-103112 | Web Science (S. 818) | 5 | York Sure-Vetter |
| T-WIWI-102662 | Workflow-Management (S. 828) | 5 | Andreas Oberweis |
| T-WIWI-103523 | Advanced Lab Informatics (S. 233) | 4 | Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner |

**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**

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.

**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 / Compulsory Modules 1 / Statistics
Compulsory Elective Modules / Compulsory Modules 2 / Statistics
Additional Examinations

| ECTS | Language | Version |
|---|---|---|
| 9 | Deutsch | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103123 | Advanced Statistics (S. 237) | 4,5 | Oliver Grothe |

**Ergänzungsangebot**

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103124 | Multivariate Statistical Methods (S. 532) | 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
New module starting winter term 2015/2016.

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

**Responsibility:** Melanie Schienle

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

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

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103125 | Applied Econometrics (S. 245) | 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. 320) | 4,5 | Rheza Nakhaeizadeh |
| T-WIWI-103064 | Financial Econometrics (S. 386) | 4,5 | Melanie Schienle |
| T-WIWI-103126 | Non- and Semiparametrics (S. 537) | 4,5 | Melanie Schienle |
| T-WIWI-103127 | Panel Data (S. 564) | 4,5 | Wolf-Dieter Heller |
| T-WIWI-103065 | Statistical Modeling of generalized regression models (S. 744) | 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.

### Remarks
New module starting winter term 2015/2016.

### 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 / Compulsory Modules 1 / Statistics
Compulsory Elective Modules / Compulsory Modules 2 / Statistics
Additional Examinations

| ECTS | Recurrence | Duration | Language | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | Deutsch | 1 |

**Wahlplfichtangebot**

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-103125 | Applied Econometrics (S. 245) | 4,5 | Melanie Schienle |
| T-WIWI-103066 | Data Mining and Applications (S. 320) | 4,5 | Rheza Nakhaeizadeh |
| T-WIWI-103064 | Financial Econometrics (S. 386) | 4,5 | Melanie Schienle |
| T-WIWI-103124 | Multivariate Statistical Methods (S. 532) | 4,5 | Oliver Grothe |
| T-WIWI-103126 | Non- and Semiparametrics (S. 537) | 4,5 | Melanie Schienle |
| T-WIWI-103127 | Panel Data (S. 564) | 4,5 | Wolf-Dieter Heller |
| T-WIWI-103128 | Portfolio and Asset Liability Management (S. 592) | 4,5 | Mher Safarian |
| T-WIWI-103065 | Statistical Modeling of generalized regression models (S. 744) | 4,5 | Wolf-Dieter Heller |
| T-WIWI-103129 | Stochastic Calculus and Finance (S. 745) | 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.

**Remarks**

New module starting winter term 2015/2016.

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

## M Module: Commercial Law (WI4JURA2) [M-INFO-101191]

**Responsibility:** Thomas Dreier

**Organisation:** KIT-Fakultät für Informatik

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules / Compulsory Modules 2 / Law

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-INFO-102013 | Exercises in Civil Law (S. 372) | 9 | Yvonne Matz, Thomas Dreier |

## M Module: Governance, Risk & Compliance (WI4JURGRC) [M-INFO-101242]

**Responsibility:** Thomas Dreier

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 1 |

**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. 321) | 3 | Nikolaus Marsch |
| T-INFO-101308 | Copyright (S. 312) | 3 | Thomas Dreier |
| T-INFO-101315 | Tax Law I (S. 767) | 3 | Thomas Dreier |
| T-INFO-101316 | Law of Contracts (S. 474) | 3 | Thomas Dreier |
| T-INFO-101288 | Corporate Compliance (S. 313) | 3 | Thomas Dreier |
| T-INFO-101997 | Seminar: Legal Studies I (S. 706) | 3 | Thomas Dreier |

## M Module: Public Business Law (WI4JURA6) [M-INFO-101217]

**Responsibility:** Matthias Bäcker

**Organisation:** KIT-Fakultät für Informatik

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules / Compulsory Modules 2 / Law

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 1 |

**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. 776) | 3 | Matthias Bäcker |
| T-INFO-101303 | Data Protection Law (S. 321) | 3 | Nikolaus Marsch |
| T-INFO-101311 | Public Media Law (S. 640) | 3 | Thomas Dreier |
| T-INFO-101312 | European and International Law (S. 370) | 3 | Matthias Bäcker |
| T-INFO-101348 | Environmental Law (S. 369) | 3 | Matthias Bäcker |

## M Module: Private Business Law (WI4JURA5) [M-INFO-101216]

**Responsibility:** Thomas Dreier

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

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-INFO-101994 | Civil Law for Advanced (S. 292) | 3 | Thomas Dreier |
| T-INFO-101329 | Employment Law I (S. 345) | 3 | Thomas Dreier |
| T-INFO-101330 | Employment Law II (S. 346) | 3 | Thomas Dreier |
| T-INFO-101316 | Law of Contracts (S. 474) | 3 | Thomas Dreier |
| T-INFO-101314 | Tax Law II (S. 768) | 3 | Detlef Dietrich, Thomas Dreier |
| T-INFO-101315 | Tax Law I (S. 767) | 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: Intellectual Property Law (WI4JURA4) [M-INFO-101215]

**Responsibility:** Thomas Dreier

**Organisation:** KIT-Fakultät für Informatik

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules / Compulsory Modules 2 / Law

| ECTS | Recurrence | Duration | Language | Level | Version |
|---|---|---|---|---|---|
| 9 | Jedes Semester | 2 Semester | Deutsch | 4 | 1 |

**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. 300) | 3 | Thomas Dreier |
| T-INFO-101307 | Internet Law (S. 459) | 3 | Thomas Dreier |
| T-INFO-101308 | Copyright (S. 312) | 3 | Thomas Dreier |
| T-INFO-101310 | Patent Law (S. 567) | 3 | Thomas Dreier |
| T-INFO-101313 | Trademark and Unfair Competition Law (S. 787) | 3 | Yvonne Matz |

**Conditions**

None

## M Module: Sociology (WI4SOZ1) [M-GEISTSOZ-101169]

**Responsibility:** Gerd Nollmann

**Organisation:** KIT-Fakultät für Geistes- und Sozialwissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Compulsory Elective Modules / Compulsory Modules 2 / Sociology

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

**Compulsory**

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-GEISTSOZ-101957 | Special Sociology (S. 732) | 4 | Gerd Nollmann |
| T-GEISTSOZ-101962 | Theoretical Sociology (S. 778) | 2 | Gerd Nollmann |
| T-GEISTSOZ-101958 | Projectseminar (S. 638) | 4 | Gerd Nollmann |

**Conditions**

None

**Qualification Objectives**

The student

- Gains theoretical and methodical knowledge of social processes and structures.
- Is able to apply his/her gained knowledge practically.
- Is able to present his/her work results in a precise and clear way.

**Content**

The module sociology offers students the possibility to get to know problems touching social phenomens and to answer these theoretically as well as empirically. For example: Who does earn how much in his job and why? How do subcultures emerge? Why are boys' grades in school always worse than those of girls? Do divorces have negative influences on the development of children? How does mass consumption influence the individual? Is there a world society emerging?

In addition the module contains courses on sociological methods that are essential to answer the above questions scientifically.

## M Module: Strategic Corporate Management and Organization (WI4BWLUO1) [M-WIWI-101450]

**Responsibility:** Hagen Lindstädt

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 2 |

**Wahlpflichtangebot**

Non-Compulsory Block; You must choose 9 credits.

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102630 | Managing Organizations (S. 493) | 3,5 | Hagen Lindstädt |
| T-WIWI-102803 | Modeling Strategic Decision Making (S. 528) | 4,5 | Hagen Lindstädt |
| T-WIWI-102629 | Management and Strategy (S. 488) | 3,5 | Hagen Lindstädt |
| T-WIWI-102871 | Problem Solving, Communication and Leadership (S. 620) | 2 | Hagen Lindstädt |

### 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

See German version.

### Content

The module emphasizes the following aspects: The students learn models and frameworks which are used in strategic management and managing organizations. In addition, the module provides knowledge about management concepts and their practical application.

The module addresses three focal points: First, the students will learn models, frameworks and theoretical findings of the economic organization theory. Further, questions of a value-based concern leadership are discussed. Finally, the limitations of the basic models of economic decision theory are identified and advanced concepts are developed.

### Recommendations

None

### Remarks

The module will not be offered any more from summer term 2015. Students who are already assigned on the module can still finish it until summer term 2016.

The course "Organization Theory" will not be offered any more from summer term 2015 on. The examination will be offered latest until winter term 2015/2016 (repeaters only).

The credits for the courses "Managing Organizations" and "Management and Strategy" have been changed from 4 to 3,5 from summer term 2015 on.

### Workload

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

# M Module: Stochastic Modelling and Optimization (WI4OR7) [M-WIWI-101657]

**Responsibility:** Karl-Heinz Waldmann

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Additional Examinations

| ECTS | Recurrence | Duration | Level | Version |
|---|---|---|---|---|
| 9 | Jedes Semester | 1 Semester | 4 | 1 |

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

| Identifier | Course | ECTS | Responsibility |
|---|---|---|---|
| T-WIWI-102628 | Optimization in a Random Environment (S. 558) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102730 | OR-Oriented Modeling and Analysis of Real Problems (Project) (S. 562) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102728 | Quality Control I (S. 642) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102729 | Quality Control II (S. 643) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102627 | Simulation I (S. 721) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102703 | Simulation II (S. 723) | 4,5 | Karl-Heinz Waldmann |
| T-WIWI-102711 | Markov Decision Models II (S. 504) | 4,5 | Karl-Heinz Waldmann |

### Learning Control / Examinations
The assessment is carried out as partial written 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 posses detailed knowledge in modelling, analyzing and optimizing stochastic systems in economy and engineering.

### Content
Markov Decision Models I: Markov Chains, Poisson Processes.
Markov Decision Models II: Queuing Systems, Stochastic Decision Processes
Simulation I: Generation of random numbers, Monte Carlo integration, Discrete event simulation, Discrete and continuous random variables, Statistical analysis of simulated data.
Simulation II: Variance reduction techniques, Simulation of stochastic processes, Case studies.
Quality Control I: Statistical Process Control, Acceptance Sampling, Design of experiments
Quality Control II: Reliability of complexe systems with and without repair, Maintenance
OR-orientied modeling and analysis of real problems: project-based modelling and analysis

### Remarks
The examination

- T-WIWI-102627 Simulation I will be offered latest until winter term 2016/2017 (for beginners).
- T-WIWI-102703 Simulation II will be offered latest until summer term 2017 (for beginners).
- T-WIWI-102711 Markov Decision Models II will be offered latest until winter term 2016/2017 (for beginners).

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

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

# Part V
# Module component exams

## T Course: Wildcard Key Competences Seminar 2 [T-WIWI-104681]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 2 | 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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2521533 | Advanced Game Theory | Vorlesung (V) | 2 | Nora Szech, Karl-Martin Ehrhart, Johannes Brumm |
| WS 16/17 | 2521534 | | Übung (Ü) | 1 | Nora Szech |

### 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.

*The following informations are from the event Advanced Game Theory (WS 16/17):*

### 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:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner

**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2513306 | Event Processing: Processing of Real-Time Data and their Business Potential | Seminar / Praktikum (S/P) | 2 | Ljiljana Stojanovic, Rudi Studer, Suad Sejdovic, Dominik Riemer, York Sure-Vetter |
| SS 2016 | 2512300 | | Seminar / Praktikum (S/P) | 3 | Aditya Mogadala, Achim Rettinger, Rudi Studer, York Sure-Vetter, Andreas Thalhammer |
| SS 2016 | 2512200 | | Praktikum (P) | 3 | Andreas Oberweis, Murat Citak |
| SS 2016 | 2512100 | | Praktikum (P) | 4 | Pradyumn Kumar Shukla |
| SS 2016 | 2512101 | | Praktikum (P) | 3 | Michael Meier, Andreas Drescher, Andreas Oberweis, Frederic Toussaint |
| WS 16/17 | 2512200 | | Praktikum (P) | 3 | Meike Ullrich, Andreas Fritsch, Andreas Schoknecht, Andreas Oberweis, Murat Citak |
| WS 16/17 | 2512100 | Security | Praktikum (P) | 4 | Hartmut Schmeck, Kaibin Bao |
| WS 16/17 | 2512310 | Smart Services and the IoT | Seminar / Praktikum (S/P) | | Tobias Weller, Maria Maleshkova, Johannes Kunze von Bischhoffshausen, York Sure-Vetter |
| WS 16/17 | 2512307 | Applications of Semantic MediaWiki | Seminar / Praktikum (S/P) | 3 | Tobias Weller, Matthias Frank, Achim Rettinger, Rudi Studer, Maria Maleshkova, York Sure-Vetter |
| WS 16/17 | 2512101 | | Praktikum (P) | 3 | Andreas Drescher, Andreas Oberweis, Frederic Toussaint |

| | | | |
|---|---|---|---|
| WS 16/17 | 2512301 | Seminar / Praktikum 3 (S/P) | Tobias Christof Käfer, Rudi Studer, Maribel Acosta Deibe, Andreas Harth, York Sure-Vetter |

**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
- 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.

*The following informations are from the event Event Processing: Processing of Real-Time Data and their Business Potential (SS 2016):*

**Content**
Topics of interest include, but are not limited to:

- Prediction of lucrative areas / routes
- Real-time visualization of event streams
- Fraud Detection
- Sales forecast

Gladly, data with other data (e.g.weather or event data for NYC) can be linked.

*The following informations are from the event (SS 2016):*

**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.

*The following informations are from the event Smart Services and the IoT (WS 16/17):*

**Content**
Domains of interest include, but are not limited to:

- Medicine

- Social Media
- Finance Market

*The following informations are from the event Applications of Semantic MediaWiki (WS 16/17):*

**Content**
Topics of interest include, but are not limited to:

- Analysis of Medical Processes
- Correlation analysis of medical data
- Visualization of data in SMW
- Sentiment analysis of Twitter data
- Upload Interface for SMW
- Process Matching of process data

*The following informations are from the event (WS 16/17):*

**Workload**
Topicsof interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

## T Course: Advanced Management Accounting [T-WIWI-102885]

**Responsibility:** Marcus Wouters
**Contained in:** [M-WIWI-101510] Cross-functional Management Accounting

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2579907 | Advanced Management Accounting | Vorlesung (V) | 3 | Michael Pelz, 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.
The course is compulsory and must be examined.

*The following informations are from the event Advanced Management Accounting (WS 16/17):*

**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.

## T Course: Advanced Statistics [T-WIWI-103123]

**Responsibility:** Oliver Grothe
**Contained in:** [M-WIWI-101637] Analytics and Statistics

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550552 | | Vorlesung (V) | 2 | Oliver Grothe |
| WS 16/17 | 2550553 | | Übung (Ü) | 2 | Laura Hersing, 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

**Remarks**
New course starting winter term 2015/2016

## 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 | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**Learning Control / Examinations**

The course T-WIWI-102609 - Advanced Topics in Economic Theory is currently not available. The course restarts in summer term 2018.

The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the beginning of the recess 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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

*The following informations are from the event Airport logistics (WS 16/17):*

### 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: Algorithms for Internet Applications [T-WIWI-102658]

**Responsibility:** Hartmut Schmeck
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511103 | | Übung (Ü) | 1 | Hartmut Schmeck, Jan Müller, Kaibin Bao |
| WS 16/17 | 2511102 | Algorithms for Internet Applications | Vorlesung (V) | 2 | Hartmut Schmeck |

### Learning Control / Examinations
The examination will be offered latest until summer term 2017 (repeaters only).
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", 45 min) (according Section 4(2), 3 of the examination regulation).
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

### Remarks
This course will not be offered after WS 2016/17

*The following informations are from the event Algorithms for Internet Applications (WS 16/17):*

### Aim
The students will learn to master methods and concepts of essential algorithms within Internet applications and to develop capabilities for innovative improvements. The course aims at teaching advanced concepts for the design and application of algorithms with respect to the requirements in networked systems. Based on a fundamental understanding of taught concepts and methods the students should be able to select appropriate concepts and methods for problem settings in their future professional life, and - if necessary - customize and apply them in an adequate way. The students will be capable to find appropriate arguments for their chosen approach to a problem setting.
In particular, the student will

- know the structure and elementary protocols of the Internet (TCP/IP) and standard routing algorithms (distance vector and link state routing),
- know methods of information retrieval in the WWW, algorithms for searching information and be able to assess the performance of search engines,
- know how to design and use cryptographic methods and protocols to guarantee and check confidentiality, data integrity and authenticity,
- know algorithmic basics of electronic payment systems and of electronic money.

### Content
Internet and World Wide Web are changing our world, this core course provides the necessary background and methods for the design of central applications of the Internet. After an introduction into Internet technology the following topics are addressed: information retrieval in the www, structure and functioning of search engines, foundations of secure communication, electronic payment systems and digital money, and - if time permits - security architectures.

### Workload
The total workload for this course is approximately 150.0 hours. For further information see German version.

**Literature**

- Tanenbaum: Computer Networks, 4th edition, Prentice-Hall 2003.
- Baeza-Yates, Ribeiro-Neto: Modern Information Retrieval. Addison-Wesley, 1999.
- Wobst: Abenteuer Kryptologie : Methoden, Risiken und Nutzen der Datenverschlüsselung, 3rd edition. Addison-Wesley, 2001.
- Schneier: Applied Cryptography, John Wiley, 1996.
- Furche, Wrightson: Computer money : Zahlungssysteme im Internet [Übers.: Monika Hartmann]. - 1. Aufl. - Heidelberg : dpunkt, Verl. für Digitale Technologie, 1997.

**Elective literature:**

- Further references will be given in the course.

## 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2134150 | Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines | Vorlesung (V) | 2 | Marcus Gohl |

**Learning Control / Examinations**
Letter of attendance or oral exam (25 minutes, no auxillary means)

**Conditions**
none

*The following informations are from the event Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines (SS 2016):*

**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:** Uwe Wagner
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2134134 | Analysis tools for combustion diagnostics | Vorlesung (V) | 2 | Jürgen Pfeil |

### Learning Control / Examinations
oral examination, Duration: 25 min., no auxiliary means

### Conditions
none

*The following informations are from the event Analysis tools for combustion diagnostics (SS 2016):*

### 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: Applied Ecology and Water Quality [T-BGU-103647]

**Responsibility:** Stephan Fuchs
**Contained in:** [M-BGU-101000] Environmental Management

| ECTS | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## Course: Applied Econometrics [T-WIWI-103125]

**Responsibility:** Melanie Schienle
**Contained in:** [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2520020 | Applied Econometrics | Vorlesung (V) | 2 | Melanie Schienle |
| SS 2016 | 2520021 | | Übung (Ü) | 2 | Melanie Schienle, Carsten Bormann |

**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

*The following informations are from the event Applied Econometrics (SS 2016):*

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

**Literature**

- Davidson, R., and MacKinnon, J.G. (2004): Econometric Theory and Methods, Oxford University Press.
- Hayashi, F. (2000): Econometrics, Princeton University Press.

Die Vorlesungsunterlagen werden in Ilias bereitgestellt. Für weitere Informationen: http://statistik.econ.kit.edu/.

## T Course: Applied Informatics II - IT Systems for eCommerce [T-WIWI-102651]

**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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511032 | Applied Informatics II - IT Systems for e-Commerce | Vorlesung (V) | 2 | Ingo Scholtes |
| SS 2016 | 2511033 | | Übung (Ü) | 1 | Andreas Schoknecht, Ingo Scholtes |

**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.

**Conditions**
None

**Recommendations**
Knowledge of content of the modules Foundations in Informatics [IW1INF1] and Algorithms I [IW2INF2] is expected.

*The following informations are from the event Applied Informatics II - IT Systems for e-Commerce (SS 2016):*

**Aim**
Students

- explain the strengths and weaknesses of various modeling approachesfor Information Systems and choose an appropriate
- method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- model given problems in Description Logics and apply description logic rules,
- describe the main ontology concepts and languages and explain SPARQL queries,
- create and evaluate a relational database schema and express queries in relational algebra

**Content**
In the context of complex information systems, modelling is of central importance, e.g. – in the context of systems to be developed – for a better understanding of their functionality or in the context of existing systems for supporting maintenance and further development.
Modelling, in particular modelling of information systems, forms the core part of this lecture. The lecture is organized in two parts. The first part mainly covers the modelling of static aspectes, the second part covers the modelling of dynamic aspects of information systems.
The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and description logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets as well as well as event driven process chains together with their respective analysis techniques will be introduced.

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

**Literature**
Tba in the lecture.

## T Course: Asset Pricing [T-WIWI-102647]

**Responsibility:** Marliese Uhrig-Homburg, Martin Ruckes
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101482] Finance 1
[M-WIWI-101483] Finance 2
[M-WIWI-101502] Economic Theory and its Application in Finance

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530555 | Asset Pricing | Vorlesung (V) | 2 | Marliese Uhrig-Homburg, Martin Ruckes |
| SS 2016 | 2530556 | | Übung (Ü) | 1 | Claus Schmitt, Marliese Uhrig-Homburg, Martin Ruckes |

**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.

*The following informations are from the event Asset Pricing (SS 2016):*

**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-101446] Market Engineering
[M-WIWI-101500] Microeconomic Theory
[M-WIWI-101453] Applied Strategic Decisions

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2520409 | | Übung (Ü) | 1 | Karl-Martin Ehrhart |
| WS 16/17 | 2520408 | | Vorlesung (V) | 2 | 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

## T Course: Automated Manufacturing Systems [T-MACH-102162]

**Responsibility:** Jürgen Fleischer
**Contained in:** [M-MACH-101298] Automated Manufacturing Systems

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 9 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2150904 | Automated Manufacturing Systems | Vorlesung / Übung (VÜ) | 6 | Jürgen Fleischer |

**Learning Control / Examinations**
The assessment is carried out as an oral exam. The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Automated Manufacturing Systems (SS 2016):*

**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

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: 177 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 | Version |
| --- | --- |
| 3 | 1 |

**Conditions**
none

## T Course: Automotive Engineering [T-MACH-100092]

**Responsibility:** Hans-Joachim Unrau, Frank Gauterin
**Contained in:** [M-MACH-101266] Automotive Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113805 | Automotive Engineering I | Vorlesung (V) | 4 | Hans-Joachim Unrau, Frank Gauterin |

**Learning Control / Examinations**
Written examination

Duration: 120 minutes

Auxiliary means: none

**Conditions**
none

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

- The course [T-MACH-102203] *Automotive Engineering I* must not have been started.

*The following informations are from the event Automotive Engineering I (WS 16/17):*

**Aim**
The students know the movements and the forces at the vehicle and are familiar with active and passive security. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to judge and to develop the complex system "vehicle".

**Content**
1. History and future of the automobile
2. Driving mechanics: driving resistances and driving performances, mechanics of the longitudinal and transverse forces, passive safety

3. Engines: combustion engine, alternative drives (e.g. electric motor, fuel cell)

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5. Power transmission and distribution: drive shafts, cardon joints, differentials

**Workload**
regular attendance: 45 hours
self-study: 195 hours

**Literature**

1. Mitschke, M./ Wallentowitz, H.: Dynamik der Kraftfahrzeuge, Springer-Verlag, Berlin, 2004

2. Braes, H.-H.; Seiffert, U.: Handbuch Kraftfahrzeugtechnik, Vieweg&Sohn Verlag, 2005

3. Gnadler, R.: Script to the lecture 'Automotive Engineering I'

## T Course: Automotive Engineering I [T-MACH-102203]

**Responsibility:** Martin Gießler, Frank Gauterin
**Contained in:** [M-MACH-101266] Automotive Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113809 | Automotive Engineering I | Vorlesung (V) | 4 | Martin Gießler, Frank Gauterin |

**Learning Control / Examinations**
Written examination

Duration: 120 minutes

Auxiliary means: none

**Conditions**
Examination in English
Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

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

- The course [T-MACH-100092] *Automotive Engineering* must not have been started.

*The following informations are from the event Automotive Engineering I (WS 16/17):*

**Aim**
The students know the movements and the forces at the vehicle and are familiar with active and passive security. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to judge and to develop the complex system "vehicle".

**Content**
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of the longitudinal and transverse forces, passive safety

3. Engines: combustion engine, alternative drives (e.g. electric motor, fuel cell)

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5.Power transmission and distribution: drive shafts, cardon joints, differentials

**Workload**
regular attendance: 45 hours
self-study: 195 hours

**Literature**

1. Mitschke, M./ Wallentowitz, H.: Dynamik der Kraftfahrzeuge, Springer-Verlag, Berlin, 2004

2. Braes, H.-H.; Seiffert, U.: Handbuch Kraftfahrzeugtechnik, Vieweg&Sohn Verlag, 2005

3. Gnadler, R.: Script to the lecture 'Automotive Engineering I'

## T Course: Automotive Engineering II [T-MACH-102117]

**Responsibility:** Hans-Joachim Unrau, Frank Gauterin
**Contained in:** [M-MACH-101266] Automotive Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114835 | Automotive Engineering II | Vorlesung (V) | 2 | Hans-Joachim Unrau |

**Learning Control / Examinations**
Written Examination

Duration: 90 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Automotive Engineering II (SS 2016):*

**Aim**
The students have an overview of the modules, which are necessary for the road holding of a motor vehicle and the power transmission between vehicle bodywork and roadway. They have knowledge of different wheel suspensions, the tyres, the steering elements and the brakes. They know different execution forms, the function and the influence on the driving or brake behavior. They are able to develop the appropriate components correctly. They are ready to analyze, to judge and to optimize the complex relationship of the different components under consideration of boundary conditions.

**Content**
1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, retarder, comparison of the designs

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
1. Heißing, B./Ersoy, M.: Fahrwerkhandbuch: Grundlagen, Fahrdynamik, Komponenten, Systeme, Mechatronik, Perspektiven, Vieweg-Verlag, Wiesbaden, 2011

2. Breuer, B./Bill, K.-H.: Bremsenhandbuch: Grundlagen - Komponenten - Systeme - Fahrdynamik, Vieweg-Verlag, Wiesbaden, 2012

3. Gnadler, R.: Script to the lecture 'Automotive Engineering II'

## 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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

*The following informations are from the event Automotive Logistics (SS 2016):*

**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 Liberalised Energy Markets [T-WIWI-102690]

**Responsibility:** Wolf Fichtner
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets
[M-WIWI-102808] Digital Service Systems in Industry

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581998 | Basics of Liberalised Energy 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

*The following informations are from the event Basics of Liberalised Energy Markets (WS 16/17):*

**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: Basics of Technical Logistics [T-MACH-102163]

**Responsibility:** Jan Oellerich, Martin Mittwollen
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117095 | Basics of Technical Logistics | Vorlesung / Übung (VÜ) | 4 | Jan Oellerich, Martin Mittwollen |

**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

*The following informations are from the event Basics of Technical Logistics (WS 16/17):*

**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: Bayesian Methods for Financial Economics [T-WIWI-106191]

**Responsibility:** Maxim Ulrich
**Contained in:** [M-WIWI-103123] Quantitative Valuation
[M-WIWI-103122] Quantitative Risk Management

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Learning Control / Examinations**
The grade is based on an exam. The exam covers all the material that is taught in the current semester. The exam takes place in the last week of the lecture-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period).

**Conditions**
None

**Recommendations**
None

**Remarks**
New course starting summer term 2017.

## T Course: Behavioral Approaches in Marketing [T-WIWI-102619]

**Responsibility:** Bruno Neibecker
**Contained in:** [M-WIWI-101489] Strategy, Communication, and Data Analysis
[M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2572168 | | Übung (Ü) | 1 | Bruno Neibecker |
| WS 16/17 | 2572167 | Behavioral Approaches in Marketing | Vorlesung (V) | 2 | Bruno Neibecker |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The examination will be offered latest until winter term 2016/2017 (repeaters only).

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Behavioral Approaches in Marketing (WS 16/17):*

**Aim**
Students have learned the following outcomes and competences:

- To specify the key terms in marketing and communication management
- To identify and define theoretical constructs in marketing communication, based on behavioral theory
- To indentify the main research trends
- To analyze and interpret high level academic articles
- To learn interactive skills to work in teams and to follow a goal-oriented approach
- To gain understanding of methodological research to develop concrete plans for marketing decision-making

**Content**
This course gives an introduction to consumer behavior and the influence of cognitive and emotional information processing on consumer decision making. The contribution of advertising response models is considered and faced with social and environmental aspects (e.g. cross-cultural influences) on consumer behavior, mass communication and internet advertising. In addition, a scientific case study on the effectiveness of TV-commercials is discussed. Central issues of the course:
Case Studies in brand management and advertising response.
Psychological factors (research design and test marketing / arousal / effectiveness of TV-commercials as case studies).
Emotions in marketing.
Information processing and retention in memory (schema theory / visual information processing/grounded theory).
Complex advertising response models (attitude towads the ad / attitude towards the brand / persuasion / context effects in learning / decision making / Means-end-theory and strategic advertising).
Social processes (culture / subculture / cross cultural influence / product design).
Neuromarketing.

**Workload**
The total workload for this course is approximately 140.0 hours. For further information see German version.

**Literature**
(Literature is in English and German, see German description)

## 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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2141864 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I | Vorlesung (V) | 2 | Andreas Guber |

**Learning Control / Examinations**
Oral examination: Elective Course (Duration: 30 minutes) or Main Course in combination with other lectures (Duration: 60 minutes)

Aids: none

*The following informations are from the event BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (WS 16/17):*

**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-101287] Microsystem Technology
[M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142883 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II | Vorlesung (V) | 2 | Andreas Guber |

**Learning Control / Examinations**
Oral: Elective Course (Duration: 30 minutes) or Main Course in combination with other lectures (Duration: 60 minutes)

Aids: none

**Conditions**
none

*The following informations are from the event BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (SS 2016):*

**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-101287] Microsystem Technology
[M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142879 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III | Vorlesung (V) | 2 | Andreas Guber |

**Learning Control / Examinations**
Oral: Elective Course (Duration: 30 minutes) or Main Course in combination with other lectures (Duration: 60 minutes)

Aids: None

**Conditions**
none

*The following informations are from the event BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (SS 2016):*

**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-101294] Nanotechnology
[M-MACH-101287] Microsystem Technology
[M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142140 | Bionics for Engineers and Natural Scientists | Vorlesung (V) | 2 | Hendrik Hölscher, Stefan Walheim, Christian Greiner |

**Learning Control / Examinations**
written or oral exam

**Conditions**
none

*The following informations are from the event Bionics for Engineers and Natural Scientists (SS 2016):*

**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: 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6241804 | | Vorlesung (V) | 2 | Helmut Johannes Miernik, Rainer Kohlhammer |

**Conditions**
none

## T Course: BUS-Controls [T-MACH-102150]

**Responsibility:** Marcus Geimer, Felix Weber
**Contained in:** [M-MACH-101266] Automotive Engineering
[M-MACH-101267] Mobile Machines

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114092 | BUS-Controls | Vorlesung (V) | 2 | Marcus Geimer, Felix Weber |

**Learning Control / Examinations**
The assessment consists of an oral exam taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event BUS-Controls (SS 2016):*

**Aim**
The students will get an overview of the theoretic and practical functioning of different bus systems.

After the practical oriented lessons the students will be able to visualize the communication structure of different applications, design basic systems and evaluate the complexity of programming of the complete system.

**Content**

- Knowledge of the basics of data communication in networks
- Overview of the operating mode of current field buses
- Explicit observation of the operating mode and application areas of CAN buses
- Practical programming of an example application (hardware is provided)

**Workload**

- regular attendance: 21 hours
- self-study: 92 hours

**Literature**
**Elective literature:**

- Etschberger, K.: Controller Area Network, Grundlagen, Protokolle, Bausteine, Anwendungen; München, Wien: Carl Hanser Verlag, 2002.
- Engels, H.: CAN-Bus - CAN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

## 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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540500 | Business Administration in Information Engineering and Management | Vorlesung (V) | 2 | Andreas Geyer-Schulz, Andreas Sonnenbichler |
| SS 2016 | 2540501 | | Übung (Ü) | 1 | Fabian Ball, Andreas Sonnenbichler |

**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.

**Conditions**
None

**Recommendations**
Basic knowledge from Operations Research (linear programming) and from decision theory are expected.

*The following informations are from the event Business Administration in Information Engineering and Management (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2595484 | Business and IT Service Management | Vorlesung (V) | 2 | Gerhard Satzger |
| WS 16/17 | 2595485 | | Übung (Ü) | 1 | Gerhard Satzger, 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

*The following informations are from the event Business and IT Service Management (WS 16/17):*

**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 services.
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: with new digital services, new business models and 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. Particular focus will be on the interdependence of business, IT and legal aspects.
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 day) 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

## T Course: Business data strategy [T-WIWI-106187]

**Responsibility:** Christof Weinhardt
**Contained in:** [M-WIWI-103117] Data Science: Data-Driven Information Systems

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540484 | | Vorlesung (V) | 2 | Christof Weinhardt |

**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

**Remarks**
Limited number of participants.

## 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540531 | Business Dynamics | Vorlesung (V) | 2 | Paul Glenn, Andreas Geyer-Schulz |
| WS 16/17 | 2540532 | Exercise Business Dynamics | Übung (Ü) | 1 | Paul Glenn, Andreas Geyer-Schulz |

**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.

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Business Dynamics (WS 16/17):*

**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
**Contained in:** [M-WIWI-103117] Data Science: Data-Driven Information Systems
[M-WIWI-101506] Service Analytics

| ECTS | Version |
| --- | --- |
| 4,5 | 1 |

**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. We recommend attending the lecture Management of Information Systems.

## T Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

**Responsibility:** Rico Knapper, 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540457 | | Übung (Ü) | 1 | Florian Hawlitschek, Timm Teubner |
| SS 2016 | 2540456 | Business Models in the Internet: Planning and Implementation | Vorlesung (V) | 2 | Timm Teubner |

**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

*The following informations are from the event Business Models in the Internet: Planning and Implementation (SS 2016):*

**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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2545005 | | Seminar (S) | 2 | Ralph Henn |
| WS 16/17 | 2500014 | | Seminar (S) | 2 | |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
None

**Recommendations**
None

*The following informations are from the event (WS 16/17):*

**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.

*The following informations are from the event (SS 2016):*

**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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511210 | Business Process Modelling | Vorlesung (V) | 2 | Andreas Oberweis |
| WS 16/17 | 2511211 | | Übung (Ü) | 1 | Andreas Drescher, 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

*The following informations are from the event Business Process Modelling (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2530299 | Business Strategies of Banks | Vorlesung (V) | 2 | Wolfgang Müller |

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

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Business Strategies of Banks (WS 16/17):*

**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: CAD-NX Training Course [T-MACH-102187]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101281] Virtual Engineering B

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 2 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2123357 | CAD-NX training course | Praktikum (P) | 3 | Jivka Ovtcharova, Mitarbeiter |
| WS 16/17 | 2123357 | CAD-NX training course | Praktikum (P) | 2 | Jivka Ovtcharova, Mitarbeiter |

**Learning Control / Examinations**
Practical examination, duration: 60 min., auxiliary means: script

**Conditions**
none

*The following informations are from the event CAD-NX training course (WS 16/17):*

**Aim**
Students are able to:

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

**Content**
The participant will learn the following knowledge:

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

**Workload**
Regular attendance: 35 hours,
Self-study: 12 hours

**Literature**
Practical course skript

## T Course: Case Studies in Sales and Pricing [T-WIWI-102834]

**Responsibility:** Martin Klarmann
**Contained in:** [M-WIWI-101487] Sales Management
[M-WIWI-101649] Services Marketing

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch/englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2572182 | | Block (B) | 1 | Martin Klarmann, Assistenten |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
None

**Recommendations**
None

**Remarks**
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

*The following informations are from the event (WS 16/17):*

**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

## 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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2545019 | 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.

*The following informations are from the event Case studies seminar: Innovation management (WS 16/17):*

**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

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 2 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2123358 | CATIA CAD training course | Praktikum (P) | 2 | Jivka Ovtcharova, Mitarbeiter |

**Learning Control / Examinations**
Practical examination, duration: 60 min., auxiliary means: script

**Conditions**
none

*The following informations are from the event CATIA CAD training course (WS 16/17):*

**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: Ceramic Processing Technology [T-MACH-102182]

**Responsibility:** Joachim Binder
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2126730 | Ceramics Processing | Vorlesung (V) | 2 | Joachim Binder |

**Learning Control / Examinations**
The assessment consists of an oral exam (approx. 20 min) taking place at the agreed date.
Auxiliary means: none
The re-examination is offered upon agreement.

**Conditions**
none

*The following informations are from the event Ceramics Processing (SS 2016):*

**Aim**
The students are able to name the major ceramic process technologies and explain their specifics in detail. Additionally, they are capable of illustrating the correlations between the individual processes and their importance for the production of engineering ceramics. The students are able to relate processing effects to material properties. Furthermore the students can apply the basics to concrete tasks. They are able to comprehend and assess information in professional articles.

**Content**
The course imparts technological basics for processing of engineering ceramics. The course is arranged in the following units:

- Synthesis methods
- Powder conditioning and mixing methods
- Forming of ceramics
- Sintering
- Finishing processes
- Ceramic films and multi-layer systems
- Effects of processing on properties

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
W. Kollenberg: Technische Keramik, Vulkan Verlag 2010.
M. N. Rahaman: Ceramic Processing, CRC Taylor & Francis, 2007.
D.W. Richerson: Modern ceramic engineering, CRC Taylor & Francis, 2006.
A. G. King: Ceramic Technology and Processing, William Andrew, 2002.

## T Course: Challenges in Supply Chain Management [T-WIWI-102872]

**Responsibility:** Robert Blackburn
**Contained in:** [M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550494 | Challenges in Supply Chain Management | Vorlesung (V) | | Robert Blackburn |

**Learning Control / Examinations**
The assessment consists of a written paper and an oral exam (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 [WI1OR]" is assumed.

**Remarks**
Please notice that this course can be attended only in the elective part of the course program.
The number of participants is restricted due to the execution of joint projects with BASF teams and the resulting examination effort. 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.

*The following informations are from the event Challenges in Supply Chain Management (SS 2016):*

**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-101796]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101064] Fundamentals of Transportation

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6232806 | | Vorlesung (V) | 2 | Peter Vortisch |

### Conditions
none

## T Course: Chemical, Physical and Material Scientific Aspects of Polymers in Microsystem Technologies [T-MACH-102169]

**Responsibility:** Matthias Worgull
**Contained in:** [M-MACH-101291] Microfabrication

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**Learning Control / Examinations**
The assessment will consist of a oral exam (30 min) (following §4 (2), 2 of the examination regulation).

**Conditions**
none

## T Course: Civil Law for Advanced [T-INFO-101994]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101216] Private Business Law

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24650 | Civil Law for Advanced | Vorlesung (V) | 2 | Benjamin Raue |

*The following informations are from the event Civil Law for Advanced (SS 2016):*

**Aim**
Der/die Studierende besitzt vertiefte, über die Vorlesungen *BGB für Anfänger* [24012] und *BGB für Fortgeschrittene* [24504] sowie *HGB und Gesellschaftsrecht* [24011] hinausgehende Kenntnisse im deutschen Gesellschaftsrecht, im Handelsrecht sowie im Bürgerlichen Recht. Er kennt die wesentlichen Auslegungsgrundsätze und Maximen, an denen sich die Rechtsprechung und herrschende Meinung orientieren und auch auf neue Problemfelder anzwenden. Der/die Studierende ist in der Lage, insbesondere im Recht der Schuldverhältnisse (vertraglich/gesetzlich), auch komplexere rechtliche und wirtschaftliche Zusammenhänge zu durchdenken und Probleme zu lösen.

**Content**
Die Vorlesung befasst sich vertieft mit einzelnen Problemfeldern aus den Bereichen des Gesellschaftsrechts, des Handelsrechts und des Rechts der vertraglichen und gesetzlichen Schuldverhältnisse. Es werden rechtliche und wirtschaftliche Zusammenhänge anhand konkreter Beispiele eingehend und praxisnah besprochen.

**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**
Klunzinger, Eugen: Übungen im Privatrecht, Verlag Vahlen, ISBN 3-8006-3291-8, in der neuesten Auflage

## T Course: Combustion Engines I [T-MACH-102194]

**Responsibility:** Thomas Koch, Heiko Kubach
**Contained in:** [M-MACH-101275] Combustion Engines I

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2133113 | Combustion Engines I | Vorlesung / Übung (VÜ) | 4 | Thomas Koch |

**Learning Control / Examinations**
oral examination, Duration: 25 min., no auxiliary means

**Conditions**
none

*The following informations are from the event Combustion Engines I (WS 16/17):*

**Aim**
The student can name and explain the working princicle 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:** Heiko Kubach
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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

*The following informations are from the event Combustion Engines II (SS 2016):*

**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 | Version |
|---|---|
| 5 | 1 |

**Conditions**
none

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

**Responsibility:** Kay Mitusch
**Contained in:** [M-WIWI-101406] Network Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2561205 | | Übung (Ü) | 1 | Kay Mitusch, Cornelia Gremm |
| WS 16/17 | 2561204 | Competition in Networks | Vorlesung (V) | 2 | 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.

**Recommendations**
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required. Useful, but not necessary, are basic knowledge of industrial economics, prinicpal agent theory, and contract theory.

*The following informations are from the event Competition in Networks (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 5 | englisch | Jedes Wintersemester | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2590459 | | Übung (Ü) | 1 | Pradyumn Kumar Shukla |
| WS 16/17 | 2590458 | Computational Economics | Vorlesung (V) | 2 | 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.

*The following informations are from the event Computational Economics (WS 16/17):*

### 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 Risk and Asset Management [T-WIWI-102878]

**Responsibility:** Maxim Ulrich

**Contained in:**
[M-WIWI-103120] Financial Economics
[M-WIWI-101512] Computational Finance
[M-WIWI-103123] Quantitative Valuation
[M-WIWI-103121] Financial Technology for Risk and Asset Management

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 2 |

### Learning Control / Examinations

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-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period).

By assignment of the module Computational Finance: There will be an exam at the end of the lecture.

### Conditions

None.

By assignment of the module Computational Finance: The programming seminar "Solving Computational Risk and Asset Management Problems" has to be attended in the same semester.

### Recommendations

None

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

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24671 | Law of Contracts | Vorlesung (V) | 2 | Alexander Hoff |

*The following informations are from the event Law of Contracts (SS 2016):*

**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: Computer Integrated Planning of New Products [T-MACH-102125]

**Responsibility:** Roland Kläger
**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 2016 | 2122387 | Computer Integrated Planning of New Products | Vorlesung (V) | 2 | Roland Kläger |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Computer Integrated Planning of New Products (SS 2016):*

**Aim**
Der/ die Studierende

- versteht die Standardabläufe im Produktplanungsbereich,
- besitzt grundlegende Kenntnisse über Zusammenhänge, Vorgänge und Strukturelemente als Handlungsleitfaden bei der Planung neuer Produkte,
- besitzt grundlegende Kenntnisse über die Grundlagen und Merkmale der Rapid Prototyping Verfahrenstechnologien,
- versteht die simultane Unterstützung des Produktplanungsprozesses durch entwicklungsbegleitend einsetzbare Rapid Prototyping (RP)-Systeme.

**Content**
Die Steigerung der Kreativität und Innovationsstärke bei der Planung und Entwicklung neuer Produkte wird u.a. durch einen verstärkten Rechnereinsatz für alle Unternehmen zu einer der entscheidenden Einflussgrößen für die Wettbewerbsfähigkeit der Industrie im globalen Wettbewerb geworden ist.

Entsprechend verfolgt die Vorlesung folgende Ziele:

- Das Grundverständnis für Standardabläufe im Produktplanungsbereich erlangen, Kenntnis über Zusammenhänge, Vorgänge und Strukturelemente erwerben und als Handlungsleitfaden bei der Planung neuer Produkte benutzen lernen;
- Kenntnis über die Anforderungen und Möglichkeiten der Rechnerunterstützung erhalten, um die richtigen Methoden und Werkzeuge für die effiziente und sinnvolle Unterstützung eines spezifischen Anwendungsfalles auszuwählen;
- mit den Elementen und Methoden des rechnerunterstützten Ideenmanagements vertraut gemacht werden;
- die Möglichkeiten der simultanen Unterstützung des Produktplanungsprozesses durch entwicklungsbegleitend einsetzbare Rapid Prototyping (RP)-Systeme kennen lernen;

Kenntnis über die Grundlagen und Merkmale dieser RP-Verfahrenstechnologien erwerben und - in Abhängigkeit des zu entwickelnden Produkts - anhand von Beispielen effizient und richtig zur Anwendung bringen können.

**Workload**
Gesamtaufwand bei 3 Leistungspunkten: ca. 100 Stunden.

- Präsenszeit: 26 Stunden
- Vor- /Nachbereitung: 26 Stunden
- Prüfung und Prüfungsvorbereitung: 48 Stunden

## T Course: Constitution and Properties of Protective Coatings [T-MACH-105150]

**Responsibility:** Sven Ulrich
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2177601 | Constitution and Properties of Protective Coatings | Vorlesung (V) | 2 | Sven Ulrich |

**Learning Control / Examinations**
oral examination (30 min)

no tools or reference materials

**Conditions**
none

*The following informations are from the event Constitution and Properties of Protective Coatings (WS 16/17):*

**Aim**
Transfer of the basic knowledge of surface engineering, of the relations between constitution, properties and performance, of the manifold methods of modification, coating and characterization of surfaces.

**Content**
introduction and overview

concepts of surface modification

coating concepts

coating materials

methods of surface modification

coating methods

characterization methods

state of the art of industrial coating of tools and components

new developments of coating technology

**Workload**
regular attendance: 22 hours
self-study: 98 hours

**Literature**
Bach, F.-W.: Modern Surface Technology, Wiley-VCH, Weinheim, 2006

Copies with figures and tables will be distributed

## T Course: Constitution and Properties of Wearresistant Materials [T-MACH-102141]

**Responsibility:** Sven Ulrich
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Version |
|---|---|---|
| 4 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2194643 | Constitution and Properties of Wear resistant materials | Vorlesung (V) | 2 | Sven Ulrich |

**Learning Control / Examinations**
oral examination (30 min)

no tools or reference materials

**Conditions**
none

*The following informations are from the event Constitution and Properties of Wear resistant materials (SS 2016):*

**Aim**
Basic understanding of constitution of wear-resistant materials, of the relations between constitution, properties and performance, of principles of increasing of hardness and toughness of materials as well as of the characteristics of the various groups of wear-resistant materials.

**Content**
introduction

materials and wear

unalloyed and alloyed tool steels

high speed steels

stellites and hard alloys

hard materials

hard metals

ceramic tool materials

superhard materials

new developments

**Workload**
regular attendance: 22 hours
self-study: 98 hours

**Literature**
Laska, R. Felsch, C.: Werkstoffkunde für Ingenieure, Vieweg Verlag, Braunschweig, 1981

Schedler, W.: Hartmetall für den Praktiker, VDI-Verlage, Düsseldorf, 1988

Schneider, J.: Schneidkeramik, Verlag moderne Industrie, Landsberg am Lech, 1995

Copies with figures and tables will be distributed

## T Course: Construction and Maintenance of Guided Track Infrastructure [T-BGU-101851]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering
[M-BGU-101111] Public Transportation Operations

| ECTS | Language | Version |
|---|---|---|
| 1,5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6234809 | Construction and Maintenance of Tracke Infrastructure | Vorlesung (V) | 1 | Mitarbeiter/innen, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Construction and Maintenance of Tracke Infrastructure (SS 2016):*

**Literature**
Fiedler: Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf

## T Course: Construction Equipment [T-BGU-101845]

**Responsibility:** Sascha Gentes
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6243701 | | Vorlesung (V) | 2 | Sascha Gentes, Günther Dörfler |

**Conditions**
none

## T Course: Control of Linear Multivariable Systems [T-ETIT-100666]

**Responsibility:** Sören Hohmann
**Contained in:** [M-ETIT-101157] Control Engineering II

| ECTS | Language | Version |
|---|---|---|
| 6 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23179 | | Übung (Ü) | 1 | Florian Köpf |
| WS 16/17 | 23177 | | Vorlesung (V) | 3 | Mathias Kluwe |

**Conditions**
none

## T Course: Control Technology [T-MACH-105185]

**Responsibility:** Christoph Gönnheimer
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2150683 | Control Technology | Vorlesung (V) | 2 | Christoph Gönnheimer |

**Learning Control / Examinations**
The assessment is carried out as an oral exam. The examination is offered every semester. Reexaminations are offered at every ordinary examination date. In case of a great number of participating students assessment is carried out as a written exam. Oral exams then are only carried out in the event of repetition.

**Conditions**
none

*The following informations are from the event Control Technology (SS 2016):*

**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

**Literature**
Lecture Notes

## T Course: Convex Analysis [T-WIWI-102856]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 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-101242] Governance, Risk & Compliance
[M-INFO-101215] Intellectual Property Law

| ECTS | Language | Version |
| --- | --- | --- |
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
| --- | --- | --- | --- | --- | --- |
| WS 16/17 | 24121 | Copyright | Vorlesung (V) | 2 | Thomas Dreier |

*The following informations are from the event Copyright (WS 16/17):*

**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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2400087 | Corporate Compliance | Vorlesung (V) | 2 | Andreas Herzig |

*The following informations are from the event Corporate Compliance (WS 16/17):*

**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-101480] Finance 3
[M-WIWI-101483] Finance 2
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101453] Applied Strategic Decisions

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530215 | | Übung (Ü) | 2 | Daniel Hoang, Martin Ruckes |
| SS 2016 | 2530214 | | Vorlesung (V) | 2 | 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

*The following informations are from the event (SS 2016):*

**Content**
Students are told profound knowledge about appropriate financing of firms.

**Literature**
**Elective Literature**
Tirole, J. (2006): The Theory of Corporate Finance. Princeton University Press.

## T Course: Country Manager Simulation [T-WIWI-106137]

**Responsibility:** Sven Feurer
**Contained in:** [M-WIWI-101487] Sales Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2572172 | | Block (B) | | Sven Feurer |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 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 following courses can be chosen in the Sales Management Module: Country Manager Simulation, Case Studies in Sales and Pricing or Preisverhandlungen und Verkaufspräsentationen.
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.

*The following informations are from the event (WS 16/17):*

**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

## 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2530566 | | Übung (Ü) | 1 | Michael Hofmann |
| WS 16/17 | 2530565 | Credit Risk | Vorlesung (V) | 2 | Marliese Uhrig-Homburg |

**Learning Control / Examinations**
The assessment consists of a written exam following §4, Abs. 2, 1.

**Conditions**
None

**Recommendations**
See German version.

*The following informations are from the event Credit Risk (WS 16/17):*

**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: Current Issues in Innovation Management [T-WIWI-102873]

**Responsibility:** Marion Weissenberger-Eibl
**Contained in:** [M-WIWI-101507] Innovation Management

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Unregelmäßig | 1 |

**Learning Control / Examinations**
Non exam assessment (following §4(2) 3 of the examination regulation).

**Conditions**
None

**Recommendations**
None

**Remarks**
See German version.

## 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 | Language | Recurrence | Version |
|---|---|---|---|
| 2 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530350 | Current Issues in the Insurance Industry | Seminar (S) | 2 | Wolf-Rüdiger Heilmann |

**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.

*The following informations are from the event Current Issues in the Insurance Industry (SS 2016):*

**Aim**
Knowledge and understanding of important current characteristics of insurance, e.g. insurance markets, lines, products, investment, company pension schemes, corporate structures and governance as well as controlling.

**Workload**
The total workload for this course is approximately 60 hours. For further information see German version.

## T Course: Current Topics on BioMEMS [T-MACH-102176]

**Responsibility:** Andreas Guber
**Contained in:** [M-MACH-101290] BioMEMS

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2143873 | Actual topics of BioMEMS | Seminar (S) | 2 | Andreas Guber, Giorgio Cattaneo |
| WS 16/17 | 2143873 | Actual topics of BioMEMS | Seminar (S) | 2 | Andreas Guber |

**Learning Control / Examinations**
active participation and own presentation

*The following informations are from the event Actual topics of BioMEMS (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2520375 | | Vorlesung (V) | 2/4 | Rheza Nakhaeizadeh |

### Learning Control / Examinations

- Oral examination 70%
- Conduction of a small empirical study 30%

### Conditions

None

## 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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 24018 | | Vorlesung (V) | 2 | Nikolaus Marsch |

*The following informations are from the event (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511202 | Database Systems and XML | Vorlesung (V) | 2 | Andreas Oberweis |
| WS 16/17 | 2511203 | | Übung (Ü) | 1 | Andreas Fritsch, Andreas Oberweis, Timm Caporale |

**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

*The following informations are from the event Database Systems and XML (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530551 | | Übung (Ü) | 1 | Marliese Uhrig-Homburg, Stefan Fiesel |
| SS 2016 | 2530550 | Derivatives | Vorlesung (V) | 2 | Marliese Uhrig-Homburg |

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

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Derivatives (SS 2016):*

**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 Basics in Highway Engineering [T-BGU-101670]

**Responsibility:** Ralf Roos
**Contained in:** [M-BGU-100998] Design, Construction, Operation and Maintenance of Highways

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6200407 | | Vorlesung (V) | 2 | Ralf Roos, Matthias Zimmermann |
| SS 2016 | 6200408 | | Übung (Ü) | | Plamena Plachkova-Dzhurova, Matthias Zimmermann |

**Conditions**
none

## T Course: Design Thinking [T-WIWI-102866]

**Responsibility:** Orestis Terzidis
**Contained in:** [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2545010 | | Seminar (S) | 2 | Boris Kneisel |
| WS 16/17 | 2500008 | | Seminar (S) | 2 | |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**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 | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch/englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2513305 | Developing IT-based Business Models | Seminar (S) | 2 | Rudi Studer, Maria Maleshkova, York Sure-Vetter, Felix Leif Keppmann |

**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.

*The following informations are from the event Developing IT-based Business Models (WS 16/17):*

**Content**
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

## T Course: Digital Service Design [T-WIWI-105773]

**Responsibility:** Alexander Mädche
**Contained in:** [M-WIWI-102806] Service Innovation, Design & Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540420 | | Vorlesung (V) | 2 | 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.

## T Course: Digital Transformation in Organizations [T-WIWI-106201]

**Responsibility:** Alexander Mädche
**Contained in:** [M-WIWI-102754] Service Economics and Management
[M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-101410] Business & Service Engineering
[M-WIWI-101448] Service Management

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**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.

## T Course: Disassembly Process Engineering [T-BGU-101850]

**Responsibility:** Sascha Gentes
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6241829 | | Übung (Ü) | 1 | Sascha Gentes |
| SS 2016 | 6241828 | | Vorlesung (V) | 1 | Sascha Gentes |

**Conditions**
none

## T Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102805] Service Operations
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550488 | | Vorlesung (V) | 2 | Sven Spieckermann |

### Learning Control / Examinations
The assessment consists of a written paper and an oral exam (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 toOperations Research*[WI1OR] 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.

## T Course: Document Management and Groupware Systems [T-WIWI-102663]

**Responsibility:** Stefan Klink
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511212 | Document Management and Groupware Systems | Vorlesung (V) | 2 | Stefan Klink |

### Learning Control / Examinations
The assessment consists of an 1h written exam in the first week after lecture period according to Section 4(2), 1 of the examination regulation).

### Conditions
None

*The following informations are from the event Document Management and Groupware Systems (SS 2016):*

### Aim
Students master the basics of integration and structure of document management systems (DMS) and know the complete DMS process - from document capture of the archiving until retrieval. Students know how to realize operative workflows. They know which activities are needed to carry out the conceptual design and installation of DMS and they are able to apply a DMS as an archive system, workflow system and retrieval system. Furthermore, they know groupware systems exemplarily and can use them for collaborative tasks.

### Content
The lecture gives basics of document management and groupware systems. It covers different system categories, their interaction and their use areas and illustrates this with concrete examples. These include document management in the strict sense, scanning, Document Imaging (acquisition and visualization of scanned documents), indexing, electronic archiving, retrieval of relevant documents, workflow, groupware, and office communications.

### Workload
Workload: 120h overall,
Lecture 30h
Review and preparation of lectures 60h
Exam preparation 29h
Exam 1h

### Literature

- Klaus Götzer, Udo Schneiderath, Berthold Maier, Torsten Komke: Dokumenten-Management. Dpunkt Verlag, 2004, 358 Seiten, ISBN 3-8986425-8-5
- Jürgen Gulbins, Markus Seyfried, Hans Strack-Zimmermann: Dokumenten-Management. Springer, Berlin, 2002, 700 Seiten, ISBN 3-5404357-7-8
- Uwe M. Borghoff, Peter Rödig, Jan Scheffcyk, Lothar Schmitz: Langzeitarchivierung – Methoden zur Erhaltung digitaler Dokumente. Dpunkt Verlag, 2003, 299 Seiten, ISBN 3-89864-258-5

Further literature is given in each lecture individually.

## T Course: Economic Efficiency of Guided Transport Systems [T-BGU-101794]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering
[M-BGU-101113] Project in Public Transportation
[M-BGU-101111] Public Transportation Operations

| ECTS | Language | Version |
|---|---|---|
| 1,5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6234902 | Economic Efficiency of Guided Transport Systems | Vorlesung (V) | 1 | KIT Mitarbeiter, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Economic Efficiency of Guided Transport Systems (WS 16/17):*

**Content**
- Basics of Business Management
- Cost-Performance Calculation
- Investment and Financing
- Basics of National Economy
- Market Forms
- Financial Science
- Cost Theorie
- Basics of Transport Industry
- Traffic Demand and Offer
- Transport Policy

**Literature**
Aberle: Transportwirtschaft, Oldenbourg-Verlag
Kunz: Eisenbahnrecht, Nomos, Baden-Baden

## T Course: Economic Integration in Europe [T-WIWI-102896]

**Responsibility:** Jan Kowalski
**Contained in:** [M-WIWI-101481] Economic Policy II

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Learning Control / Examinations**
See German version

**Conditions**
None

## T Course: eEnergy: Markets, Services, Systems [T-WIWI-102794]

**Responsibility:** Christof Weinhardt
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets
[M-WIWI-101411] Information Engineering
[M-WIWI-101446] Market Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540464 | eEnergy: Markets, Services, Systems | Vorlesung (V) | 2 | Christof Weinhardt, Alexander Schuller |
| SS 2016 | 2540465 | | Übung (Ü) | 1 | Johannes Gärttner, Alexander Schuller, David Dauer |

### 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). The bonus only applies to the first and second exam of the semester in which it was obtained.

### Conditions
None

### Recommendations
None

### Remarks
The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

*The following informations are from the event eEnergy: Markets, Services, Systems (SS 2016):*

### Aim
The student

- understands the tasks and basic structure of the energy economy, in particular concerning electricity markets,
- understands the change in the energy economy and the necessity for the development of a Smart Grid,
- knows the market mechanisms in the energy market and their role in coordination and allocation of electric energy,
- is able to describe the relation between OTC, spot and balancing energy markets,
- knows the regulation specifications for energy markets and can reflect them critically,
- is able to model smart grid mechanisms and to evaluate them by simulation based methods.

### Content
Scope of the lecture *eEnergy: Markets, Services, Systems* is economics and information management in energy markets. Integration of the growing number of renewable energy sources imposes new challenges on energy markets and the power system. To improve coordination between supply and demand it is necessary to interlink centralized and decentralized generators as well as consumers by means of ICT. Current electricity networks are extended by intelligent IT components thus incorporating the "Smart Grid". Existing market structures for electricity have to be adjusted for a successful implementation of demand side management and integration of an increasing number of renewable energy producers as well as electric vehicles. Apart from regulatory and economic concepts, methods for modeling and analysis of energy markets are introduced and explained during the course.
The lecture is structured as follows:

1. **Electricity Markets**
   Market Models, EEX (spot and futures market), OTC Trading, Market Coupling
2. **Regulation**
   Charges and Incentives, Network Congestion (Management)
3. **Demand Side Management**
   Smart Meters, Tariffs, Price Elasticity, Storage Systems, Electric Mobility
4. **Modeling and Analysis of Energy Markets**

**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: Efficient Algorithms [T-WIWI-102655]

**Responsibility:** Hartmut Schmeck
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511101 | | Übung (Ü) | 1 | Hartmut Schmeck, Marlon Braun |
| SS 2016 | 2511100 | Efficient Algorithms | Vorlesung (V) | 2 | Hartmut Schmeck |

**Learning Control / Examinations**
The examination will be offered latest until summer term 2017 (repeaters only).
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

*The following informations are from the event Efficient Algorithms (SS 2016):*

**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:** Russell McKenna, Patrick Jochem
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2581006 | Efficient Energy Systems and Electric Mobility | Vorlesung (V) | 2 | Russell McKenna, Patrick Jochem |

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

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Efficient Energy Systems and Electric Mobility (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540455 | | Übung (Ü) | 1 | Christof Weinhardt, Benedikt Notheisen |
| WS 16/17 | 2540454 | eFinance: Information Engineering and Management for Securities Trading | Vorlesung (V) | 2 | Christof Weinhardt |

**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

*The following informations are from the event eFinance: Information Engineering and Management for Securities Trading (WS 16/17):*

**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 Bortenlänger, 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: Electrical Railway Traction Systems [T-MACH-102121]

**Responsibility:** Peter Gratzfeld
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114346 | Electric Rail Vehicles | Vorlesung (V) | 2 | Peter Gratzfeld |

**Learning Control / Examinations**
The assessment will consist of a oral exam (20 min) according to §4 (2), 2 of the examination regulation.
The exam is offered each semester. The re-examination is offered upon prior agreement with the interested participants and not later than the next regular examination date.

*The following informations are from the event Electric Rail Vehicles (SS 2016):*

**Aim**
The students know the history of electric traction in railway transportation from the very beginning to modern vehicles with three-phase traction drives.
They know the basics of railway transportation, vehicle dynamics and wheel-rail-contact and can deduct the requirements for electric rail vehicles out of it.
They understand purpose, design and functionality of electric traction drives.
They learn about the different systems of traction power supply with its advantages and disadvantages.
They are informed about actual concepts and new developments in the field of electric railway vehicles.

**Content**
History of electric traction with railway vehicles, economic impact
Vehicle dynamics: running resistance, tractive effort diagram, running cycles
Wheel-rail-contact
Electric drives: traction motors, power conversion, drives for vehicles at dc and ac lines, dieselelectric vehicles, multi system vehicles, axle drives, transmission of tractive effort to the rails
Traction power supply: networks, substations, inductive power supply, energy management
Modern vehicle concepts for mass transit and main line

**Workload**
Regular attendance: 21 hours
Self-study: 21 hours
Exam and preparation: 78 hours

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

## T Course: Elements and Systems of Technical Logistics [T-MACH-102159]

**Responsibility:** Vladimir Madzharov, Martin Mittwollen
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117096 | Elements and systems of Technical Logistics | Vorlesung / Übung (VÜ) | 3 | Vladimir Madzharov, 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
previous / parallel visit of LV 21177095 “Basics of Technical Logistics”

*The following informations are from the event Elements and systems of Technical Logistics (WS 16/17):*

### 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 of Technical Logistics and Project [T-MACH-102178]

**Responsibility:** Vladimir Madzharov, Martin Mittwollen
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117097 | Elements and systems of Technical Logistics plus project | Vorlesung / Übung (VÜ) | 4 | Vladimir Madzharov, 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** preconditioned

*The following informations are from the event Elements and systems of Technical Logistics plus project (WS 16/17):*

**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
- Judge about systems in place and justify it in front of subject related persons.

**Content**

- 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
- Self manufacturing of a project report to recesses the topic.

**Workload**
presence: 48h
rework: 132h

**Literature**
recommendations during lectures

## 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 | Version |
|---|---|---|---|
| 3,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581962 | Emissions into the Environment | Vorlesung (V) | 2 | Ute Karl |

**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

*The following informations are from the event Emissions into the Environment (WS 16/17):*

**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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 24167 | Employment Law I | Vorlesung (V) | 2 | Alexander Hoff |

*The following informations are from the event Employment Law I (WS 16/17):*

**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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24668 | Employment Law II | Vorlesung (V) | 2 | Alexander Hoff |

*The following informations are from the event Employment Law II (SS 2016):*

**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-101452] Energy Economics and Technology
[M-WIWI-101468] Environmental Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2581004 | | Übung (Ü) | 1 | Katrin Seddig |
| SS 2016 | 2581003 | Energy and Environment | Vorlesung (V) | 2 | Ute Karl |

**Learning Control / Examinations**
The examination will be in form of an written exam acc. to §4(2), 2 ER.

**Conditions**
None

*The following informations are from the event Energy and Environment (SS 2016):*

**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.

## T Course: Energy and Process Technology I [T-MACH-102211]

**Responsibility:** Corina Schwitzke, Amin Velji, Heiner Wirbser, Hans-Jörg Bauer
**Contained in:** [M-MACH-101296] Energy and Process Technology I

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 9 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2157961 | Energy and Process Technology I | Vorlesung / Übung (VÜ) | 6 | Heiner Wirbser, Uwe Wagner, Hans-Jörg Bauer, Mitarbeiter |

**Learning Control / Examinations**
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
none

*The following informations are from the event Energy and Process Technology I (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 9 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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

*The following informations are from the event Energy and Process Technology II (SS 2016):*

**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 CO2 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 CO2 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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

*The following informations are from the event Energy Conversion and Increased Efficiency in Internal Combustion Engines (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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.

*The following informations are from the event Energy efficient intralogistic systems (WS 16/17):*

### 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 Policy [T-WIWI-102607]

**Responsibility:** Martin Wietschel
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2581959 | Energy Policy | Vorlesung (V) | 2 | Martin Wietschel |

**Learning Control / Examinations**
The assessment consists of a written exam 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.

**Conditions**
None

*The following informations are from the event Energy Policy (SS 2016):*

**Aim**
See German version.

**Content**
The course deals with material and energy policy of policy makers and includes the effects of such policies on the economy as well as the involvement of industrial and other stakeholders in the policy design. At the beginning the neoclassical environment policy is discussed. Afterwards the Sustainable Development concept is presented and strategies how to translate the concept in policy decision follows. In the next part of the course an overview about the different environmental instruments classes, evaluation criteria for these instruments and examples of environmental instruments like taxes or certificates will be discussed. The final part deals with implementation strategies of material and energy policy.

**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: Energy Systems Analysis [T-WIWI-102830]

**Responsibility:** Valentin Bertsch
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581002 | Energy Systems Analysis | Vorlesung (V) | 2 | Valentin Bertsch |

**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.

*The following informations are from the event Energy Systems Analysis (WS 16/17):*

**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:** Dogan Keles, Wolf Fichtner, Clemens Cremer
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2581020 | Energy Trade and Risk Management | Vorlesung (V) | 3 | Dogan Keles, Clemens Cremer |

**Learning Control / Examinations**
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Energy Trade and Risk Management (SS 2016):*

**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

## Course: Engine Measurement Techniques [T-MACH-105169]

**Responsibility:** Sören Bernhardt
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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.

*The following informations are from the event Engine measurement techniques (SS 2016):*

**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**
Lecture notes available in the lectures or in the 'Studentenhaus'

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 Geophysics for external students [T-PHYS-103118]

**Responsibility:** Friedemann Wenzel
**Contained in:** [M-WIWI-101642] Natural Hazards and Risk Management 1
[M-WIWI-101644] Natural Hazards and Risk Management 2

| ECTS | Language | Version |
|---|---|---|
| 4 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 4060212 | | Übung (Ü) | 1 | Friedemann Wenzel, Andreas Schäfer |
| SS 2016 | 4060211 | | Vorlesung (V) | 1 | Friedemann Wenzel, Andreas Schäfer |

## T Course: Engineering of Financial Software [T-WIWI-106193]

**Responsibility:** Maxim Ulrich
**Contained in:** [M-WIWI-103121] Financial Technology for Risk and Asset Management

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**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 "Financial Technology for Risk and Asset Management"
2. Students have already passed the exam for (i) "Computational Risk and Asset Management" or (ii) "Machine Learning in Finance" with a grade of at least 2.0.

**Recommendations**
None

**Remarks**
New course starting winter term 2016/2017.

## 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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511600 | Enterprise Architecture Management | Vorlesung (V) | 2 | Thomas Wolf |
| WS 16/17 | 2511601 | | Übung (Ü) | 1 | Thomas Wolf |

**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

*The following informations are from the event Enterprise Architecture Management (WS 16/17):*

**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 | Language | Recurrence | Version |
|---|---|---|---|
| 3 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2545012 | Entrepreneurial Leadership & Innovation Management | Seminar (S) | 2 | Carsten Linz |
| WS 16/17 | 2500015 | Entrepreneurial Leadership & Innovation Management | Seminar (S) | 2 | Carsten Linz, 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

*The following informations are from the event Entrepreneurial Leadership & Innovation Management (WS 16/17):*

**Aim**
- Seize what determines entrepreneurial performance
- Identify entrepreneurial opportunities and evaluate them
- Develop and sharpen innovative business ideas
- Pitch a business idea in front of potential share-/stakeholders
- Lead new business growth by driving the enterprise evolution
- Effectively deal with critical challenges and overcome obstacles

**Content**
On campus the seminar combines foundational knowledge, real-world examples, and practical exercise/group work sessions.

**Workload**
Time of attendance: 30 hours
Studying at home: 30 hours
Exam preparation: 30 hours

*The following informations are from the event Entrepreneurial Leadership & Innovation Management (WS 16/17):*

**Aim**
- Seize what determines entrepreneurial performance
- Identify entrepreneurial opportunities and evaluate them
- Develop and sharpen innovative business ideas
- Pitch a business idea in front of potential share-/stakeholders
- Lead new business growth by driving the enterprise evolution
- Effectively deal with critical challenges and overcome obstacles

**Content**
On campus the seminar combines foundational knowledge, real-world examples, and practical exercise/group work sessions.

**Workload**
Time of attendance: 30 hours
Studying at home: 30 hours
Exam preparation: 30 hours

## T Course: Entrepreneurship [T-WIWI-102864]

**Responsibility:** Orestis Terzidis
**Contained in:** [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2545001 | Entrepreneurship | Vorlesung (V) | 2 | Orestis Terzidis |
| WS 16/17 | 2500003 | Entrepreneurship Lecture | Vorlesung (V) | 2 | 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

*The following informations are from the event Entrepreneurship (SS 2016):*

### 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.

In addition to the lectures the KIT Entrepreneurship Talks, where successful entrepreneurs share their experiences from the early stages of their companies, will be given. Dates and times will be announced in time on the EnTechnon website.

More details: http://etm.entechnon.kit.edu/211.php

### 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

*The following informations are from the event Entrepreneurship Lecture (WS 16/17):*

### 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.

In addition to the lectures the KIT Entrepreneurship Talks, where successful entrepreneurs share their experiences from the early stages of their companies, will be given. Dates and times will be announced in time on the EnTechnon website.

More details: http://etm.entechnon.kit.edu/211.php

**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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2545002 | Entrepreneurship Research | Seminar (S) | 2 | Ralph Henn, 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.

*The following informations are from the event Entrepreneurship Research (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560548 | Environmental and Ressource Policy | 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 industrial organization and economic policy. This knowledge may be acquired in the courses *Introduction to Industrial Organization*[2520371] and *Economic Policy* [2560280].

*The following informations are from the event Environmental and Ressource Policy (SS 2016):*

### 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 Aspects of Guided Transport Systems [T-BGU-101825]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering
[M-BGU-101113] Project in Public Transportation
[M-BGU-101111] Public Transportation Operations

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6234901 | Environmental Aspects of Guided Transport Systems | Vorlesung (V) | 2 | Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Environmental Aspects of Guided Transport Systems (WS 16/17):*

**Content**
- Basics of Environmental Protection
- Human Medical Influences through Noise
- Basics and Systems of Active and Passive Noise Control
- Sound Calculation (Schall 03)
- Customer Focus

**Literature**
Aberle: Transportwirtschaft, Oldenbourg-Verlag
Kunz: Eisenbahnrecht, Nomos, Baden-Baden

## 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 | Version |
|---|---|
| 4 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6224905 | | Seminar (S) | 2 | Charlotte Kämpf |

**Learning Control / Examinations**
Non exam assessment (following §4(2), 3 of the examination regulation).

**Conditions**
None

**Recommendations**
None

## T Course: Environmental Economics and Sustainability [T-WIWI-102615]

**Responsibility:** Rainer Walz
**Contained in:** [M-WIWI-101468] Environmental Economics

| ECTS | Recurrence | Version |
|---|---|---|
| 5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 24140 | | Vorlesung (V) | 2 | Nikolaus Marsch |

*The following informations are from the event (WS 16/17):*

**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:** Matthias Bäcker
**Contained in:** [M-INFO-101217] Public Business Law

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24666 | | Vorlesung (V) | 2 | Ulf Brühann |

*The following informations are from the event (SS 2016):*

**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: Exchanges [T-WIWI-102625]

**Responsibility:** Jörg Franke
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530296 | Exchanges | Vorlesung (V) | 1 | Jörg Franke |

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

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Exchanges (SS 2016):*

**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: Exercises in Civil Law [T-INFO-102013]

**Responsibility:** Yvonne Matz, Thomas Dreier
**Contained in:** [M-INFO-101191] Commercial Law

| ECTS | Language | Version |
|---|---|---|
| 9 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24506 | Exercises in Civil Law | Vorlesung (V) | 2 | Benjamin Raue |
| SS 2016 | 24926 | Case Studies in Civil Law | Übung (Ü) | 2 | Eva-Maria Bauer, Franziska Brinkmann, Cornelius Kleiner |
| SS 2016 | 24504 | Advanced Civil Law | Vorlesung (V) | 2 | Yvonne Matz |
| WS 16/17 | 24011 | Commercial and Corporate Law | Vorlesung (V) | 2 | Alexander Wiele |

*The following informations are from the event Commercial and Corporate Law (WS 16/17):*

**Aim**

1. Der/die Studierende kennt die Besonderheiten der Handelsgeschäfte, der handelsrechtlichen Stellvertretung und des Kaufmannsrechts. Er/sie hat vertiefte Kenntnisse über die Organisationsformen, die das deutsche Gesellschaftsrecht für unternehmerische Aktivitäten zur Verfügung stellt. Er/sie ist vertraut mit dem Recht der Personengesellschaften (Gründung, Beitritt, Auflösung, Corporate Governance). Er/sie kennt die Besonderheiten der GmbH und der GmbH&co.KG sowie der AG.

**Content**
Die Vorlesung beginnt mit einer Einführung in die Kaufmannsbegriffe des Handelsgesetzbuches. Danach werden das Firmenrecht, das Handelsregisterrecht und die handelsrechtliche Stellvertretung besprochen. Es folgen die allgemeinen Bestimmungen zu den Handelsgeschäften und die besonderen Handelsgeschäfte. Im Gesellschaftsrecht werden zunächst die Grundlagen der Personengesellschaften erläutert. Danach erfolgt eine Konzentration auf das Kapitalgesellschaftsrecht, welches die Praxis dominiert.

**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.
\begintabular|l|c|r|
\hline
Aktivität & & Arbeitsaufwand \\
\hline
\itshape Präsenzzeit & & \\
Besuch der Vorlesung & 15 x 90min & 22h 30m \\
\hline
Vor- / Nachbereitung der Vorlesung & 15 x 120min & 30h 00m \\
Prüfung vorbereiten & & 37h 30m \\
\hline
Summe & & 90h 00m \\
\hline
\endtabular

**Literature**
Klunzinger, Eugen

- Grundzüge des Handelsrechts, Verlag Vahlen, 12. Aufl. 2003, ISBN 3-8006-2914-3
- Grundzüge des Gesellschaftsrechts, Verlag Vahlen, 13. Aufl. 2004, ISBN 3-8006-3077-X

**Weiterführende Literatur**
Wird in der Vorlesung bekannt gegeben.

*The following informations are from the event Exercises in Civil Law (SS 2016):*

**Aim**
Der/die Studierende hat vertiefte Kenntnisse in der juristischen Falllösungstechnik (Anspruchsaufbau, Gutachtenstil, Subsumtion). Er/sie ist in der Lage, juristische Problemfälle der Praxis mit juristischen Mitteln methodisch sauber zu lösen.

**Content**
In 5 Übungsterminen wird der Stoff der Veranstaltungen "BGB für Fortgeschrittene" und "Handels- und Gesellschaftsrecht" wiederholt und die juristische Falllösungsmethode vertiefend eingeübt. Weiterhin werden im Rahmen der Übung 5 Klausuren geschrieben, die sich über den gesamten bisher im Privatrecht erlernten Stoff erstrecken. Weitere Termine sind für die Klausurrückgabe und die Besprechungen der einzelnen Klausuren reserviert.

**Workload**
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden, davon 22,5 h Präsenz und 67,5 h Klausurvor- und nachbereitungszeit..
\begintabular|l|c|r|
\hline
Aktivität & & Arbeitsaufwand \\
\hline
\itshape Präsenzzeit & & \\
Besuch der Vorlesung (darin 5 Klausuren) & 15 x 90min & 22h 30m \\
\hline
Vor- / Nachbereitung der Vorlesung & 15 x 120min & 30h 00m \\
Skript 2x wiederholen & 2 x 10h & 20h 00m \\
Prüfung vorbereiten & & 17h 30m \\
\hline
Summe & & 90h 00m \\
\hline
\endtabular

*The following informations are from the event Advanced Civil Law (SS 2016):*

**Aim**
Der/die Studierende hat vertiefte Kenntnisse des allgemeinen und des besonderen Schuldrechts sowie des Sachenrechts. Er/sie kennt die gesetzlichen Grundregelungen von Leistungsort und Leistungszeit einschließlich der Modalitäten der Leistungsabwicklung sowie die gesetzliche Regelung des Rechts der Leistungsstörungen (Unmöglichkeit, Nichtleistung, verspätete Leistung, Schlechtleistung). Der/die Studierende ist vertraut mit den Grundzügen der gesetzlichen Vertragstypen und der Verschuldens- wie auch der Gefährdungshaftung. Der/die Studierende kann aus dem Sachenrecht die unterschiedlichen Arten der Übereignung unterscheiden und hat einen Überblick über die dinglichen Sicherungsrechte

**Content**
Aufbauend auf den in der Vorlesung BGB für Anfänger erworbenen Grundkenntnissen des Zivilrechts und insbesondere des allgemeinen Teils des Bürgerlichen Gesetzbuches (BGB) behandelt die Vorlesung die gesetzlichen Regelungen des allgemeinen und des besonderen Schuldrechts, also zum einen die gesetzlichen Grundregelungen von Leistungsort und Leistungszeit einschließlich der Modalitäten der Leistungsabwicklung und des Rechts der Leistungsstörungen (Unmöglichkeit, Nichtleistung, verspätete Leistung, Schlechtleistung). Zum anderen werden die gesetzlichen Vertragstypen (insbesondere Kauf, Miete, Werk- und Dienstvertrag, Leihe, Darlehen), vorgestellt und Mischtypen besprochen (Leasing, Factoring, neuere Computerverträge). Darüber hinaus wird das Haftungsrecht in den Formen der Verschuldens- und der Gefährdungshaftung besprochen. Im Sachenrecht geht es um Besitz und Eigentum, um die verschiedenen Übereignungstatbestände sowie um die wichtigsten dinglichen Sicherungsrechte.

**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.

\begintabular|l|c|r|
\hline
Aktivität & & Arbeitsaufwand \\
\hline
\itshape Präsenzzeit & & \\
Besuch der Vorlesung & 15 x 90min & 22h 30m \\
\hline
Vor- / Nachbereitung der Vorlesung & 15 x 120min & 30h 00m \\
Skript 2x wiederholen & 2 x 10h & 20h 00m \\
Prüfung vorbereiten & & 17h 30m \\
\hline
Summe & & 90h 00m \\
\hline
\endtabular
\captionArbeitsaufwand für die Lerneinheit "BGB für Fortgeschrittene"

**Literature**
Wird in der Vorlesung bekannt gegeben.
**Weiterführende Literatur**
Wird in der Vorlesung bekannt gegeben.

## T Course: Experimental Economics [T-WIWI-102614]

**Responsibility:** Christof Weinhardt, Timm Teubner

**Contained in:** [M-WIWI-101446] Market Engineering
[M-WIWI-103118] Data Science: Data-Driven User Modeling
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101505] Experimental Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540489 | Experimental Economics | Vorlesung (V) | 2 | Jella Pfeiffer, Verena Dorner, Timm Teubner |
| WS 16/17 | 2540493 | | Übung (Ü) | 1 | Jella Pfeiffer, Verena Dorner, Timm Teubner |

**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). The bonus only applies to the first and second exam of the semester in which it was obtained.

**Conditions**

None

*The following informations are from the event Experimental Economics (WS 16/17):*

**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: Experimental Lab Class in Welding Technology, in Groups [T-MACH-102099]

**Responsibility:** Jürgen Hoffmeister
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2173560 | Welding Lab Course, in groupes | Praktikum (P) | 3 | Volker Schulze, Stefan Dietrich |

**Learning Control / Examinations**
Certificate to be issued after evaluation of the lab class report

**Conditions**
Certtificate of attendance for Welding technique

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

- The course [T-MACH-105170] *Welding Technology* must have been passed.

*The following informations are from the event Welding Lab Course, in groupes (WS 16/17):*

**Aim**
The students are capable to name a survey of current welding processes and their suitability for joining different metals. The students can evaluate the advantages and disadvantages of the individual procedures. The students have weld with different welding processes.

**Content**
Gas welding of steels with different weld geometries

Gas welding of cast iron, nonferrous metals

Brazing of aluminum

Electric arc welding with different weld geometries

Gas welding according to the TIG, MIG and MAG procedures

**Workload**
regular attendance: 31,5 hours
preparation: 8,5 hours
lab report: 80 hours

**Literature**
distributed during the lab attendance

## T Course: Fabrication Processes in Microsystem Technology [T-MACH-102166]

**Responsibility:** Klaus Bade
**Contained in:** [M-MACH-101295] Optoelectronics and Optical Communication
[M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2143882 | Fabrication Processes in Microsystem Technology | Vorlesung (V) | 2 | Klaus Bade |
| WS 16/17 | 2143882 | Fabrication Processes in Microsystem Technology | Vorlesung (V) | 2 | Klaus Bade |

**Learning Control / Examinations**
Oral examination, 20 minutes

**Conditions**
none

*The following informations are from the event Fabrication Processes in Microsystem Technology (WS 16/17):*

**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
2$^{nd}$ Edition, ACS, Washington DC, 1994

## T Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550487 | | Übung (Ü) | 1 | Brita Rohrbeck |
| WS 16/17 | 2550486 | Facility Location and Strategic Supply Chain Management | Vorlesung (V) | 2 | Stefan Nickel |

### 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.

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

- The course [T-WIWI-103061] *Prerequisite for Facility Location and Strategic Supply Chain Management* must have been passed.

### Recommendations
None

### Remarks
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

*The following informations are from the event Facility Location and Strategic Supply Chain Management (WS 16/17):*

### 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: Failure of Structural Materials: Deformation and Fracture [T-MACH-102140]

**Responsibility:** Daniel Weygand, Oliver Kraft, Peter Gumbsch
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2181711 | Failure of structural materials: deformation and fracture | Vorlesung / Übung (VÜ) | 3 | Daniel Weygand, Peter Gumbsch |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Failure of structural materials: deformation and fracture (WS 16/17):*

**Aim**
The student

- has the basic understanding of mechanical processes to explain the relationship between externally applied load and materials strength.
- can explain the foundation of linear elastic fracture mechanics and is able to determine if this concept can be applied to a failure by fracture.
- can decribe the main empirical materials models for deformation and fracture and can apply them.
- has the physical understanding to describe and explain phenomena of failure.

**Content**

1. Introduction
2. linear elasticity
3. classification of stresses
4. Failure due to plasticity
   - tensile test
   - dislocations
   - hardening mechanisms
   - guidelines for dimensioning
5. composite materials
6. fracture mechanics
   - hypotheses for failure
   - linear elasic fracture mechanics
   - crack resitance
   - experimental measurement of fracture toughness
   - defect measurement
   - crack propagation
   - application of fracture mechanics
   - atomistics of fracture

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); worth reading, relatively simple but comprehensive
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); classic on the mechanical behavior of materials, extensive and good
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relatively simple but yet comprehensive overview of metallic materials

## T Course: Failure of Structural Materials: Fatigue and Creep [T-MACH-102139]

**Responsibility:** Patric Gruber, Oliver Kraft, Peter Gumbsch
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2181715 | Failure of Structural Materials: Fatigue and Creep | Vorlesung (V) | 2 | Patric Gruber, Peter Gumbsch |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Failure of Structural Materials: Fatigue and Creep (WS 16/17):*

**Aim**
The student

- has the basic understanding of mechanical processes to explain the relationships between externally applied load and materials strength.
- can describe the main empirical materials models for fatigue and creep and can apply them.
- has the physical understanding to describe and explain phenomena of failure.
- can use statistical approaches for reliability predictions.
- can use its acquired skills, to select and develop materials for specific applications.

**Content**
1 Fatigue
1.1 Introduction
1.2 Statistical Aspects
1.3 Lifetime
1.4 Fatigue Mechanisms
1.5 Material Selection
1.6 Thermomechanical Loading
1.7 Notches and Shape Optimization
1.8 Case Study: ICE-Desaster

2 Creep
2.1 Introduction
2.2 High Temperature Plasticity
2.3 Phänomenological DEsciption of Creep
2.4 Creep Mechanisms
2.5 Alloying Effects

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); worth reading, relatively simple but comprehensive
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); classic on the mechanical behavior of materials, extensive and good
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relatively simple but yet comprehensive overview of metallic materials
- Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); standard work on fatigue, all classes of materials, extensive, for beginners and advanced student

## T Course: Field Training Water Quality [T-BGU-101089]

**Responsibility:** Stephan Fuchs
**Contained in:** [M-BGU-101000] Environmental Management

| ECTS | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530205 | | Vorlesung (V) | 2 | Torsten Luedecke |
| SS 2016 | 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.

*The following informations are from the event (SS 2016):*

**Content**
This course aims at providing students with the understanding of the purposes of alternative costing systems as well as the use of relevant information for decision making. The course will also examine techniques for the purpose of cost management and accounting for control.

**Literature**
**Elective Literature**

- Coenenberg, A.G. Kostenrechnung und Kostenanalyse, 6. Aufl. 2007.
- Ewert, R. und Wagenhofer, A. Interne Unternehmensrechnung, 7. Aufl. 2008.
- Götze, U. Kostenrechnung und Kostenmanagement. 3. Aufl. 2007.
- Kilger, W., Pampel, J., Vikas, K. Flexible Plankostenrechnung und Deckungsbeitragsrechnung , 11. Aufl. 2002.

## 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 | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2520022 | | Vorlesung (V) | 2 | Melanie Schienle |
| SS 2016 | 2520023 | | Übung (Ü) | 2 | Melanie Schienle, Chong Liang |

**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 is offered in summer term 2016, in winter term 2017/18 and afterwards every second term

## T Course: Financial Intermediation [T-WIWI-102623]

**Responsibility:** Martin Ruckes
**Contained in:** [M-WIWI-101480] Finance 3
[M-WIWI-101483] Finance 2
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101453] Applied Strategic Decisions

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2530233 | | Übung (Ü) | 1 | Daniel Hoang, Martin Ruckes |
| WS 16/17 | 2530232 | Financial Intermediation | Vorlesung (V) | 2 | 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

*The following informations are from the event Financial Intermediation (WS 16/17):*

**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 | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2530260 | Fixed Income Securities | Vorlesung (V) | 2 | Marliese Uhrig-Homburg |
| WS 16/17 | 2530561 | | Übung (Ü) | 1 | Martin Hain |

**Learning Control / Examinations**
The assessment consists of a written exam following §4, Abs. 2, 1.

**Conditions**
None

**Recommendations**
See German version.

*The following informations are from the event Fixed Income Securities (WS 16/17):*

**Aim**
The objective of this course is to become familiar with national and international bond markets. Therefore, we first have a look at financial instruments that are of particular importance. Thereafter, specific models and methods that allow the evaluation of interest rate derivatives are introduced and applied.

**Content**
The lecture deals with both German and international bond markets, which are an important source of funding for both the corporate and the public sector. After an overview of the most important bond markets, various definitions of return are discussed. Based on that, the concept of the yield curve is presented. The modelling of the dynamics of the term structure of interest rates provides the theoretical foundation for the valuation of interest rate derivatives, which is discussed in the last part of the lecture.

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

**Literature**

- Bühler, W., Uhrig-Homburg, M., Rendite und Renditestruktur am Rentenmarkt, in Obst/Hintner, Geld-, Bank- und Börsenwesen - Handbuch des Finanzsystems, (2000), S.298-337.
- Sundaresan, S., Fixed Income Markets and Their Derivatives, Academic Press, 3rd Edition, (2009).

**Elective literature:**

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

## T Course: Fluid Power Systems [T-MACH-102093]

**Responsibility:** Stefan Haug, Martin Scherer, Marcus Geimer
**Contained in:** [M-MACH-101266] Automotive Engineering
[M-MACH-101267] Mobile Machines

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2114093 | Fluid Technology | Vorlesung (V) | 2 | Lars Brinkschulte, Martin Scherer, Marcus Geimer |

**Learning Control / Examinations**
The assessment consists of a writen exam (90 minutes) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Fluid Technology (WS 16/17):*

**Aim**
The students will be able to

- know and understand physical principles of fluid power systems
- know the current components and their operating mode
- know the advantages and disadvantages of different components
- dimension the components for a given purpose
- calculate simple systems

**Content**
In the range of hydrostatics the following topics will be introduced:

- Hydraulic fluids
- Pumps and motors
- Valves
- Accessories
- Hydraulic circuits.

In the range of pneumatics the following topics will be introduced:

- Compressors
- Motors
- Valves
- Pneumatic circuits.

**Workload**

- regular attendance: 21 hours
- self-study: 92 hours

**Literature**
Scritum for the lecture *Fluidtechnik*
Institute of Vehicle System Technology
downloadable

## T Course: Foundry Technology [T-MACH-105157]

**Responsibility:** Christian Wilhelm
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2174575 | Foundry Technology | Vorlesung (V) | 2 | Christian Wilhelm |

**Learning Control / Examinations**
oral

duration: 20 - 30 minutes

no notes

*The following informations are from the event Foundry Technology (SS 2016):*

**Aim**
The students know the specific moulding and casting techniques and are able to describe them in detail. The students know the application of moulding and casting techniques concerning castings and metals, their advantages and disadvantages in comparision, their application limits and are able to describe these in detail.
The students know the applied metals and are able to describe advantages and disadvantages as well as the specific range of use.
The students are able, to describe detailled mould and core materials, technologies, their application focus and mould-affected casting defects.
The students know the basics of casting process of any casting parts concerning the above mentioned criteria and are able to desvcribe detailled.

**Content**
Moulding and casting processes
Solidifying of melts
Castability
Fe-Alloys
Non-Fe-Alloys
Moulding and additive materials
Core production
Sand reclamation
Feeding technology
Design in casting technology
Casting simulation
Foundry Processes

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Reference to literature, documentation and partial lecture notes given in lecture

## T Course: Freight Transport [T-BGU-100619]

**Responsibility:** Bastian Chlond

**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation
[M-BGU-101111] Public Transportation Operations

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6232809 | | Vorlesung / Übung (VÜ) | 2 | Bastian Chlond |

**Conditions**

none

## T Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

**Responsibility:** Bernhard Kehrwald
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2133108 | Fuels and Lubricants for Combustion Engines | Vorlesung (V) | 2 | Bernhard Kehrwald |

**Learning Control / Examinations**
oral examination, Duration: ca. 25 min., no auxiliary means

**Conditions**
none

*The following informations are from the event Fuels and Lubricants for Combustion Engines (WS 16/17):*

**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 for Design of Motor-Vehicle Bodies I [T-MACH-102116]

**Responsibility:** Horst Dietmar Bardehle
**Contained in:** [M-MACH-101266] Automotive Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113814 | Fundamentals for Design of Motor-Vehicles Bodies I | Vorlesung (V) | 1 | Horst Dietmar Bardehle |

**Learning Control / Examinations**
Oral group examination

Duration: 30 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Fundamentals for Design of Motor-Vehicles Bodies I (WS 16/17):*

**Aim**
The students have an overview of the fundamental possibilities for design and manufacture of motor-vehicle bodies. They know the complete process, from the first idea, through the concept to the dimensioned drawings (e.g. with FE-methods). They have knowledge about the fundamentals and their correlations, to be able to analyze and to judge relating components as well as to develop them accordingly.

**Content**
1. History and design

2. Aerodynamics

3. Design methods (CAD/CAM, FEM)

4. Manufacturing methods of body parts

5. Fastening technologie

6. Body in white / body production, body surface

**Workload**
regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH,

Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

## T Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

**Responsibility:** Horst Dietmar Bardehle
**Contained in:** [M-MACH-101266] Automotive Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114840 | Fundamentals for Design of Motor-Vehicles Bodies II | Vorlesung (V) | 1 | Horst Dietmar Bardehle |

**Learning Control / Examinations**
Oral group examination

Duration: 30 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Fundamentals for Design of Motor-Vehicles Bodies II (SS 2016):*

**Aim**
The students know that, often the design of seemingly simple detail components can result in the solution of complex problems. They have knowledge in testing procedures of body properties. They have an overview of body parts such as bumpers, window lift mechanism and seats. They understand, as well as, parallel to the normal electrical system, about the electronic side of a motor vehicle. Based on this they are ready to analyze and to judge the relation of these single components. They are also able to contribute competently to complex development tasks by imparted knowledge in project management.

**Content**
1. Body properties/testing procedures

2. External body-parts

3. Interior trim

4. Compartment air conditioning

5. Electric and electronic features

6. Crash tests

7. Project management aspects, future prospects

**Workload**
regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

## T Course: Fundamentals in the Development of Commercial Vehicles I [T-MACH-105160]

**Responsibility:** Jörg Zürn
**Contained in:** [M-MACH-101265] Vehicle Development
[M-MACH-101267] Mobile Machines

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113812 | Fundamentals in the Development of Commercial Vehicles I | Vorlesung (V) | 1 | Jörg Zürn |

**Learning Control / Examinations**
Oral group examination

Duration: 30 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Fundamentals in the Development of Commercial Vehicles I (WS 16/17):*

**Aim**
The students have proper knowledge about the process of commercial vehicle development starting from the concept and the underlying original idea to the real design. They know that the customer requirements, the technical realisability, the functionality and the economy are important drivers.
The students are able to develop parts and components. Furthermore they have knowledge about different cab concepts, the interior and the interior design process. Consequently they are ready to analyze and to judge concepts of commercial vehicles as well as to participate competently in the commercial vehicle development.

**Content**
1. Introduction, definitions, history
2. Development tools
3. Complete vehicle
4. Cab, bodyshell work
5. Cab, interior fitting
6. Alternative drive systems
7. Drive train
8. Drive system diesel engine
9. Intercooled diesel engines

**Workload**
regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**
1. Marwitz, H., Zittel, S.: ACTROS – die neue schwere Lastwagenbaureihe von Mercedes-Benz, ATZ 98, 1996, Nr. 9

2. Alber, P., McKellip, S.: ACTROS – Optimierte passive Sicherheit, ATZ 98, 1996

3. Morschheuser, K.: Airbag im Rahmenfahrzeug, ATZ 97, 1995, S. 450 ff.

## Course: Fundamentals in the Development of Commercial Vehicles II [T-MACH-105161]

**Responsibility:** Jörg Zürn
**Contained in:** [M-MACH-101265] Vehicle Development
[M-MACH-101267] Mobile Machines

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114844 | Fundamentals in the Development of Commercial Vehicles II | Vorlesung (V) | 1 | Jörg Zürn |

**Learning Control / Examinations**
Oral group examination

Duration: 30 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Fundamentals in the Development of Commercial Vehicles II (SS 2016):*

**Aim**
The students know the advantages and disadvantages of different drives. Furthermore they are familiar with components, such as transfer box, propeller shaft, powered and non-powered frontaxle etc. Beside other mechanical components, such as chassis, axle suspension and braking system, also electric and electronic systems are known. Consequently the student are able to analyze and to judge the general concepts as well as to adjust them precisely with the area of application.

**Content**
1. Gear boxes of commercial vehicles
2. Intermediate elements of the drive train
3. Axle systems
4. Front axles and driving dynamics
5. Chassis and axle suspension
6. Braking System
7. Systems
8. Excursion

**Workload**
regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**
1. Schittler, M., Heinrich, R., Kerschbaum, W.: Mercedes-Benz Baureihe 500 – neue V-Motorengeneration für schwere Nutzfahrzeuge, MTZ 57 Nr. 9, S. 460 ff., 1996

2. Robert Bosch GmbH (Hrsg.): Bremsanlagen für Kraftfahrzeuge, VDI-Verlag, Düsseldorf, 1. Auflage, 1994

3. Rubi, V., Strifler, P. (Hrsg. Institut für Kraftfahrwesen RWTH Aachen): Industrielle Nutzfahrzeugentwicklung,

Schriftenreihe Automobiltechnik, 1993

## T Course: Fundamentals of Automobile Development I [T-MACH-105162]

**Responsibility:** Rolf Frech
**Contained in:** [M-MACH-101265] Vehicle Development

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113810 | Fundamentals of Automobile Development I | Vorlesung (V) | 1 | Rolf Frech |

**Learning Control / Examinations**
Written examination

Duration: 90 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Fundamentals of Automobile Development I (WS 16/17):*

**Aim**
The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

**Content**
1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

**Workload**
regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**
The scriptum will be provided during the first lessons

## T Course: Fundamentals of Automobile Development II [T-MACH-105163]

**Responsibility:** Rolf Frech
**Contained in:** [M-MACH-101265] Vehicle Development

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114842 | Fundamentals of Automobile Development II | Vorlesung (V) | 1 | Rolf Frech |

**Learning Control / Examinations**
Written examination

Duration: 90 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Fundamentals of Automobile Development II (SS 2016):*

**Aim**
The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

**Content**
1. Application-oriented material and production technology I
2. Application-oriented material and production technology II
3. Overall vehicle acoustics in the automobile development
4. Drive train acoustics in the automobile development
5. Testing of the complete vehicle
6. Properties of the complete automobile

**Workload**
regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**
The scriptum will be provided during the first lessons.

## T Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

**Responsibility:** Egbert Lox
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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

*The following informations are from the event Fundamentals of catalytic exhaust gas aftertreatment (SS 2016):*

**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: Fundamentals of X-Ray Optics I [T-MACH-105186]

**Responsibility:** Arndt Last
**Contained in:** [M-MACH-101291] Microfabrication
[M-MACH-101292] Microoptics

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2141007 | | Vorlesung (V) | 2 | Arndt Last |

### Learning Control / Examinations
oral examination

### Conditions
none

## T Course: Fundamentals of X-Ray Optics II [T-MACH-102174]

**Responsibility:** Arndt Last
**Contained in:** [M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2141007 | X-ray Optics | Vorlesung (V) | 2 | Arndt Last |

**Learning Control / Examinations**
The assessment will consist of a oral exam (30 min) (following §4 (2), 2 of the examination regulation).

**Conditions**
Fundamentals of X-ray optics I [2142007] must be examined beforehand.

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

- The course [T-MACH-105186] *Fundamentals of X-Ray Optics I* must have been passed.

*The following informations are from the event X-ray Optics (WS 16/17):*

**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

## T Course: Gas Engines [T-MACH-102197]

**Responsibility:** Rainer Golloch
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Recurrence | Version |
|---|---|---|
| 4 | Jedes Sommersemester | 1 |

**Learning Control / Examinations**
Oral examination, duration 25 min., no auxillary means

**Conditions**
none

## T Course: Gas-Markets [T-WIWI-102692]

**Responsibility:** Andrej Marko Pustisek
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581022 | Gas-Markets | Vorlesung (V) | 2 | Andrej Marko Pustisek |

**Learning Control / Examinations**
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Gas-Markets (WS 16/17):*

**Aim**

- Technical and economic principles of the natural gas industry
- Assessment of natural gas as energetic source
- Classification and assessment of the natural gas industry in a political and economic context
- Assessment of decisions, actions taken and consequences thereof in the natural gas industry
- Recognition, assessment and valuation of interdependencies between different energy markets
- Development of a qualified market view for natural gas markets

**Content**

- Introduction and principles
  - Definition and composition of natural gas
  - Main physical parameters of natural gas
  - The natural gas value chain and its interdependencies to other fuels
- Natural gas markets
  - Brief overview of sources and production (incl. shale gas)
  - Worldwide reserves of natural gas
  - Worldwide and European natural gas production and consumption
  - Natural gas market structure in Europe and Germany (incl. the role of hubs)
  - European and German energy (esp. natural gas) prices and their development
  - Parameters not harmonized in European natural gas markets and consequences thereof
- Natural gas (commodity) contracts
  - The impact of the market structure modification to contract structure
  - Main elements of natural gas purchase and sales contracts
  - General comparison of traditional and market based pricing
- Natural gas transportation
  - Technical description of pipeline transportation

- Historical development of the European natural gas (pipeline) transportation system (incl. new projects)
- LNG transportation
- Comparison of LNG and pipeline transportation
- Main elements of natural gas transportation contracts
- Costs of natural gas transportation
- Natural gas transportation pricing systems
- Transportation capacity trading

- Natural gas storage
  - Storage functions and parameters
  - Technical description of natural gas storages
  - Storage types
  - Natural gas storage in Europe
  - Main elements of natural gas storage contracts
  - Costs of storage
  - Natural gas storage pricing

- Special topics
  - Selected aspects of regulation and legislation relevant for the natural gas industry
  - Portfolio management and risk management in the natural gas industry
  - "Gas-to-Liquids" – technical description and economic impact
  - Brief overview of revenue management applied in the natural gas industry
  - Brief overview of bio-methane and its impact to natural gas markets in Germany

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

## T Course: Gear Cutting Technology [T-MACH-102148]

**Responsibility:** Markus Klaiber
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2149655 | Gear Cutting Technology | Vorlesung (V) | 2 | Markus Klaiber |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Gear Cutting Technology (WS 16/17):*

**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.
The following topics will be covered:

- Sample applications
- Basics of gearing geometry
- Need of gearboxes
- Soft machining processes
- Hardening processes
- Hard machining processes
- Bevel gear production
- Measurement and testing
- Manufacturing of gearbox components
- Special gearings

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Lecture Slides

## T Course: Global Optimization I [T-WIWI-102726]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550144 | | Übung (Ü) | | Oliver Stein, Marcel Sinske |
| SS 2016 | 2550135 | | Übung (Ü) | 1 | Tomás Bajbar, 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*Global Optimization II*[2550136]. 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.

### Recommendations

None

### Remarks

Part I and II of the lecture are held consecutively in the *same*semester.

## T Course: Global Optimization I and II [T-WIWI-103638]

**Responsibility:**
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 9 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550144 | | Übung (Ü) | | Oliver Stein, Marcel Sinske |
| SS 2016 | 2550134 | | Vorlesung (V) | 2 | Oliver Stein |
| SS 2016 | 2550136 | | Vorlesung (V) | 2 | Oliver Stein |
| SS 2016 | 2550135 | | Übung (Ü) | 1 | Tomás Bajbar, 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. 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

### 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.

## T Course: Global Optimization II [T-WIWI-102727]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550144 | | Übung (Ü) | | Oliver Stein, Marcel Sinske |
| SS 2016 | 2550135 | | Übung (Ü) | 1 | Tomás Bajbar, 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 to the written examinationen is subject to fulfilling the prerequisite.
The examination can also be combined with the examination of*Global Optimization I*[2550134]. 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.

## 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2149610 | Global Production and Logistics - Part 1: Global Production | Vorlesung (V) | 2 | Gisela Lanza |

**Learning Control / Examinations**
The assessment is carried out as an oral exam. The examination date can be defined individually.

**Conditions**
none

*The following informations are from the event Global Production and Logistics - Part 1: Global Production (WS 16/17):*

**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 site-appropriate production and product construction case-specifically.
- 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.
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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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.

*The following informations are from the event Global Production and Logistics - Part 2: Global Logistics (SS 2016):*

**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: Global Vehicle Evaluation within Virtual Road Test [T-MACH-102177]

**Responsibility:** Bernhard Schick
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114850 | Global vehicle evaluation within virtual road test | Vorlesung (V) | 2 | Bernhard Schick |

**Learning Control / Examinations**
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: CarMaker Simulation Environment

**Conditions**
none

*The following informations are from the event Global vehicle evaluation within virtual road test (SS 2016):*

**Aim**
The students have an overview of the vehicle dynamics simulation, the model parametrization and the related data sources. They have good knowledge about vehicle dynamics test methods and related execution of virtual test driving (open loop, closed loop). They are able to evaluate driving behavior based on self-created results. They have achieved knowledge about influences and interactions of components such as tires, suspension, kinematics and compliance, roll bars, steering, brakes, mass distribution and powertrain and they have the qualification to analyze, to judge and to optimize components with regard to global vehicle behavior.

**Content**
1. Testing and evaluation methods
2. Fundamentals of vehicle dynamics simulation
3. Execution of virtual test driving and evaluation of the results
4. Influence of several components and optimization of global driving behavior

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
1. Reimpell, J.: Fahrwerktechnik: Grundlagen, Vogel Verlag, 1995
2. Unrau, H.-J.: Scriptum zur Vorlesung "Fahreigenschaften I"
3. Unrau, H.-J.: Scriptum zur Vorlesung "Fahreigenschaften II"
4. IPG: User Guide CarMaker

## T Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101473] Mathematical Programming
[M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 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 lecture is offered irregularly. The planned lectures and courses for the next three years are announced online.

## T Course: Handling Characteristics of Motor Vehicles I [T-MACH-105152]

**Responsibility:** Hans-Joachim Unrau
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113807 | Handling Characteristics of Motor Vehicles I | Vorlesung (V) | 2 | Hans-Joachim Unrau |

**Learning Control / Examinations**
Verbally

Duration: 30 up to 40 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Handling Characteristics of Motor Vehicles I (WS 16/17):*

**Aim**
The students know the basic connections between drivers, vehicles and environment. They can build up a vehicle simulation model, with which forces of inertia, aerodynamic forces and tyre forces as well as the appropriate moments are considered. They have proper knowledge in the area of tyre characteristics, since a special meaning comes to the tire behavior during driving dynamics simulation. Consequently they are ready to analyze the most importent influencing factors on the driving behaviour and to contribute to the optimization of the handling characteristics.

**Content**
1. Problem definition: Control loop driver - vehicle - environment (e.g. coordinate systems, modes of motion of the car body and the wheels)

2. Simulation models: Creation from motion equations (method according to D'Alembert, method according to Lagrange, programme packages for automatically producing of simulation equations), model for handling characteristics (task, motion equations)

3. Tyre behavior: Basics, dry, wet and winter-smooth roadway

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
1. Willumeit, H.-P.: Modelle und Modellierungsverfahren in der Fahrzeugdynamik,
B. G. Teubner Verlag, 1998

2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R.; Unrau, H.-J.: Reprint collection to the lecture Handling Characteristics of Motor Vehicles I

## T Course: Handling Characteristics of Motor Vehicles II [T-MACH-105153]

**Responsibility:** Hans-Joachim Unrau
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114838 | Handling Characteristics of Motor Vehicles II | Vorlesung (V) | 2 | Hans-Joachim Unrau |

**Learning Control / Examinations**
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Handling Characteristics of Motor Vehicles II (SS 2016):*

**Aim**
The students have an overview of common test methods, with which the handling of vehicles is gauged. They are able to interpret results of different stationary and transient testing methods. Apart from the methods, with which e.g. the driveability in curves or the transient behaviour from vehicles can be registered, also the influences from cross-wind and from uneven roadways on the handling characteristics are well known. They are familiar with the stability behavior from single vehicles and from vehicles with trailer. Consequently they are ready to judge the driving behaviour of vehicles and to change it by specific vehicle modifications.

**Content**
1. Vehicle handling: Bases, steady state cornering, steering input step, single sine, double track switching, slalom, cross-wind behavior, uneven roadway

2. stability behavior: Basics, stability conditions for single vehicles and for vehicles with trailer

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
1. Zomotor, A.: Fahrwerktechnik: Fahrverhalten, Vogel Verlag, 1991
2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R. Unrau, H.-J.: Reprint collection to the lecture Handling Characteristics of Motor Vehicles II

## Course: Heat Economy [T-WIWI-102695]

**Responsibility:** Wolf Fichtner
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2581001 | Heat Economy | 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
None

### Recommendations
None

### Remarks
See German version.

*The following informations are from the event Heat Economy (SS 2016):*

### 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 Performance Powder Metallurgy Materials [T-MACH-102157]

**Responsibility:** Rainer Oberacker
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2126749 | Advanced powder metals | Vorlesung (V) | 2 | Rainer Oberacker |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Advanced powder metals (SS 2016):*

**Aim**
The students know the basics of powder metallurgy. They are able to assess the conditions for applying either powder metallurgy or competing production methods. They have knowledge on production, properties and application of the most important PM materials.

**Content**
The lecture gives an overview on production, properties and application of structural and functional powder metallurgy material. The following groups of materials are presented: PM High Speed Steels, Cemented Carbides, PM Metal Matrix Composites, PM Specialities, PM Soft Magnetic and Hard Magnetic Materials.

**Workload**
regular attendance: 22 hours
self-study: 98 hours

**Literature**


- W. Schatt ; K.-P. Wieters ; B. Kieback. ".Pulvermetallurgie: Technologien und Werkstoffe", Springer, 2007
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
- F. Thümmler, R. Oberacker. "Introduction to Powder Metallurgy", Institute of Materials, 1993

## T Course: High-Voltage Technology I [T-ETIT-101913]

**Responsibility:** Rainer Badent
**Contained in:** [M-ETIT-101163] High-Voltage Technology

| ECTS | Language | Version |
|---|---|---|
| 4,5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23360 | | Vorlesung (V) | 2 | Rainer Badent |
| WS 16/17 | 23362 | | Übung (Ü) | 1 | Tobias Maier |

**Conditions**
none

## T Course: High-Voltage Technology II [T-ETIT-101914]

**Responsibility:** Rainer Badent
**Contained in:** [M-ETIT-101163] High-Voltage Technology

| ECTS | Language | Version |
|---|---|---|
| 4,5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 23361 | | Vorlesung (V) | | Rainer Badent |
| SS 2016 | 23363 | | Übung (Ü) | 1 | Daniel Geißler |

**Conditions**
none

## 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 | Version |
|---|---|---|
| 4 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23394 | | Übung (Ü) | | Peter Krasselt |
| WS 16/17 | 23392 | | Vorlesung (V) | 2 | Rainer Badent |

**Conditions**
none

## T Course: Homework "Project in Public Transportation" [T-BGU-101856]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101113] Project in Public Transportation

| ECTS | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## T Course: Homework ”Public Transportation Operations” [T-BGU-101857]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101111] Public Transportation Operations

| ECTS | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## T Course: Homework ”Track Guided Transport Systems / Engineering” [T-BGU-101858]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering

| ECTS | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## T Course: Hospital Management [T-WIWI-102787]

**Responsibility:** Stefan Nickel

**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550493 | Hospital Management | Block (B) | 1 | Martin Hansis |

**Learning Control / Examinations**
There are no further examination dates for this course from summer term 2017 on.
The assessment consists of attendance, a seminar thesis and a final exam (according to §4(2), 1 of the examination regulation).

**Conditions**
None

**Remarks**
The lecture is held in every semester.
The planned lectures and courses for the next three years are announced online.

*The following informations are from the event Hospital Management (SS 2016):*

**Aim**
The student

- understands the proncipales of work flows in hospitals,
- utilizes Operations Research methods in so-called non-profit-organisations to improve service qualities,
- explains, classifies and deals with the most important application areas for mathematical models, e.g. personnel planning or quality management.

**Content**
The lecture "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. Students have the possibility to participate in a final exam.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

## T Course: Incentives in Organizations [T-WIWI-105781]

**Responsibility:** Petra Nieken
**Contained in:** [M-WIWI-101510] Cross-functional Management Accounting
[M-WIWI-101500] Microeconomic Theory
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101505] Experimental Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2573004 | Übungen zu Incentives in Organizations | Übung (Ü) | 1 | Petra Nieken, Mitarbeiter |
| SS 2016 | 2573003 | Incentives in Organizations | Vorlesung (V) | 2 | 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.

*The following informations are from the event Incentives in Organizations (SS 2016):*

### Aim
The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics.
- understands how econometric methods can be used to analyze performance and compensation data.
- knows 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 data for 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**
Slides
Additional case studies and research papers will be announced in the lecture.

## T Course: Industrial Application of Material Handling Systems in Sorting and Distribution Systems [T-MACH-102092]

**Responsibility:** Jörg Föller
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2118089 | Application of technical logistics in sorting- and distribution technology | Block-Vorlesung (BV) | 2 | Jörg Föller |

### Learning Control / Examinations
oral 30 min

### Conditions
none

*The following informations are from the event Application of technical logistics in sorting- and distribution technology (SS 2016):*

### Aim
Students are able to:

- Describe and classify basics and characteristics of application of sorting and distribution of goods,
- Solve drive and control tasks with appropriate concept selection,
- Design systems with appropriate calculation methods and evaluate them financially, and
- Judge about the confirmity of the system by using relevant standards and set of rules.

### Content
Basics of goods sorting and distribution technology, employment characteristics, classification, interpretation, dimensioning, costs considerations. Relevant control, modern sets of rules and propulsion principles

### Workload
regular attendance: 21 hours
self-study: 99 hours

### Literature
None.

## T Course: Industrial Application of Technological Logistics Instancing Crane Systems [T-MACH-105149]

**Responsibility:** Markus Golder

**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Recurrence | Version |
|---|---|---|
| 4 | Jedes Wintersemester | 1 |

**Learning Control / Examinations**

The assessment consists of an oral exam according to §4 (2), 2 of the examination regulation. It may be a written exam (according to §4 (2), 1 of the examination regulation) in the case of large number of participants.

**Conditions**

none

## 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2595506 | | Übung (Ü) | 1 | Björn Schmitz |
| WS 16/17 | 2595505 | Industrial Services | Vorlesung (V) | 2 | Björn Schmitz, Hansjörg Fromm |

**Learning Control / Examinations**
A final written exam will be conducted

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Industrial Services (WS 16/17):*

**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.

## 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 | Version |
|---|---|---|
| 3 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2122014 | Information Engineering | Seminar (S) | 2 | Jivka Ovtcharova, Mitarbeiter |

**Learning Control / Examinations**
Non exam assessment (following §4(2), 3 of the examination regulation).

**Conditions**
none

## T Course: Information management in production [T-MACH-105937]

**Responsibility:** Oliver Riedel
**Contained in:** [M-MACH-101281] Virtual Engineering B
[M-MACH-101283] Virtual Engineering A

| ECTS | Recurrence | Version |
|---|---|---|
| 4 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2122400 | Information Management in Production | Block-Vorlesung (BV) | 2 | Oliver Riedel |

**Learning Control / Examinations**
oral exam
(more than 50 persons: written exam)

**Conditions**
none

## 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2118094 | Information Systems in Logistics and Supply Chain Management | Vorlesung (V) | 2 | Christoph Kilger |

**Learning Control / Examinations**
oral / written (if necessary) => (see "Studienplan Maschinenbau")
examination aids: none

**Conditions**
none

*The following informations are from the event Information Systems in Logistics and Supply Chain Management (SS 2016):*

**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: Information Technology and Business Information [T-WIWI-102635]

**Responsibility:** Bruno Neibecker
**Contained in:** [M-WIWI-101489] Strategy, Communication, and Data Analysis

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2571162 | Information Technology and Business Information | Vorlesung (V) | 2 | Bruno Neibecker |
| SS 2016 | 2571163 | | Übung (Ü) | 1 | Bruno Neibecker |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The examination will be offered latest until winter term 2016/2017 (repeaters only).

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Information Technology and Business Information (SS 2016):*

**Aim**
Students have learned the following outcomes and competences:

- To specify the key terms in marketing research
- To design a market research project
- To indentify the main research trends
- To analyze and interpret high level academic articles
- To learn interactive skills to work in teams and to follow a goal-oriented approach
- To gain understanding of methodological research to develop concrete plans for marketing decision-making

**Content**
The goal of the course is to create a text that is comprehensive, practical, applied, and managerial and that presents a balanced coverage of both, quantitative and qualitative approaches. It takes the perspective of users of marketing research and set out to reflect the current trends in the use of computers (e.g. statistical packages and online research). The course covers as main topics an introduction to interactive mulimedia systems, techniques of internet marketing research, methods of primary data collection including questionnaires and scaling of psychological attributes, methods of observation, program analyzer, psychobiological methods, content analysis and cognitive response approach, experimental designs and panels, secondary data collection, management support systems, a case study in marketing decision support and an overview of philosophy of science.

**Workload**
The total workload for this course is approximately 140.0 hours. For further information see German version.

**Literature**
(Literature is in English and German, see German description)

## T Course: Infrastructure Dimensioning and Running Dynamics Based Railway Alignment [T-BGU-101848]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6234806 | Infrastructure Dimensioning and Running Dynamics of Railway Tracks | Vorlesung (V) | 1 | Mitarbeiter/innen, Eberhard Hohnecker |
| SS 2016 | 6234807 | Exercises on Infrastructure Dimensioning and Running Dynamics of Railway Tracks | Übung (Ü) | 1 | Mitarbeiter/innen, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Infrastructure Dimensioning and Running Dynamics of Railway Tracks (SS 2016):*

**Literature**
Fiedler: Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf

## T Course: Infrastructure Equipment of Railway Tracks [T-BGU-101849]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering
[M-BGU-101111] Public Transportation Operations

| ECTS | Language | Version |
|---|---|---|
| 1,5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6234808 | Infrastructure Equipment of Railway Tracks | Vorlesung (V) | 1 | Mitarbeiter/innen, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Infrastructure Equipment of Railway Tracks (SS 2016):*

**Literature**
Fiedler: Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf

## T Course: Infrastructure Management [T-BGU-100051]

**Responsibility:** Ralf Roos
**Contained in:** [M-BGU-100998] Design, Construction, Operation and Maintenance of Highways
[M-BGU-100999] Highway Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| 6 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6233802 | | Vorlesung (V) | 2 | Ralf Roos |
| SS 2016 | 6233801 | | Vorlesung (V) | 2 | Ralf Roos |

**Conditions**
none

## 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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2545015 | 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

*The following informations are from the event Innovation Management: Concepts, Strategies and Methods (SS 2016):*

**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.

## 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-101481] Economic Policy II
[M-WIWI-101497] Agglomeration and Innovation

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560236 | Innovationtheory and -policy | Vorlesung (V) | 2 | Ivan Savin, 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.

*The following informations are from the event Innovationtheory and -policy (SS 2016):*

### 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 | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530323 | Insurance Marketing | Vorlesung (V) | 3 | Edmund Schwake |

**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

*The following informations are from the event Insurance Marketing (SS 2016):*

**Aim**
See German version.

**Content**
See German version.

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

**Literature**
**Elective literature:**

- Farny, D.. Versicherungsbetriebslehre (Kapitel III.3 sowie V.4). Karlsruhe 2011
- Kurtenbach / Kühlmann / Käßer-Pawelka. Versicherungsmarketing. . . . Frankfurt 2001
- Wiedemann, K.-P./Klee, A. Ertragsorientiertes Zielkundenmanagement für Finanzdienstleister, Wiesbaden 2003

## Course: Insurance Production [T-WIWI-102648]

**Responsibility:** Ute Werner
**Contained in:** [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Unregelmäßig | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530324 | Insurance Production | Vorlesung (V) | 3 | Ute Werner |

### 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

*The following informations are from the event Insurance Production (SS 2016):*

### Aim
See German version.

### Content
See German version.

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

### Literature
**Elective literature:**
P. Albrecht. Zur Risikotransformationstheorie der Versicherung: Grundlagen und ökonomische Konsequenzen. Mannheimer Manuskripte zur Versicherungsbetriebslehre und Risikotheorie Nr. 36
D. Farny. Versicherungsbetriebslehre. 2011.
H. Neugebauer. Kostentheorie und Kostenrechnung für Versicherungsunternehmen. 1995
A. Wiesehan. Geschäftsprozessoptimierung für Versicherungsunternehmen. München 2001

## 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 | Version |
|---|---|---|
| 2,5 | Jedes Sommersemester | 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 Production Planning [T-MACH-102106]

**Responsibility:** Gisela Lanza
**Contained in:** [M-MACH-101272] Integrated Production Planning

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 9 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2150660 | Integrated production planning | Vorlesung / Übung (VÜ) | 6 | Gisela Lanza |

**Learning Control / Examinations**
The assessment is carried out as an oral exam. The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Integrated production planning (SS 2016):*

**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**
As part of this lecture further engineering aspects of production technology are taught. This includes content from the manufacturing technology, machine tools and handling techniques as well as the organization and planning.
Planning factories within the context of value networks and integrated production systems (Toyota etc.) requires an integrated perspective for the consideration of all functions included in the "factory" system. This includes the planning of manufacturing systems including the product, the value network and factory production, and the examination of SOPs, the running of a factory and maintenance. Content and theory covered by this lecture are completed with many examples from industry and exercises based on real-life situations and conditions.
Main topics covered by the lecture:

- The basic principles of production planning
- Links between product planning and production planning
- Integrating a production site into a production network
- Steps and methods of factory planning
- Approach to the integrated planning of manufacturing and assembly plants
- Layout of production sites
- Maintenance
- Material flow
- Digital factory
- Process simulation for material flow optimisation
- Start-up

**Workload**
regular attendance: 63 hours
self-study: 177 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2150601 | Integrative Strategies in Production and Development of High Performance Cars | Vorlesung (V) | 2 | Karl-Hubert Schlichtenmayer |

**Learning Control / Examinations**
The assessment is carried out as an written exam. The examination is offered every semester. Reexaminations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Integrative Strategies in Production and Development of High Performance Cars (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540526 | Übung zu Intelligent CRM Architectures | Übung (Ü) | 1 | Fabian Ball |
| WS 16/17 | 2540525 | Intelligent CRM Architectures | Vorlesung (V) | 2 | Andreas Geyer-Schulz |

### 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.

### Conditions
None

### Recommendations
It is recommended to additionally review the Bachelor-level lecture "Customer Relationship Management" from the module "CRM and Servicemanagement".

*The following informations are from the event Intelligent CRM Architectures (WS 16/17):*

### Aim
Students have special knowledge of software architecures and of the methods which are used in the their development (Systems nalysis, 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 archteucture 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**

## T Course: International Economic Policy [T-WIWI-102897]

**Responsibility:** Jan Kowalski
**Contained in:** [M-WIWI-101481] Economic Policy II

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

### Learning Control / Examinations

The assessment consists of a written exam (60min) according to Setion 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

Previous visit of the lectures*Economics II: Macroeconomics*[2600014] is recommended.

### Remarks

The examination will be offered latest until summer term 2016 (repeaters only).

## 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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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.

*The following informations are from the event International Finance (SS 2016):*

**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 | Version |
|---|---|---|---|
| 3,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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

*The following informations are from the event International Management in Engineering and Production (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 24354 | Internet Law | Vorlesung (V) | 2 | Thomas Dreier |

*The following informations are from the event Internet Law (WS 16/17):*

**Aim**
Der/die Studierende hat einen umfassenden Überblick über die Rechtsmaterien, die im Rahmen der Nutzung des Internet tangiert sind. Das reicht vom Recht der Domainnamen über eine Reihe urheberrechtsspezifischer Fragestellungen und Fragen des elektronischen Vertragsschlusses, des Fernabsatz- sowie des elektronischen Geschäftsverkehrvertrages bis hin zu Haftungsfragen und Fragen des Wettbewerbsrechts. Die Studenten erkennen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen, den informations- und kommunikationstechnischen Rahmenbedingungen und dem rechtlichen Regelungsrahmen. Sie kennen die einschlägigen Regelungen des nationalen Rechts lernen und können sie auf praktische Sachverhalte anwenden.

**Content**
Die Veranstaltung befasst sich mit den rechtlichen Regelungen, die bei der Nutzung des Internet berührt sind und durch die die Nutzung des Internet geregelt wird. Das reicht vom Recht der Domainnamen über eine Reihe urheberrechtsspezifischer Fragestellungen und Fragen des elektronischen Vertragsschlusses, des Fernabsatz- sowie des elektronischen Geschäftsverkehrvertrages bis hin zu Haftungsfragen und Fragen des Wettbewerbsrechts. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen, den informations- und kommunikationstechnischen Rahmenbedinungen und dem rechtlichen Regelungsrahmen erkennen. Sie sollen die einschlägigen Regelungen des nationalen Rechts kennen lernen und auf praktische Sachverhalte anwenden können.

**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. \begintabular|l|c|r|
\hline
Aktivität & & Arbeitsaufwand \\
\hline
\itshape Präsenzzeit & & \\
Besuch der Vorlesung & 15 x 90min & 22h 30m \\
\hline
Vor- / Nachbereitung der Vorlesung & 15 x 120min & 30h 00m \\
Skript 2x wiederholen & 2 x 10h & 20h 00m \\
Prüfung vorbereiten & & 17h 30m \\
\hline
Summe & & 90h 00m \\
\hline
\endtabular
\captionArbeitsaufwand für die Lerneinheit "Internetrecht"

## T Course: Introduction in Human Factors Engineering [T-MACH-105189]

**Responsibility:** Kai Furmans
**Contained in:** [M-MACH-101278] Material Flow in Networked Logistic Systems

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117059 | Mathematical models and methods for Production Systems | Vorlesung (V) | 4 | Judith Stoll, Kai Furmans |

**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

*The following informations are from the event Mathematical models and methods for Production Systems (WS 16/17):*

**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: Introduction to Ceramics [T-MACH-100287]

**Responsibility:** Michael Hoffmann
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2125757 | Introduction to Ceramics | Vorlesung (V) | 3 | Michael Hoffmann |

**Learning Control / Examinations**
The assessment consists of an oral exam (30 min) taking place at a specific date.
The re-examination is offered at a specific date.

**Conditions**
None

*The following informations are from the event Introduction to Ceramics (WS 16/17):*

**Aim**
The students know the most relevant crystal structures and defects of non metallic inorganic materials, are able to read binary and ternary phase diagrams and are familar with powdertechnological shaping techniques, sintering and grain growth. They know the basics of the linear elastic fracture mechanics, are familar with Weibull statistics, K-concept, subcritical crack growth, creep and the opportunities for microstructural reinforcement of ceramics. The students are able to explain the correlation among chemical bonding, crystal and defect structures and the electrical properties of ceramics.

**Content**
After a short introduction to interatomic bonding, fundamental concepts of crystallography, the stereographic projection and the most important symmetry elements will be given. Different types of crystal structures are explained and the relevance of imperfections are analysed with respect to the mechanical and electrical properties of ceramics. Then, the impact of surfaces, interfaces and grain boundaries for the preparation, microstructural evolution and the resulting properties is discussed. Finally, an introduction is given to ternary phase diagrams.
The second part of the course covers structure, preparation and application aspects of nonmetallic inorganic glasses, followed by an introduction to the properties and processing methods of fine-grained technical powders. The most relevant shaping methods, such as pressing, slip casting, injection moulding and extrusion are introduced. Subsequently, the basics of science of sintering and the mechanisms for normal and abnormal grain growth are discussed. Mechanical properties of ceramics are analysed using basic principles of linear elastic fracture mechanics, Weibull statistics, concepts for subcritical crack growth and creep models to explain the behaviour at elevated temperatures. Furthermore it is demonstrated that mechanical properties can be siginificantly enhanced by various types of microstructural toughening mechanisms. The electronic and ionic conductivity of ceramic materials are explained based on defect-chemical considerations and band structure models. Finally, the characteristics of a dielectric, pyroelectric, and piezoelectric behaviour is discussed.

**Workload**
regular attendance: 45 hours
self-study: 135 hours

**Literature**

- H. Salmang, H. Scholze, "Keramik", Springer
- Kingery, Bowen, Uhlmann, "Introduction To Ceramics", Wiley
- Y.-M. Chiang, D. Birnie III and W.D. Kingery, "Physical Ceramics", Wiley
- S.J.L. Kang, "Sintering, Densification, Grain Growth & Microstructure", Elsevier

## T Course: Introduction to Microsystem Technology I [T-MACH-105182]

**Responsibility:** Jan Gerrit Korvink, Andreas Guber
**Contained in:** [M-MACH-101287] Microsystem Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2141861 | Introduction to Microsystem Technology I | Vorlesung (V) | 2 | Jan Gerrit Korvink |

**Learning Control / Examinations**
written examination for implementation in a major field, 30 min oral exam for elective subject

**Conditions**
none

*The following informations are from the event Introduction to Microsystem Technology I (WS 16/17):*

**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:** Andreas Guber
**Contained in:** [M-MACH-101287] Microsystem Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142874 | Introduction to Microsystem Technology II | Vorlesung (V) | 2 | Jan Gerrit Korvink, Oliver Gruschke |

**Learning Control / Examinations**
written examination for major field, oral exam (30 min) for elective field

**Conditions**
none

*The following informations are from the event Introduction to Microsystem Technology II (SS 2016):*

**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: IT-Based Road Design [T-BGU-101804]

**Responsibility:** Matthias Zimmermann
**Contained in:** [M-BGU-101066] Safety, Computing and Law in Highway Engineering

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6233901 | | Vorlesung / Übung (VÜ) | 2 | Matthias Zimmermann |

**Conditions**
none

*The following informations are from the event (WS 16/17):*

**Aim**
Die Absolventinnen und Absolventen können DV-gestützte Verfahren für den Entwurf einer Straße in Lage, Höhe und Querschnitt anwenden und neue Straßen bemessen.

**Content**
In einer digitalen Welt werden auch zunehmend Planungs- und Entwurfsaufgaben DV-gestützt bearbeitet. In dieser Lehrveranstaltung wird daher die Methode des DV-gestützten Straßenentwurfs in der Theorie sowie praktisch an grundlegenden Entwurfsbeispielen behandelt. Die Übungen hierzu werden mit den beiden gängigsten Entwurfsprogrammen durchgeführt.

# 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2118183 | IT-Fundamentals of Logistics | Vorlesung (V) | 2 | Frank Thomas |

**Learning Control / Examinations**
oral exam

**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.

*The following informations are from the event IT-Fundamentals of Logistics (SS 2016):*

**Aim**
Students are able to:

- Describe and classify automation technology for material flow and the information technology necessary,
- identify, analyze and design the business processes in internal logistics,
- identify risks of failure and counteract and
- transfer the knowledge to practical implementations.

**Content**
This lecture, with exercises, treats automation technology in material flow as well as the information technology that has a direct relationship with it. In the first few chapters and exercises, an overview is given of the motors and conveying technology elements used in materials handling, and the sensors required for the purpose are explained. The target control types as well as the topic of coding techniques and RFID (GS1, barcodes, scanner, etc.) are treated in detail. Material flow controls are defined based on these chapters. Among other things, the functions of a stored-memory controller are explained in this section. Hierarchically classified control structures and
their integration in network structures are considered in detail. The principles of communications systems (bus systems etc.) are supplemented with information on the use of the Internet as well as data warehousing strategies. An overview of modern logistics systems, especially in stores administration, illustrates new problem solution strategies in the area of information technology for logistics systems. After an analysis of the causes for system failures, measures are worked
out for reducing the risks of failure. Furthermore, the objectives, task areas as well as various scheduling strategies in the area of transport management and control are presented. Worthwhile information on Europe-wide logistics concepts round off this practice-oriented lecture series. The presentation of the lectures will be multimedia-based. Exercises repeat and extend the knowledge principles imparted in the lectures and illustrate the
subject with practical examples.
Focuses:

- System architecture for logistics solutions / Modularization of conveyors
- Material Flow Control System (MFCS) / Transport Handling
- GS 1, optical reading devices, RFID
- Data communication between controllers, computers and networks

- Business processes for internal logistics – software follows function
- Adaptive IT - Future-oriented software architecture
- System stability and data backup –Software-Engineering
- XTS – The Extensible Transport System

**Workload**
regular attendance: 21 hours
self-study: 99 hours

## T Course: Knowledge Discovery [T-WIWI-102666]

**Responsibility:** Rudi Studer
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511303 | Exercises to Knowledge Discovery | Übung (Ü) | 1 | Aditya Mogadala, Achim Rettinger, Rudi Studer |
| WS 16/17 | 2511302 | Knowledge Discovery | Vorlesung (V) | 2 | Tobias Weller, Achim Rettinger, Rudi Studer |

**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

*The following informations are from the event Knowledge Discovery (WS 16/17):*

**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 Laser Materials Processing [T-MACH-102154]

**Responsibility:** Johannes Schneider
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2183640 | Laboratory "Laser Materials Processing" | Praktikum (P) | 3 | Johannes Schneider, Wilhelm Pfleging |
| WS 16/17 | 2183640 | Laboratory "Laser Materials Processing" | Praktikum (P) | 3 | Johannes Schneider, Wilhelm Pfleging |

### Learning Control / Examinations

The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

### Conditions

Basic knowledge of physics, chemistry and material science is assumed.

*The following informations are from the event Laboratory "Laser Materials Processing" (WS 16/17):*

### Aim

The student

- can describe the influence of laser, material and process parameters and can choose suitable parameters for the most important methods of laser-based processing in automotive engineering.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

### Content

The laboratory compromises 8 half-day experiments, which address the following laser processing topics of metals, ceramics and polymers:

- safety aspects
- surface hardening and remelting
- melt and reactive cutting
- surface modification by dispersing or alloying
- welding
- surface texturing
- metrology

There are used CO2-, excimer-, Nd:YAG- and high power diode-laser sources within the laboratory.

### Workload

regular attendance: 34 hours
self-study: 86 hours

### Literature

W.T. Silfvast: Laser Fundamentals, 2008, Cambrigde University Press
W.M. Steen: Laser Materials Processing, 2010, Springer

## T Course: Laboratory Work Water Chemistry [T-CIWVT-103351]

**Responsibility:** Harald Horn, Gudrun Abbt-Braun
**Contained in:** [M-CIWVT-101121] Water Chemistry and Water Technology I

| ECTS | Version |
|---|---|
| 4 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 22664 | | Praktikum (P) | 2 | Harald Horn, und Mitarbeiter, Gudrun Abbt-Braun |

**Conditions**
none

## Course: Laser in Automotive Engineering [T-MACH-105164]

**Responsibility:** Johannes Schneider
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2182642 | Laser in automotive engineering | Vorlesung (V) | 2 | Johannes Schneider |

**Learning Control / Examinations**
oral examination (30 min)

no tools or reference materials

**Conditions**
Basic knowledge of physics, chemistry and material science is assumed.
It is not possible, to combine this lecture with the lecture *Physical basics of laser technology* [2181612].

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

- The course [T-MACH-102102] *Physical Basics of Laser Technology* must not have been started.

*The following informations are from the event Laser in automotive engineering (SS 2016):*

**Aim**
The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of Nd:YAG-, $CO_2$- and high power diode-laser sources.
- can describe the most important methods of laser-based processing in automotive engineering and illustrate the influence of laser, material and process parameters
- can analyse manufacturing problems and is able to choose a suitable laser source and process parameters.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

**Content**
Based on a short description of the physical basics of laser technology the lecture reviews the most important high power lasers and their various applications in automotive engineering. Furthermore the application of laser light in metrology and safety aspects will be addressed.

- physical basics of laser technology
- laser beam sources (Nd:YAG-, $CO_2$-, high power diode-laser)
- beam properties, guiding and shaping
- basics of materials processing with lasers
- laser applications in automotive engineering
- economical aspects
- savety aspects

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**

W. M. Steen: Laser Material Processing, 2010, Springer
W. T. Silfvast: Laser Fundamentals, 2008, Cambridge University Press

## 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 | Version |
|---|---|---|
| 4 | englisch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23480 | | Vorlesung (V) | 2 | Marc Eichhorn |
| WS 16/17 | 23481 | | Übung (Ü) | 1 | Marc Eichhorn |

**Conditions**
none

## T Course: Law Aspects of Guided Transport Systems [T-BGU-101793]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering
[M-BGU-101113] Project in Public Transportation
[M-BGU-101111] Public Transportation Operations

| ECTS | Language | Version |
|---|---|---|
| 1,5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6234903 | Law Aspects of Guided Transport Systems | Vorlesung (V) | 1 | KIT Mitarbeiter, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Law Aspects of Guided Transport Systems (WS 16/17):*

**Content**
- Law Basics
- Public and Administrative Law in Germany
- European Railway Law
- German Railway Law
- Environmental Law in Germany
- Railway Law in the German Federal States
- Financing Law and Public Procurement Law

**Literature**
Aberle: Transportwirtschaft, Oldenbourg-Verlag
Kunz: Eisenbahnrecht, Nomos, Baden-Baden

## 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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24671 | Law of Contracts | Vorlesung (V) | 2 | Alexander Hoff |

*The following informations are from the event Law of Contracts (SS 2016):*

**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: Laws concerning Traffic and Roads [T-BGU-100053]

**Responsibility:** Dietmar Hönig
**Contained in:** [M-BGU-101066] Safety, Computing and Law in Highway Engineering

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6233803 | | Vorlesung (V) | 2 | Dietmar Hönig |

### Conditions
none

## T Course: Lean Construction [T-BGU-100148]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101884] Lean Management in Construction

| ECTS | Version |
|---|---|
| 4,5 | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241901 | | Vorlesung (V) | 2 | KIT Mitarbeiter, Annett Schöttle, Shervin Haghsheno |
| WS 16/17 | 6241902 | | Übung (Ü) | 2 | KIT Mitarbeiter, Annett Schöttle, Shervin Haghsheno |

**Conditions**
The project paper Lean Construction has to be attested.

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

- The course [T-BGU-101007] *project paper Lean Construction* must have been passed.

## 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 | Version |
|---|---|---|---|
| 3,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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

**Remarks**
The course will be offered from winter term 2015/16 and replace the course "Material Flow Analysis and Life Cycle Assessment [2581995]".

*The following informations are from the event Life Cycle Assessment (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2118078 | Logistics - Organisation, Design, and Control of Logistic Systems | Vorlesung (V) | 3 | Kai Furmans |

**Learning Control / Examinations**
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation. The grade of the exam may be improved by passing case studies.

**Conditions**
None

**Recommendations**
Requied are lectures on "Linear Algebra" and "Stochastic".

*The following informations are from the event Logistics - Organisation, Design, and Control of Logistic Systems (SS 2016):*

**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-100620]

**Responsibility:** Bastian Chlond
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Wintersemester | 1 |

**Conditions**
none

## T Course: Machine Learning in Finance [T-WIWI-106195]

**Responsibility:** Maxim Ulrich

**Contained in:** [M-WIWI-103121] Financial Technology for Risk and Asset Management
[M-WIWI-103122] Quantitative Risk Management

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Learning Control / Examinations**

The grade is based on an exam. The exam covers all the material that is taught in the current semester. The exam takes place in the last week of the lecture-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period). Throughout the semester we distributed exercises that can be solved by students on a voluntary basis. A student who solves at least 80% of these exercises will obtain a 0.3 bonus on top of his exam grade.

**Conditions**

None

**Recommendations**

None

**Remarks**

New course starting summer term 2017.

## 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 | Version |
|---|---|---|---|
| 9 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2149902 | Machine Tools and Industrial Handling | Vorlesung / Übung (VÜ) | 6 | Jürgen Fleischer |

**Learning Control / Examinations**
The assessment is carried out as an oral exam. The examination is offered every semester. Reexaminations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Machine Tools and Industrial Handling (WS 16/17):*

**Aim**
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 lecture provides an overview of machine tool and handling devices structures, use and application areas. Within the lecture based and industrially oriented knowledge for selection, dimensioning and evaluation is conveyed. First the components of machine tools are explained systematically. Here the distinctive features of dimensioning machine tools are deduced followed by the integral dimensioning of machine tools. Subsequently the use of machine tools is shown in exemplary application areas e.g. turning, milling, grinding, metal forming, sheet metal forming and gear cutting.
The lecture provides an inside view of industrial application and is illustrated with current examples.
The topics are as follows:

- Frame and frame components
- Main drives and main spindles
- Requirements for feed axes
- Electro-mechanical feed axis
- Fluidic feed axes
- Control technologies
- Peripheral components

- Metrological assessment
- Machine maintenance
- Process-diagnosis
- Machinery Directiv
- Machine tool examples

**Workload**
regular attendance: 63 hours
self-study: 177 hours

**Literature**
Lecture Notes

## T Course: Macro-Finance [T-WIWI-106194]

**Responsibility:** Maxim Ulrich
**Contained in:** [M-WIWI-103120] Financial Economics

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2530362 | | Vorlesung (V) | 2 | Maxim Ulrich |
| WS 16/17 | 2530363 | | Übung (Ü) | 2 | Stephan Florig |

**Learning Control / Examinations**
The grade is based on an exam. The exam covers all the material that is taught in the current semester. The exam takes place in the last week of the lecture-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period).

**Conditions**
None

**Recommendations**
None

**Remarks**
New course starting winter term 2016/2017.

## T Course: Management Accounting 1 [T-WIWI-102800]

**Responsibility:** Marcus Wouters
**Contained in:** [M-WIWI-101498] Management Accounting

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2579901 | | Übung (Ü) | 2 | Michael Pelz, Marcus Wouters |
| SS 2016 | 2579900 | Management Accounting 1 | Vorlesung (V) | 2 | 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 and project that runs for several weeks during the semester.
The final grade is the weigthed average of the examination and the project assessment.

**Conditions**
None

*The following informations are from the event Management Accounting 1 (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2579903 | | Übung (Ü) | 2 | Marcus Wouters, Ana Mickovic |
| WS 16/17 | 2579902 | Management Accounting 2 | Vorlesung (V) | 2 | 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 and project that runs for several weeks during the semester.
The final grade is the weigthed average of the examination and the project assessment.

**Conditions**
None

**Recommendations**
It is recommended to take part in the course "Management Accounting 1" before this course.

*The following informations are from the event Management Accounting 2 (WS 16/17):*

**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 and Strategy [T-WIWI-102629]

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-101450] Strategic Corporate Management and Organization

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2577900 | Management and Strategy | Vorlesung (V) | 2 | Bettina Widmann, Hagen Lindstädt |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) taking place at the beginn of the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
None

*The following informations are from the event Management and Strategy (SS 2016):*

**Aim**
After passing this course students are able to

- prepare strategic decisions along the ideal-typical strategy process in practice ("strategic analysis").
- assess strategic options.
- explain the portfolio management (Parental advantage and best owner of business entities).
- discuss price and capacity decisions in oligopolies and explain them in examples.

**Content**
The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration. Thereby a focus is on imparting knowledge about how price developments in oligopolistic markets can be understood, modeled and forecasted based on game theory.

**Workload**
The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**

- Grant, R.M.: *Contemporary Strategy Analysis.* Blackwell, 5. Aufl. Massachusetts 2005.
- Lindstädt, H.; Hauser, R.: *Strategische Wirkungsbereiche von Unternehmen.* Gabler, Wiesbaden 2004.

The relevant excerpts and additional sources are made known during the course.

## T Course: Management in Public Transport [T-BGU-101795]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101113] Project in Public Transportation

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6234805 | Management in Public Transport | Vorlesung (V) | 2 | Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Management in Public Transport (SS 2016):*

**Literature**
Fiedler, Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf
Pachl, Systemtechnik des Schienenverkehrs, Teubner-Verlag, Stuttgart
Janicki, Fahrzeugtechnik, Eisenbahn-Fachverlag, Heidelberg

## 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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511214 | Management of IT-Projects | Vorlesung (V) | 2 | Roland Schätzle |
| SS 2016 | 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

*The following informations are from the event Management of IT-Projects (SS 2016):*

**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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2545003 | Managing New Technologies | Vorlesung (V) | 3 | Thomas Reiß |
| SS 2016 | 2545004 | | Übung (Ü) | 2 | Thomas Reiß |

**Learning Control / Examinations**
Written exam 100% following §4, Abs. 2.

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Managing New Technologies (SS 2016):*

**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: Managing Organizations [T-WIWI-102630]

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-101450] Strategic Corporate Management and Organization

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2577902 | Managing Organizations | Vorlesung (V) | 2 | Hagen Lindstädt, Alexander Klopfer |

**Learning Control / Examinations**
The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
None

*The following informations are from the event Managing Organizations (WS 16/17):*

**Aim**
After passing this course students are able to

- evaluate strengths and weaknesses of existing organisational structures and rules.
- compare alternatives of organisational structure in practice and assess and interpret them regarding their effectiveness and efficiency.
- assess the management of organisational changes.

**Content**
The course should enable the participants to assess the strengths and weaknesses of existing organisational structures and rules using systematic criteria. Here concepts and models for designing organisation structures, regulating organizational processes and managing organisational changes are presented and discussed using case studies. The course is structured to relate to actions and aims to give students a realistic view of the opportunities and limits of rational design approaches.

**Workload**
The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**


- Laux, H.; Liermann, F.: *Grundlagen der Organisation*, Springer. 6. Aufl. Berlin 2005.
- Lindstädt, H.: *Organisation*, in Scholz, C. (Hrsg.): Vahlens Großes Personallexikon, Verlag Franz Vahlen. 1. Aufl. München, 2009.
- Schreyögg, G.: *Organisation. Grundlagen moderner Organisationsgestaltung*, Gabler. 4. Aufl. Wiesbaden 2003.


The relevant excerpts and additional sources are made known during the course.

## T Course: Manufacturing Technology [T-MACH-102105]

**Responsibility:** Frederik Zanger, Volker Schulze
**Contained in:** [M-MACH-101276] Manufacturing Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 9 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2149657 | Manufacturing Technology | Vorlesung / Übung (VÜ) | 6 | Frederik Zanger, Volker Schulze |

**Learning Control / Examinations**
The assessment is carried out as a written exam. The examination is offered every semester. Reexaminations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Manufacturing Technology (WS 16/17):*

**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-101411] Information Engineering
[M-WIWI-102754] Service Economics and Management
[M-WIWI-101409] Electronic Markets
[M-WIWI-101446] Market Engineering
[M-WIWI-101453] Applied Strategic Decisions

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540460 | Market Engineering: Information in Institutions | Vorlesung (V) | 2 | Christof Weinhardt, Margeret Hall |
| SS 2016 | 2540461 | | Übung (Ü) | 1 | Christof Weinhardt, Ewa Lux |

**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. The bonus points only apply to the first and second exam of the semester in which they were obtained.

**Conditions**
None

*The following informations are from the event Market Engineering: Information in Institutions (SS 2016):*

**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-102811]

**Responsibility:** Martin Klarmann
**Contained in:** [M-WIWI-101647] Data Science: Evidence-based Marketing
[M-WIWI-101487] Sales Management
[M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2571151 | | Übung (Ü) | 1 | Verena Rieger |
| SS 2016 | 2571150 | Market Research | 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
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

*The following informations are from the event Market Research (SS 2016):*

### 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 (2012), Marketingmanagement, 4. 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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2572171 | | Übung (Ü) | 1 | Verena Rieger |
| WS 16/17 | 2572170 | | Vorlesung (V) | 2 | Martin Klarmann |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation)

**Conditions**
In order to attend Marketing Analytics, students are required to have passed the course Market Research [2571150].

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

- The course [T-WIWI-102811] *Market Research* must have been passed.

**Recommendations**
None

**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.

*The following informations are from the event (WS 16/17):*

**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

## T Course: Marketing Communication [T-WIWI-102902]

**Responsibility:** Ju-Young Kim
**Contained in:** [M-WIWI-101649] Services Marketing
[M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540441 | | Übung (Ü) | 1 | Wiebke Klingemann, Ju-Young Kim |
| SS 2016 | 2540440 | Marketing Communication | Vorlesung (V) | 2 | Ju-Young Kim |

**Learning Control / Examinations**
The assessment consists of a written examination (60 min) (according to Section 4 (2),1 of the examination regulation).

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Marketing Communication (SS 2016):*

**Content**
The aim of this lecture is to provide an overview of research on marketing communication tools, such as offline and online advertising, WOM communication and viral marketing, price promotions and corporate social responsibility activities.

**Workload**
Gesamtaufwand bei 4,5 Leistungspunkten: ca. 135.0 Stunden
Präsenzzeit: 30 Stunden
Vor – und Nachbereitung der LV: 60.0 Stunden
Prüfungsvorbereitung: 45.0 Stunden

**Literature**

- Esch, F-R./Herrmann, A./Sattler, H. "Marketing – Eine managementorientierte Einführung"
- Kroeber-Riel, W./Esch, F-R. "Strategie und Technik der Werbung"
- Fuchs, W./Unger, F. (2007): "Management der Marketing Kommunikation"
- Backhaus, K./Erichson, B./Plinke, W./Weiber, R.: "Multivariate Analysemethoden: Eine anwendungsorientierte Einführung"
- Stokes, Rob (2012), "eMarketing: The Essential Guide to Online Marketing," hier erhältlich:http://students.flatworldknowledge.c
- Gedenk, Karen (2002), "Verkaufsförderung"

See lecture slides for further recommendations on literature

## 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 | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2571183 | Marketing Strategy Business Game | Block (B) | 1 | Martin Klarmann, Assistenten |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**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. Exception: In summer term 2016 exceptionally two courses can be chosen or, in case one course has already been chosen previously, a second course can be chosen.
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.

*The following informations are from the event Marketing Strategy Business Game (SS 2016):*

**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.

## Course: Markets and Organizations: Principles [T-WIWI-102821]

**Responsibility:** Andreas Geyer-Schulz
**Contained in:** [M-WIWI-101409] Electronic Markets

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

### 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.

### Conditions

None

### Recommendations

None

### Remarks

The course is not offered at the moment.

## T Course: Markov Decision Models I [T-WIWI-102710]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550679 | Markov Decision Models I | Vorlesung (V) | 2 | Ellen Platt, Karl-Heinz Waldmann, André Lust |
| WS 16/17 | 2550681 | | Übung (Ü) | 2 | Ellen Platt, Karl-Heinz Waldmann, André Lust |
| WS 16/17 | 2550680 | | Übung (Ü) | 2 | Ellen Platt, Karl-Heinz Waldmann, André Lust |

**Learning Control / Examinations**
The examination T-WIWI-102710 Markov Decision Models I will be offered latest until summer term 2017 (for beginners). The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

*The following informations are from the event Markov Decision Models I (WS 16/17):*

**Aim**
The participants will be enabled to model and analyze stochastic systems with modern techniques. The discussion of practice-oriented case studies pursues two goals. On the one hand, typical problem settings are illustrated and on the other hand, criteria for the evaluation of the performance of stochastic systems are motivated. Properties and characteristics for the evaluation of the performance of Markov Chains, Poisson Processes and queuing systems are developed.

**Content**
Markov Chains, Poisson Processes, Markov Chains in Continuous Time, Queuing Systems

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

**Literature**

- Waldmann, K.H., Stocker, U.M. (2012): Stochastische Modelle - eine anwendungsorientierte Einführung, Springer, 2. Auflage
- Elective literature:
  - Norris, J.R. (1997): Markov Chains; Cambridge University Press
  - Bremaud, P. (1999): Markov Chains, Gibbs Fields, Monte Carlo Simulation and Queues, Springer

## T Course: Markov Decision Models II [T-WIWI-102711]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550682 | Markov Decision Models II | Vorlesung (V) | 2 | Ellen Platt, Karl-Heinz Waldmann, André Lust |
| SS 2016 | 2550684 | | Übung (Ü) | 2 | Karl-Heinz Waldmann |
| SS 2016 | 2550683 | | Übung (Ü) | 1 | Karl-Heinz Waldmann |

**Learning Control / Examinations**
The examination T-WIWI-102711 Markov Decision Models II will be offered latest until winter term 2016/2017 (for beginners).
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Recommendations**
Foundations in the field of the Markov Decision Models I [2550679] are desired.

**Remarks**
The lecture is offered irregularly. The curriculum of the next two years is available online.

*The following informations are from the event Markov Decision Models II (SS 2016):*

**Aim**
The participants will be enabled to utilize Markov Decision Processes as a method for analyzing, controlling and optimizing dynamic stochastic systems. The discussion of practice-oriented case studies in the area of the management of energy systems, revenue management and logistics illustrates the application fields of Markov Decision Processes. Necessary mathematical concepts like theoretical foundations, optimality criteria and the solution of the optimality equation are presented.
Particularly the development of simple structured decision rules, that are desired by practitioners on the one hand, and that permit the efficient solutions of the optimality equation on the other hand, are discussed. The facultative computer exercise course using the programming language Java comprises a practice-oriented case study that illustrates the opportunities of the optimization of stochastic systems.

**Content**
Queuing Systems, Stochastic Decision Processes

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

**Literature**

- Waldmann, K.H., Stocker, U.M. (2012): Stochastische Modelle - eine anwendungsorientierte Einführung, Springer, 2. Auflage

- Elective literature: Puterman, M.L. (1994): Markov Decision Processes: Discrete Stochastic Dynamic Programming; John Wiley

## T Course: Mass Fluxes in River Basins [T-BGU-103648]

**Responsibility:** Stephan Fuchs
**Contained in:** [M-BGU-101000] Environmental Management

| ECTS | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## T Course: Master Thesis [T-WIWI-103142]

**Responsibility:** Martin Ruckes
**Contained in:** [M-WIWI-101650] Module Master Thesis

| ECTS | Version |
|---|---|
| 30 | 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 | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117051 | Material flow in logistic systems | Vorlesung (V) | 3 | Kai Furmans |

**Learning Control / Examinations**
25% written exam at end of semester: solving a case study/ planning problem
75% assignments during the semester consisting of solving and presenting case studies, solving exercises and holding small pieces of lectures, partially in group work

**Conditions**
none

*The following informations are from the event Material flow in logistic systems (WS 16/17):*

**Aim**
Students are able to:

- describe material flow processes qualitativ and quantitativ,
- assign possibilities of technical solutions to a open operational task,
- plan material flow systems, illustrate them in simple models and analyse them regarding their performance,
- use methods to determine performance indicators like throughput, utilization, etc., and
- evaluate material flow systems regarding performance and availability.

**Content**

- elements of material flow systems (conveyor elements, fork, join elements)
- models of material flow networks using graph theory and matrices
- queueing theory, calculation of waiting time, utilization
- warehouseing and order-picking
- shuttle systems
- sorting systems
- simulation
- calculation of availability and reliability
- value stream analysis

**Literature**
**Arnold, Dieter; Furmans, Kai :** Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 2009

## T Course: Materials and Processes for Body Leightweight Construction in the Automotive Industry [T-MACH-105166]

**Responsibility:** Stefan Kienzle, Dieter Steegmüller
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2149669 | Materials and Processes for Body Lightweight Construction in the Automotive Industry | Vorlesung (V) | 2 | Stefan Kienzle, Dieter Steegmüller |

**Learning Control / Examinations**
The assessment is carried out as an oral exam. The examination is offered every semester. Reexaminations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Materials and Processes for Body Lightweight Construction in the Automotive Industry (WS 16/17):*

**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
- aluminum and steel for lightweight construction
- fibre-reinforced plastics by the RTM and SMC process
- joining of steel and aluminum (clinching, riveting, welding)
- bonding
- coating
- finishing
- quality assurance
- virtual factory

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Lecture Notes

## T Course: Mathematical Theory of Democracy [T-WIWI-102617]

**Responsibility:** Andranik Melik-Tangian
**Contained in:** [M-WIWI-101504] Collective Decision Making

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2525537 | Mathematical Theory of Democracy | Vorlesung (V) | 2 | Andranik Melik-Tangian |

**Learning Control / Examinations**
The assessment consists of a written exam (120 min.) according to §4 (2), 1 of the examination regulation. It may be an oral exam (20 - 30 min.) (according to §4 (2), 2 of the examination regulation) in the case of poor attendance.

**Conditions**
None

*The following informations are from the event Mathematical Theory of Democracy (WS 16/17):*

**Aim**
The student understands the foundations of democracy and the implementation problems and the masters the operationalization of the problems by mathematical models

**Content**
The mathematical theory of democracy deals with the selection of representatives who make decisions on behalf of the whole society. The concept of representation is operationalized with the popularity index (average percentage of the population represented on a number of issues), and with the universality index (percentage of cases when a majority of the population is represented). With these indexes, the characteristics of individual representatives (president, dictator) and representative bodies (parliament, coalition, cabinet, council, jurors) are investigated. To bridge the representative and direct democracies, an alternative election method is proposed, which is not based on voting, but on the indexing of the candidates with regard to the political profile of the electorate. In addition, societal applications (federal election, surveys) and non-social applications (multi-criteria decisions, finances, traffic control) are considered.

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

**Literature**
Tangian, Andranik (2013) Mathematical Theory of Democracy. Springer, Berlin-Heidelberg

## T Course: Metal Forming [T-MACH-105177]

**Responsibility:** Florian Herlan
**Contained in:** [M-MACH-101284] Specialization in Production Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2150681 | Metal Forming | Vorlesung (V) | 2 | Florian Herlan |

### Learning Control / Examinations
Oral examination

*The following informations are from the event Metal Forming (SS 2016):*

**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

**Literature**
Lecture Notes

## 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6232701 | | Vorlesung / Übung (VÜ) | 2 | KIT Mitarbeiter, Peter Vortisch |

**Conditions**
none

## T Course: Methods in Economic Dynamics [T-WIWI-102906]

**Responsibility:** Ingrid Ott
**Contained in:** [M-WIWI-101514] Innovation Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560240 | Methods in Economic Dynamics | Vorlesung (V) | 1 | 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.

*The following informations are from the event Methods in Economic Dynamics (SS 2016):*

**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-101287] Microsystem Technology
[M-ETIT-101158] Sensor Technology I
[M-MACH-101290] BioMEMS
[M-MACH-101292] Microoptics
[M-ETIT-101159] Sensor Technology II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142881 | Microactuators | Vorlesung (V) | 2 | Manfred Kohl |

**Learning Control / Examinations**
(1) as core subject in the major “Micoactuators and Microsensors” combined with the core subject “New Actuators and Sensors”, oral, 60 minutes
or
(2) as elective subject in the other major fields
or
(3) as optional subject, oral exam, 30 minutes

**Conditions**
none

*The following informations are from the event Microactuators (SS 2016):*

**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:

- Microelectromechnical systems: linear actuators, microrelais, micromotors
- Medical technology and life sciences: Microvalves, micropumps, microfluidic systems
- Microrobotics: Microgrippers, polymer actuators (smart muscle)
- Information technology: Optical switches, mirror systems, read/write heads

**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: Microoptics and Lithography [T-MACH-105176]

**Responsibility:** Timo Mappes
**Contained in:** [M-MACH-101292] Microoptics

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Sommersemester | 1 |

**Learning Control / Examinations**
oral, duration 20 minutes, aids: none

**Conditions**
none

## T Course: Mixed Integer Programming I [T-WIWI-102719]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 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 I and II [T-WIWI-102733]

**Responsibility:**
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 9 | Jedes Semester | 1 |

**Learning Control / Examinations**
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation.

**Conditions**
None.

## T Course: Mixed Integer Programming II [T-WIWI-102720]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550141 | | Übung (Ü) | 1 | Oliver Stein, Nathan Sudermann-Merx |
| SS 2016 | 2550140 | | 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.

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).

## T Course: Mobile Machines [T-MACH-105168]

**Responsibility:** Marcus Geimer
**Contained in:** [M-MACH-101267] Mobile Machines

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 9 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114073 | Mobile Machines | Vorlesung (V) | 4 | Marcus Geimer, Jan Siebert |

**Learning Control / Examinations**
The assessment consists of an oral exam taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
none

*The following informations are from the event Mobile Machines (SS 2016):*

**Aim**
After completion of the course the students have knowledge of:

- a wide range of mobile machines
- operation modes and working cycles of important mobile machines
- selected subsystems and components

**Content**

- Introduction of the required components and machines
- Basics of the structure of the whole system
- Practical insight in the development techniques

**Workload**

- regular attendance: 42 hours
- self-study: 184 hours

## 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6232811 | | Vorlesung / Übung (VÜ) | 2 | Martin Kagerbauer |

**Conditions**
none

## T Course: Model Based Application Methods [T-MACH-102199]

**Responsibility:** Frank Kirschbaum
**Contained in:** [M-MACH-101303] Combustion Engines II

| ECTS | Recurrence | Version |
|---|---|---|
| 4 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2134139 | Model based Application Methods | Vorlesung (V) | 2 | Frank Kirschbaum |

**Learning Control / Examinations**
take-home exam, short presentation with oral examination

**Conditions**
none

*The following informations are from the event Model based Application Methods (SS 2016):*

**Aim**
The student can name the most important methods for model-based calibration of powertrain ECUs. Particulary he can choose and apply the correct approach for empirical modeling for a given powertrain calibration task (fuel consumption, emissions, air path, driveability, etc.) and type of plant (linear-nonlinear, static-dynamic, etc.). He is capable to solve typical Problems of a calibration engineer of automotive OEMs or suppliers.

**Content**
The efforts for the calibration of automotive powertrain ECUs are increasing due to new engine or powertrain technologies and tightening emission laws. From a present view only model based calibration methods are capable to handle this situation. The lecture presents a selection of practice-proofed model-based calibration methods.

**Workload**
regular attendance:
Lectures 2 SWS: approx. 22 h
Computer exercises 1 SWS: approx. 11 h
self study: approx. 87 h

## T Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

**Responsibility:** Christof Weinhardt, Verena Dorner
**Contained in:** [M-WIWI-101506] Service Analytics
[M-WIWI-103118] Data Science: Data-Driven User Modeling
[M-WIWI-101448] Service Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540470 | Modeling and Analyzing Consumer Behaviour with R | Vorlesung (V) | 2 | Verena Dorner |
| SS 2016 | 2540471 | | Übung (Ü) | 1 | Verena Dorner, Dominik Jung |

### 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). The bonus only applies to the first and second exam of the semester in which it was obtained.

### Conditions
None

### Recommendations
None

### Remarks
Limited number of slots
The course has been added summer term 2015.

*The following informations are from the event Modeling and Analyzing Consumer Behaviour with R (SS 2016):*

### Aim
The students

- learn to use the statistic software R on an advanced level
- understand the approach on how to model and simulate decision support systems
- know methods for evaluating, analyzing, and visualizing data

### Content
The students use the R software for handling case studies from the fields of e-commerce and decision support system (DSS). On the implementation level, participants learn to write functions in R to simulate data, e.g., corporate data. On the user level, participants learn methods for analyzing and visualizing data, e.g., for the analysis of product reviews.
Main topics covered by the lecture:
1. Data types and programming concepts in R
2. Data selection and restructuring in data frames
3. Text Mining with R
4. Optimization with R
5. Visualization 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 ($2^{nd}$ edition)

## 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-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550489 | | Praktikum (P) | 2/1 | Tanya Gonser, Melanie Reuter-Oppermann, Stefan Nickel |

**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.

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

- The course [T-WIWI-106200] *Modeling and OR-Software: Advanced Topics* must not have been started.

**Recommendations**
Basic knowledge as conveyed in the module *Introduction toOperations Research* is assumed.
Successful completion of the course Modeling 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.

## T Course: Modeling Mass Fluxes in River Basins [T-BGU-103649]

**Responsibility:** Stephan Fuchs
**Contained in:** [M-BGU-101000] Environmental Management

| ECTS | Version |
| --- | --- |
| 3 | 1 |

**Conditions**
The learning control Mass Fluxes in River Basins has to be taken.

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

- The course [T-BGU-103648] *Mass Fluxes in River Basins* must have been started.

## T Course: Modeling Strategic Decision Making [T-WIWI-102803]

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-101509] Strategic Decision Making and Organization
[M-WIWI-101510] Cross-functional Management Accounting
[M-WIWI-101450] Strategic Corporate Management and Organization

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2577908 | Modeling Strategic Decision Making | Vorlesung (V) | 2 | Kerstin Fehre, Hagen Lindstädt |

**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

*The following informations are from the event Modeling Strategic Decision Making (SS 2016):*

**Aim**
After passing this course students are able to

- discuss individual decisions under multiple goals and subjective expected utility theory.
- handle group decisions.
- assess the implications of asymmetric information and conflicting goals (Agency Theory) on the design of decision tasks
- recognize limits of the basic models and of the expected utility theory.
- illustrate and explain advancements in subjective expected utility theory.

**Content**
Starting from the basic model of economic decision theory, fundamental decision principles and calculi for multi-attribute decisions in certain and uncertain conditions up to subjective expected utility theory and the economic assessment of information are described. Subsequently participants will become familiar with agency-theoretical approaches and models for the function and design of organizational information and decision-making systems. To confront numerous infringements by decision-makers against principles and axioms of this calculus, in addition non-expected utility calculi and advanced models for decisions by economic agents are discussed; these are especially important for management decisions.

**Workload**
1 credit represents an estimated workload of 30h. The total workload for this course is approximately 135 hours. For further information see German version.

**Literature**


- Eisenführ, F.; Weber, M.: *Rationales Entscheiden*. Springer, 4. Aufl. Berlin 2003.[1]
- Laux, H.: Entscheidungstheorie. Springer, 6. Aufl. Berlin 2005.[2]
- Lindstädt, H: *Entscheidungskalküle jenseits des subjektiven Erwartungsnutzens*. In: Zeitschrift für betriebswirtschaftliche Forschung 56 (September 2004), S. 495 - 519.

## 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 | Language | Recurrence | Version |
|---|---|---|---|
| 2,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530355 | Modelling, Measuring and Managing of Extreme Risks | Vorlesung (V) | 2 | Stefan Hochrainer-Stigler |

**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

*The following informations are from the event Modelling, Measuring and Managing of Extreme Risks (SS 2016):*

**Aim**
See German version.

**Content**

- Risk preferences under uncertainty, risk management strategies using utility functions, risk aversion, premium calculations, insurance principle, exceptions, Arrow Lind theorem. Probability and statistics introduction, distributions, Lebesgue integration.
- Introduction to Extreme value theory, Catastrophe models: Introduction to extreme value theory, asymptotic models, extremal types theorem, Generalized extreme value distributions, max-stability, domain of attraction inference for the GEV distribution, model generalization: order statistics. Catastrophemodelapproaches, simulationof extremes.
- Threshold models, generalized pareto distribution, threshold selection, parameter estimation, point process characterization, estimation under maximum domain: Pickands's estimator, Hill's estimator, Deckers-Einmahl-de Haan estimator.
- Catastrophe model approaches, simulation of earthquakes, hurricanes, and floods, vulnerability functions, loss estimation. Indirectvsdirecteffects.
- Introduction to financial risk management against rare events. Basic risk measures: VaR, CVar, CEL and current approaches. Risk management measures against extreme risk for different risk bearers: Insurance principle, loading factors, credits, reserve accumulation, risk aversion.
- Risk preferences in decision making processes. Utility theory, certainty equivalent, Arrow Lind proof for risk neutrality, exceptions in risk neutrality assumptions.
- The Fiscal Risk Matrix, Fiscal Hedge Matrix, Dealing with Risk in Fiscal Analysis and Fiscal Management (macroeconomic context, specific fiscal risks, institutional framework). Reducing Government Risk Exposure (Risk mitigation with private sector, Risk transfer and risk-sharing mechanisms, Managing residual risk).
- Approaches to Managing Fiscal Risk (Reporting on financial statements, Cost-based budgeting, Rules for talking fiscal risk, Market-type arrangements). Case: Analyzing Government Fiscal Risk Exposure in China (Krumm/Wong), The Fiscal Risk of Floods: Lessons of Argentina (AlciraKreimer).
- Case study presentations: Household level index based insurance systems (India, Ethiopia, SriLanka, China), insurance back-up systems coupled with public private partnerships (France, US), Reinsurance approaches (Munich Re, Swiss Re, Allianz).

- Climate Change topics: IPCC report, global and climate change.

**Workload**
The total workload for this course is approximately 75.0 hours. For further information see German version.

**Literature**


- Woo G (2011) Calculating Catastrophe. Imperial College Press, London, U.K.
- Grossi P and Kunreuther H (eds.) (2005) Catastrophe Modeling: A New Approach to Managing Risk. New York, Springer.
- Embrechts P, Klüppelberg C, Mikosch, T (2003) ModellingExtremal Events for Insurance and Finance. Springer,New York(corr. 4th printing, 1st ed. 1997).
- Wolke, T. (2008). Risikomanagement. Oldenbourg, Muenchen.
- Klugman, A.S, Panjer, H.H, and Willmot, G.E. (2008) Loss Models: From Data to Decisions. 3rd edition. Wiley, New York.
- Slavadori G, Michele CD, Kottegoda NT and Rosso R (2007) Extremes in Nature: An Approach Using Copulas. Springer, New York.
- Amendola et al. (2013) (eds.): *Integrated Catastrophe Risk Modeling*. *Supporting Policy Processes.* Advances in Natural and Technological Hazards Research, New York, Springer,
- Hochrainer, S. (2006). Macroeconomic Risk Management against Natural Disasters. *German University Press (DUV)*, Wiesbaden, Germany.

# 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 | Version |
|---|---|
| 3 | 1 |

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

**Conditions**
None

## T Course: Multivariate Statistical Methods [T-WIWI-103124]

**Responsibility:** Oliver Grothe
**Contained in:** [M-WIWI-101637] Analytics and Statistics
[M-WIWI-101639] Econometrics and Statistics II

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550554 | | Vorlesung (V) | 2 | Oliver Grothe |
| SS 2016 | 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**
It is strongly recommended to attend the courses*Statistics 1*,*Statistics 2*and*Analysis of multivariate Data*.

## T Course: Nanotechnology for Engineers and Natural Scientists [T-MACH-105180]

**Responsibility:** Hendrik Hölscher, Stefan Walheim, Martin Dienwiebel
**Contained in:** [M-MACH-101294] Nanotechnology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2142861 | Nanotechnology for Engineers and Natural Scientists | Vorlesung (V) | 2 | Hendrik Hölscher, Stefan Walheim, Martin Dienwiebel |

**Learning Control / Examinations**
written or oral exam

**Conditions**
none

*The following informations are from the event Nanotechnology for Engineers and Natural Scientists (WS 16/17):*

**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-101294] Nanotechnology
[M-MACH-101287] Microsystem Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2143876 | Nanotechnology with Clusterbeams | Vorlesung (V) | 2 | Jürgen Gspann |

**Learning Control / Examinations**
written examination
presence in more that 70% of the lectures
Duration: 1 h

aids: none

**Conditions**
none

*The following informations are from the event Nanotechnology with Clusterbeams (WS 16/17):*

**Aim**
Nanotechnology is presented on the basis of a technology for nano- and microstructuring by accelerated nanoparticles (clusters), mainly in view of nanomechanics.

**Content**
Nanotechnology in biology
Nanosystemstechnology
Cluster beam generation, ionisation and acceleration; cluster properties
Structure generation using accelerated metal clusters
Structuring via gas cluster impact; reactive accelerated cluster erosion (RACE)
Atomic force microscopy of impact structures; nanotribology
Comparison with femtosecond laser machining (Winter term only)
Simulations; Fullerene synthesis, impact structures, visionary nanomachinery

**Literature**
Foil copies with short commentaries are distributed during the lectures.

## T Course: Nanotribology and -Mechanics [T-MACH-102167]

**Responsibility:** Hendrik Hölscher, Martin Dienwiebel
**Contained in:** [M-MACH-101291] Microfabrication
[M-MACH-101294] Nanotechnology

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2181712 | 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

*The following informations are from the event Nanotribology and -Mechanics (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511107 | | Übung (Ü) | 1 | Pradyumn Kumar Shukla |
| SS 2016 | 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

*The following informations are from the event (SS 2016):*

**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 | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 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]

## T Course: Nonlinear Optimization I [T-WIWI-102724]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550111 | | Vorlesung (V) | 2 | Oliver Stein |
| WS 16/17 | 2550142 | | Übung (Ü) | | Oliver Stein, Robert Mohr |
| WS 16/17 | 2550112 | | Übung (Ü) | | Oliver Stein, Robert Mohr |

**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 OptimizationII*[2550113]. In this case, the duration of the written examination takes 120 minutes.

**Conditions**
The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

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

1. The course [T-WIWI-103635] *Prerequisite for Nonlinear Optimization I (Master)* must have been passed.
2. The course [T-WIWI-103637] *Nonlinear Optimization I und II* must not have been started.

**Remarks**
Part I and II of the lecture are held consecutively in the *same*semester.

*The following informations are from the event (WS 16/17):*

**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 und II [T-WIWI-103637]

**Responsibility:**
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 9 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550111 | | Vorlesung (V) | 2 | Oliver Stein |
| WS 16/17 | 2550113 | | Vorlesung (V) | 2 | Oliver Stein |
| WS 16/17 | 2550142 | | Übung (Ü) | | Oliver Stein, Robert Mohr |
| WS 16/17 | 2550112 | | Übung (Ü) | | Oliver Stein, Robert Mohr |

**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**
The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

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

1. The course [T-WIWI-103635] *Prerequisite for Nonlinear Optimization I (Master)* must have been passed.
2. The course [T-WIWI-103636] *Prerequisite for Nonlinear Optimization II (Master)* must have been passed.
3. The course [T-WIWI-102724] *Nonlinear Optimization I* must not have been started.
4. 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.

*The following informations are from the event (WS 16/17):*

**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

*The following informations are from the event (WS 16/17):*

**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 | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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**
The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

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

1. The course [T-WIWI-103636] *Prerequisite for Nonlinear Optimization II (Master)* must have been passed.
2. The course [T-WIWI-103637] *Nonlinear Optimization I und II* must not have been started.

**Remarks**
Part I and II of the lecture are held consecutively in the *same*semester.

*The following informations are from the event (WS 16/17):*

**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-101295] Optoelectronics and Optical Communication
[M-MACH-101294] Nanotechnology
[M-MACH-101287] Microsystem Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2141865 | Novel actuators and sensors | Vorlesung (V) | 2 | Manfred Kohl, Martin Sommer |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Novel actuators and sensors (WS 16/17):*

**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: 1.5 hours/week
Self-study: 7 hours/week

**Work Tutorial:**
time of attendance: 1.5 hours/week
Self-study: 3.5 hours/week

**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

## Course: Online Marketing [T-WIWI-103141]

**Responsibility:** Ju-Young Kim
**Contained in:** [M-WIWI-101649] Services Marketing

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2572201 | | Übung (Ü) | 1 | Wiebke Klingemann, Ju-Young Kim |
| WS 16/17 | 2572200 | | Vorlesung (V) | 2 | Ju-Young Kim |

**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

**Remarks**
new course starting winter term 2015/2016

*The following informations are from the event (WS 16/17):*

**Aim**
Students

- know about current topics (research and practice) in online marketing and learn how the transparency of the internet provides new opportunities to measure the success of marketing instruments
- learn about relevant marketing metrics
- know how to differentiate terms like SEO, SEM, social media, content marketing and gamification.
- are able to implement their marketing knowledge in a practical context

**Content**
The aim of this lecture is to provide an overview of research on online marketing tools. Students learn about current topics (research and practice) in online marketing and learn how the transparency of the internet provides new opportunities to measure the success of marketing instruments.

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

**Literature**
Stokes, Rob (2012), "eMarketing: The Essential Guide to Online Marketing," available here:http://students.flatworldknowledge.com/c
See lecture slides for further recommendations on literature

## T Course: Open Innovation - Concepts, Methods and Best Practices [T-WIWI-102901]

**Responsibility:** Alexander Hahn
**Contained in:** [M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2571199 | Open Innovation – Concepts, Methods and Best Practices | Block (B) | 1 | Alexander Hahn |

### Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

### Conditions
None

### Recommendations
None

### Remarks
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.
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.
Exception: In summer term 2016 exceptionally two courses can be chosen or, in case one course has already been chosen previously, a second course can be chosen.
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.

*The following informations are from the event Open Innovation – Concepts, Methods and Best Practices (SS 2016):*

### Aim
Students

- know approaches, objectives, advantages and disadvantages of Open Innovation,
- know strategy, processes, methods and fields of application of Open Innovation,
- understand success factors by means of best practices from real life projects,
- can apply Open Innovation methods on their own.

### Content
Joy's Law: "No matter who you are, most of the smartest people work for someone else" (Bill Joy, Co-Founder Sun Microsystems)
This lecture conveys an understanding and practical application of Open Innovation, i.e. the collaborative opening of the innovation process to customers, suppliers, partners, competitors, new markets.... The contents encompass among others:

- approaches, objectives, advantages and disadvantages of Open Innovation
- knowledge of approaches, objectives, advantages and disadvantages of Open Innovation
- strategy, processes, methods and fields of application of Open Innovation
- focus mainly on customer integration into the innovation process (e.g. Netnography, Crowdsourcing, Lead User, Trend Receiver,...)

- Understanding of success factors by means of best practices from real life projects (Digital Open Innovation, Idea Contests, Ideation, Hackathons, Idea Management, Customer Engagement, Lead User, Trend Receiver,...)
- Independent application of Open Innovation methods.

**Workload**
Total workload for 1.5 ECTS: ca. 45 hours

**Literature**
To be announced in the course.

## T Course: Operation Methods for Earthmoving [T-BGU-101801]

**Responsibility:** Heinrich Schlick
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Version |
|---|---|
| 1,5 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241905 | | Vorlesung (V) | 1 | Heinrich Schlick, Shervin Haghsheno |

**Conditions**
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 | Version |
|---|---|
| 1,5 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241904 | | Vorlesung (V) | 1 | Harald Schneider, Shervin Haghsheno |

**Conditions**
none

## T Course: Operation Systems and Track Guided Infrastructure Capacity [T-BGU-101824]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101113] Project in Public Transportation

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6234804 | Operation Systems abd Track Guided Infrastructure Capacity | Vorlesung (V) | 2 | Mitarbeiter/innen, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Operation Systems abd Track Guided Infrastructure Capacity (SS 2016):*

**Content**
- Blocking Time and Minimum Headway Time
- Signal Box Technologies
- Capacity of Railway Infrastructure
- Modelling Operational Processes

**Literature**
Fiedler, Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf
Hausmann, Enders, Grundlagen des Bahnbetriebs, Bahn-Fachverlag, Heidelberg
Pachl, Systemtechnik des Schienenverkehrs, Teubner-Verlag, Stuttgart

## T Course: Operations Research in Health Care Management [T-WIWI-102884]

**Responsibility:** Stefan Nickel

**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch/englisch | Unregelmäßig | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550495 | Operations Research in Health Care Management | Vorlesung (V) | 2 | Stefan Nickel |
| SS 2016 | 2550496 | | Übung (Ü) | 1 | Anne Zander, Stefan Nickel |

**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 lecture is planned to be held in the summer term 2016. The planned lectures and courses for the next three years are announced online.

*The following informations are from the event Operations Research in Health Care Management (SS 2016):*

**Aim**
The student

- knows applications of basic and advanced methods of Operations Research applied to health services,
- gains the ability to use quantitative models for the operations planning and logistics in a hospital environment, e.g. appointment, transportation, operating room planning or nurse rostering as well as inventory management and layout planning
- describes the advantages and benefits of simulation models and OR methods to plan home health care services,
- applies the introduced methods in detail in practical case studies.

**Content**
In the last years reforms of the German health system, e.g. the introduction of the G-DRG-system, have put an increasing cost pressure on hospitals. Therefore their target is to improve quality, transparency, and efficiency of hospital services, e.g. by reducing the length of stay of patients. To achieve this, processes have to be analyzed in order to optimize them if necessary. When looking at the targets of optimization not only efficiency but also quality of care and patient satisfaction (e.g. waiting times) have to be taken into account.
Besides hospitals also home health care services and their planning are discussed in this lecture. Because of the demographic development this is an emerging field in the health care sector. Here, e.g. nurse rosters have to be built which give details about which nurse visits which patient at what time. While doing so different targets have to be regarded, e.g. the continuity of nurse-patient relationship or the minimization of the distances the nurses have to travel.

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

**Literature**
**Elective literature:**

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
- Hall: Patient flow: reducing delay in healthcare delivery, Springer, 2006

## T Course: Operations Research in Supply Chain Management [T-WIWI-102715]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102805] Service Operations
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Unregelmäßig | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550480 | Operations Research in Supply Chain Management | Vorlesung (V) | 2 | Stefan Nickel |
| WS 16/17 | 2550481 | | Übung (Ü) | 1 | Fabian Dunke |

### 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* and in the lectures*Facility Location and Strategic SCM*,*Tactical and operational SCM*is assumed.

### Remarks
The lecture is planned to be held in the winter term 2016/17. The planned lectures and courses for the next three years are announced online.

*The following informations are from the event Operations Research in Supply Chain Management (WS 16/17):*

### Aim
The student

- knows and applies basic and advanced modeling techniques playing an important role in today's problem solving occurring in supply networks
- models problems with a mathematical approach to technical-economical problems, and derives optimal solutions,
- classifies problems both conceptually and mathematically by identifying central variables and parameters in a specific problem setting,
- evaluates current developments in operations research and supply chain management.

### Content
Supply Chain Management constitutes a general tool for logistics process planning in supply networks. To an increasing degree quantitative decision support is provided by methods and models from Operations Research. The lecture "OR in Supply Chain Management" conveys concepts and approaches for solving practical problems and presents an insight to current research topics. The lecture's focus is set on modeling and solution methods for applications originating in different domains of a supply chain. The emphasis is put on mathematical methods like mixed integer programming, valid inequalities or column generation, and the derivation of optimal solution strategies.
In form and content, the lecture addresses all levels of Supply Chain Management: After a short introduction, the tactical and operational level will be discussed with regard to inventory models, scheduling as well as cutting and packing. The strategic level will be discussed in terms of layout planning. Another main focus of the lecture is the application of methods from online optimization. This optimization discipline has gained more and more importance in the optimization of supply chains over the several past years due to an increasing amount of dynamic data flows.

**Workload**

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

**Literature**


- Simchi-Levi, D.; Chen, X.; Bramel, J.: The Logic of Logistics: Theory, Algorithms, and Applications for Logistics and Supply Chain Management, 2nd edition, Springer, 2005
- Simchi-Levi, D.; Kaminsky, P.; Simchi-Levi, E.: Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, McGraw-Hill, 2000
- Silver, E. A.; Pyke, D. F.; Peterson, R.: Inventory Management and Production Planning and Scheduling, 3rd edition, Wiley, 1998
- Blazewicz, J.: Handbook on Scheduling - From Theory to Applications, Springer, 2007
- Pinedo, M. L.: Scheduling - Theory, Algorithms, and Systems (3rd edition), Springer, 2008
- Dyckhoff, H.; Finke, U.: Cutting and Packing in Production and Distribution - A Typology and Bibliography, Physica-Verlag, 1992
- Borodin, A.; El-Yaniv, R.: Online Computation and Competitive Analysis, Cambridge University Press, 2005
- Francis, R. L.; McGinnis, L. F.; White, A.: Facility Layout and Location: An Analytical Approach, 2nd edition, Prentice-Hall, 1992

## T Course: Optical Transmitters and Receivers [T-ETIT-100639]

**Responsibility:** Wolfgang Freude
**Contained in:** [M-MACH-101295] Optoelectronics and Optical Communication

| ECTS | Language | Version |
|---|---|---|
| 4 | englisch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23460 | | Vorlesung (V) | 2 | Wolfgang Freude |
| WS 16/17 | 23461 | | Übung (Ü) | 1 | Wolfgang Freude |

**Conditions**
none

## 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 | Version |
|---|---|---|
| 4 | englisch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23465 | | Übung (Ü) | 1 | Christian Koos |
| WS 16/17 | 23464 | | Vorlesung (V) | 2 | Christian Koos |

**Conditions**
none

## T Course: Optimization in a Random Environment [T-WIWI-102628]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**Learning Control / Examinations**
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Remarks**
The lecture is offered irregularly. The curriculum of the next two years is available online.

## T Course: Optoelectronic Components [T-ETIT-101907]

**Responsibility:** Wolfgang Freude
**Contained in:** [M-MACH-101287] Microsystem Technology

| ECTS | Version |
|---|---|
| 4 | 1 |

**Conditions**
none

## T Course: Organic Computing [T-WIWI-102659]

**Responsibility:** Hartmut Schmeck
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch/englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511104 | Organic Computing | Vorlesung (V) | 2 | Hartmut Schmeck |
| SS 2016 | 2511105 | | Übung (Ü) | 1 | Micaela Wünsche, Hartmut Schmeck, Friederike Pfeiffer-Bohnen, Lukas König |

**Learning Control / Examinations**
The examination will be offered latest until summer term 2017 (repeaters only).
The assessment of this course consists of a written examination (60 min) (following §4(2), 1 SPOs) and of submitting written exercises that recapitulate the content of the course. The exercises include theoretical questions as well as practical programming. For providing a successful solution to all exercises, a bonus will be granted, improving the grade of a passed exam by one grade-step (0.3 or 0.4,) (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015). The course will be offered every second semester (summer term) and exams may be repeated at every ordinary exam date.

**Conditions**
None

*The following informations are from the event Organic Computing (SS 2016):*

**Aim**
The student acquires the ability to master methods and concepts of Organic Computing and to demonstrate innovation skills regarding the used methods.
Therefore the course aims at the teaching of fundamentals and methods of Organic Computing within the context of its applicability in practice. On the basis of a fundamental understanding of the taught concepts and methods the students should be able to choose the adequate methods and concepts, if necessary further develop them according to the situation and use them properly when facing related problems in their later job. The students should be capable of finding arguments for the chosen solutions and express them to others.

**Content**
The mission of Organic Computing is to tame complexity in technical systems by providing appropriate degrees of freedom for self-organized behaviour adapting to changing requirements of the execution environment, in particular with respect to human needs. According to this vision an organic computer system should be aware of its own capabilities, the requirements of the environment, and it should be equipped with a number of "self-x" properties allowing for the anticipated adaptiveness and for a reduction in the complexity of system management. These self-x properties are self-organisation, self-configuration, self-optimization, self-healing, self-protection and self-explanation. In spite of these self-x properties, an organic system should be open to external control actions which might be necessary to prevent undesired behaviour.

**Workload**
The total workload for this course is approximately 150.0 hours. For further information see German version.

**Literature**

- Autonomic Computing: Concepts, Infrastructure and Applications. M. Parashar and S. Hariri (Ed.), CRC Press. December 2006.

- Self-Organization in Biological Systems. S. Camazine, J. Deneubourg, N. R. Franks, J. Sneyd, G. Theraulaz and E. Bonabeau. Princeton University Press, 2003.
- Complex Adaptive Systems: An Introduction. H. G. Schuster, Scator Verlag, 2001.
- Introduction to Evolutionary Computing. A. E. Eiben and J. E. Smith. Natural Computing Series, Springer Verlag, 2003. Swarm Intelligence: From Natural to Artificial Systems.Eric Bonabeau, Marco Dorigo and Guy Theraulaz. Oxford University Press, 1999.
- Control of Complex Systems. K. Astrom, P. Albertos, M. Blanke, A. Isidori and W. Schaufelberger. Springer Verlag, 2001.

**Elective literature:**

- **Adaptive and Self-organising Systems,** Christian Müller-Schloer, Moez Mnif, Emre Cakar, Hartmut Schmeck, Urban Richter,
  June 2007. Preprint.Submitted to ACM Transactions on Autonomous and Adaptive Systems (TAAS)
- **Organic Computing - Addressing Complexity by Controlled Self-organization,** Jürgen Branke, Moez Mnif, Christian Müller-Schloer, Holger Prothmann, Urban Richter, Fabian Rochner, Hartmut Schmeck, In Tiziana Margaria, Anna Philippou, and Bernhard Steffen, *Proceedings of ISoLA 2006*, pp. 200-206. Paphos, Cyprus, November 2006.
- Evolutionary Optimization in Dynamic Environments. J. Branke. Kluwer Academic Publishers, 2002.
- Self-star Properties in Complex Information Systems: Conceptual and Practical Foundations (Lecture Notes in Computer Science. O. Babaoglu, M. Jelasity, A. Montresor, C. Fetzer, S. Leonardi, A. van Moorsel and M. van Steen. Springer Verlag, 2005.
- Design and Control of Self-organizing Systems. C. Gershenson. PhD thesis, Vrije Universiteit Brussel, Brussels, Belgium, 2007.
- VDE / ITG / GI - Positionspapier: Organic Computing - Computer- und Systemarchitektur im Jahr 2010. Juli 2003. it - Information Technology, Themenheft Organic Computing, Oldenbourg Verlag. Volume: 47, Issue: 4/2005.

further references will be announced in class

## T Course: OR-Oriented Modeling and Analysis of Real Problems (Project) [T-WIWI-102730]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**Learning Control / Examinations**
Presentation and documentation of the rssults.

**Conditions**
None

**Remarks**
The lecture is offered irregularly. The curriculum of the next two years is available online.

## 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 | Version |
|---|---|---|
| 3 | Jedes Wintersemester | 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 | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2520321 | | Übung (Ü) | 2 | Wolf-Dieter Heller, Carlo Siebenschuh |
| SS 2016 | 2520320 | | Vorlesung (V) | 2 | Wolf-Dieter Heller |

**Conditions**
None

## Course: Parametric Optimization [T-WIWI-102855]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
| --- | --- | --- |
| 4,5 | Unregelmäßig | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
| --- | --- | --- | --- | --- | --- |
| WS 16/17 | 2550115 | | Vorlesung (V) | | Oliver Stein |
| WS 16/17 | 2550116 | | Übung (Ü) | | Oliver Stein, Nathan Sudermann-Merx |

**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).

*The following informations are from the event (WS 16/17):*

**Aim**
The student

- knows and understands the fundamentals of parametric optimization,
- is able to choose, design and apply modern techniques of parametric optimization in practice.

**Content**
Parametric Optimization deals with the impact of parameter changes on the solution of optimization problems. In practical applications this is of fundamental importance, for example, to assess the quality of a numerically computed solution or to derive quantative statements about its parameter dependence. Moreover, many optimization algorithms are controlled by variing parameters, and applications may be found in noncooperative game theory, geometric optimization and robust optimization. The lecture provides a mathematically sound introduction to these topics and is structured as follows:

- Introductory examples and terminology
- Sensitivity
- Stability and regularity conditions
- Applications: semi-infinite optimization and Nash games

**Literature**
**Elective literature:**

- J.F. Bonnans, A. Shapiro, Perturbation Analysis of Optimization Problems, Springer, New York, 2000.
- W. Dinkelbach, Sensitivitätsanalysen und parametrische Programmierung, Springer, Berlin, 1969.

- J. Guddat, F. Guerra Vasquez, H.Th. Jongen, Parametric Optimization: Singularities, Pathfollowing and Jumps, Wiley, Chichester, and Teubner, Stuttgart, 1990.
- R.T. Rockafellar, R.J.B. Wets, Variational Analysis, Springer, Berlin, 1998.

## T Course: Patent Law [T-INFO-101310]

**Responsibility:** Thomas Dreier
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24656 | Patent Law | Vorlesung (V) | 2 | Peter Bittner |

*The following informations are from the event Patent Law (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540533 | Personalization & Services | Vorlesung (V) | 2 | Andreas Sonnenbichler |
| WS 16/17 | 2540534 | Exercise Personalization & Services | Übung (Ü) | 1 | Thomas Hummel, Andreas Sonnenbichler |

**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.

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Personalization & Services (WS 16/17):*

**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**

## T Course: PH APL-ING-TL01 [T-WIWI-106291]

**Responsibility:**
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Einmalig | 1 |

## T Course: PH APL-ING-TL02 [T-WIWI-106292]

**Responsibility:**
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Einmalig | 1 |

## T Course: PH APL-ING-TL03 [T-WIWI-106293]

**Responsibility:**
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Einmalig | 1 |

## T Course: PH APL-ING-TL04 ub [T-WIWI-106294]

**Responsibility:**
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| | Einmalig | 1 |

## T Course: PH APL-ING-TL05 ub [T-WIWI-106295]

**Responsibility:**
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| | Einmalig | 1 |

## T Course: PH APL-ING-TL06 ub [T-WIWI-106296]

**Responsibility:**
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| | Einmalig | 1 |

## T Course: Photovoltaics [T-ETIT-100724]

**Responsibility:** N.N.
**Contained in:** [M-ETIT-101164] Generation and transmission of renewable power

| ECTS | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## T Course: Physical Basics of Laser Technology [T-MACH-102102]

**Responsibility:** Johannes Schneider
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Recurrence | Version |
|---|---|---|
| 5 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2181612 | Physical basics of laser technology | Vorlesung / Übung (VÜ) | 3 | Johannes Schneider |

**Learning Control / Examinations**
oral examination (30 min)

no tools or reference materials

**Conditions**
Basic knowledge of physics, chemistry and material science is assumed.
It is not possible, to combine this lecture with the lecture *Laser Application in Automotive Engineering* [2182642]

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

- The course [T-MACH-105164] *Laser in Automotive Engineering* must not have been started.

*The following informations are from the event Physical basics of laser technology (WS 16/17):*

**Aim**
The student

- 
- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of different laser sources.
- can describe the influence of laser, material and process parameters for the most important methods of laser-based materials processing and choose laser sources suitable for specific applications.
- can illustrate the possible applications of laser sources in measurement and medicine technology
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

**Content**
Based on the description of the physical basics about the formation and the properties of laser light the lecture goes through the different types of laser beam sources used in industry these days. The lecture focuses on the usage of lasers especially in materials engineering. Other areas like measurement technology or medical applications are also mentioned. An excursion to the laser laboratory of the Institute for Applied Materials (IAM) will be offered.

- 
- physical basics of laser technology
- laser beam sources (solid state, diode, gas, liquid and other lasers)
- beam properties, guiding and shaping

- lasers in materials processing
- lasers in measurement technology
- lasers for medical applications
- savety aspects

The lecture is complemented by a tutorial.

**Workload**
regular attendance: 33,5 hours
self-study: 146,5 hours

**Literature**
W. T. Silfvast: Laser Fundamentals, 2008, Cambridge University Press
W. M. Steen: Laser Material Processing, 2010, Springer

## T Course: Physics for Engineers [T-MACH-100530]

**Responsibility:** Alexander Nesterov-Müller, Peter Gumbsch
**Contained in:** [M-MACH-101291] Microfabrication
[M-MACH-101287] Microsystem Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142890 | Physics for Engineers | Vorlesung (V) | 2 | Tobias Christoph Förtsch, Daniel Weygand, Alexander Nesterov-Müller, Peter Gumbsch |

**Learning Control / Examinations**
written exam

**Conditions**
none

*The following informations are from the event Physics for Engineers (SS 2016):*

**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

**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

## 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 | Version |
|---|---|---|---|
| 5,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581952 | Planning and Management of Industrial Plants | Vorlesung (V) | 2 | Frank Schultmann |
| WS 16/17 | 2581953 | | Übung (Ü) | 2 | Carmen Mayer, Ann-Kathrin Müller |

**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

*The following informations are from the event Planning and Management of Industrial Plants (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2122376 | PLM for product development in mechatronics | Vorlesung (V) | | Martin Eigner |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event PLM for product development in mechatronics (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2121357 | PLM-CAD Workshop | Praktikum (P) | 4 | Jivka Ovtcharova, Mitarbeiter |
| WS 16/17 | 2121357 | PLM-CAD Workshop | Praktikum (P) | 4 | Jivka Ovtcharova, Mitarbeiter |

**Learning Control / Examinations**
See module specification

**Conditions**
none

*The following informations are from the event PLM-CAD Workshop (WS 16/17):*

**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: Polymer Engineering I [T-MACH-102137]

**Responsibility:** Peter Elsner
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2173590 | Polymer Engineering I | Vorlesung (V) | 2 | Kay Weidenmann, Peter Elsner |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Polymer Engineering I (WS 16/17):*

**Aim**
The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material "polymer" meeting its requirements in an economical and ecological way.
The students

- are able to describe and classify polymers
  based on the fundamental synthesis processing techniques
- can find practical applications for state-of-the-art polymers and manufacturing technologies
- are able to apply the processing techniques, the application of polymers and polymer composites regarding to the basic principles of material science
- can describe the special mechanical, chemical and elctrical prooperties of polymers and correlate these properties to the chemical bindings.
- can define application areas and the limitation in the use of polymers

**Content**
1. Economical aspects of polymers
2. Introductiom of mechanical,
chemical end electrical properties
3. Processing of polymers
(introduction)
4. Material science of polymers
5. Synthesis

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Recommended literature and selected official lecture notes are provided in the lecture

## T Course: Polymerengineering II [T-MACH-102138]

**Responsibility:** Peter Elsner
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2174596 | Polymer Engineering II | Vorlesung (V) | 2 | Kay Weidenmann, Peter Elsner |

**Learning Control / Examinations**
Oral examination

Duration: 20-30 Minutes

**Conditions**
none

**Recommendations**
Knowledge in Polymerengineering I

*The following informations are from the event Polymer Engineering II (SS 2016):*

**Aim**
The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, that the students gather knowledge and technical skills to use the material "polymer" meeting its requirements in an economical and ecological way.
The students

- can describe and classify different processing techniques
  and can exemplify mould design principles based on technical parts.
- know about practical applications and processing of polymer parts
- are able to design polymer parts according to given restrictions
- can choose appropriate polymers based on the technical requirements
- can decide how to use polymers regarding the production, economical and ecological requirements

**Content**
1. Processing of polymers
2. Properties of polymer components
Based on practical examples and components
2.1 Selection of material
2.2 Component design
2.3 Tool engineering
2.4 Production technology
2.5 Surface engineering
2.6 Sustainability, recycling

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Recommended literature and selected official lecture notes are provided in the lecture

## T Course: Polymers in MEMS A: Chemistry, Synthesis and Applications [T-MACH-102192]

**Responsibility:** Bastian Rapp
**Contained in:** [M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2141853 | Polymers in MEMS A: Chemistry, Synthesis and Applications | Vorlesung (V) | 2 | Bastian Rapp |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Polymers in MEMS A: Chemistry, Synthesis and Applications (WS 16/17):*

**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-101291] Microfabrication

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2141854 | Polymers in MEMS B: Physics, Microstructuring and Applications | Vorlesung (V) | 2 | Matthias Worgull |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Polymers in MEMS B: Physics, Microstructuring and Applications (WS 16/17):*

**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:** Matthias Worgull, Bastian Rapp
**Contained in:** [M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142855 | | Vorlesung (V) | 2 | Matthias Worgull, Bastian Rapp |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event (SS 2016):*

**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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2520357 | Portfolio and Asset Liability Management | Vorlesung (V) | 2 | Mher Safarian |
| SS 2016 | 2520358 | | Übung (Ü) | 2 | Mher Safarian |

**Learning Control / Examinations**
The assessment of this course consists of a written examination (following §4(2), 1 SPOs) and of possible additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

*The following informations are from the event Portfolio and Asset Liability Management (SS 2016):*

**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 | Version |
|---|---|---|
| 6 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23373 | | Übung (Ü) | 2 | Yannick Rink |
| WS 16/17 | 23371 | | Vorlesung (V) | 2 | Thomas Leibfried |

## 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 | Version |
|---|---|---|
| 5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 23374 | | Übung (Ü) | 1 | Sebastian König |
| SS 2016 | 23372 | | Vorlesung (V) | 2 | Thomas Leibfried |

**Conditions**
none

## T Course: Practical Course Polymers in MEMS [T-MACH-105556]

**Responsibility:** Matthias Worgull, Bastian Rapp
**Contained in:** [M-MACH-101291] Microfabrication

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2142856 | | Block (B) | 2 | Matthias Worgull, Bastian Rapp |

**Learning Control / Examinations**
The practical course will close with an oral examination.There will be only passed and failed results, no grades.

**Conditions**
none

*The following informations are from the event (SS 2016):*

**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 Course Technical Ceramics [T-MACH-105178]

**Responsibility:** Rainer Oberacker
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2125751 | Practical Course Technical Ceramics | Praktikum (P) | 2 | Rainer Oberacker |

**Learning Control / Examinations**
Colloquium and laboratory report for the respective experiments.

**Conditions**
none

*The following informations are from the event Practical Course Technical Ceramics (WS 16/17):*

**Aim**
The students are able to understand and to apply a number of basic laboratory methods used in processing and characterization of ceramic materials. They are qualified to apply new methods on the basis of standards and descriptions of experiments.

**Content**
Based on alumina as a model material, major test methods for the characterization of raw materials, intermediate and final products are practically applied. Topics:

- powder caracterization
- Shaping of powder compacts
- sintering
- microstructural characterization
- mechanical testing

On the basis of short descriptions of the methods, the students prepare themselfes, carry out the experiments and write a laboratory report.

**Workload**
regular attendance: 30 hours
self-study: 90 hours

**Literature**
Salmang, H.: Keramik, 7. Aufl., Springer Berlin Heidelberg, 2007. - Online-Ressource

Richerson, D. R.: Modern Ceramic Engineering, CRC Taylor & Francis, 2006

## 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 | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 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

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

- The course [T-WIWI-105774] *Practical Seminar: Digital Service Design* must not have been started.

**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.

## T Course: Practical Seminar Special Topics in SSME [T-WIWI-105776]

**Responsibility:** Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Alexander Mädche, York Sure-Vetter, Gerhard Satzger

**Contained in:** [M-WIWI-102808] Digital Service Systems in Industry

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**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**

The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

## T Course: Practical Seminar: Crowd Analytics [T-WIWI-106214]

**Responsibility:** Christof Weinhardt, Timm Teubner
**Contained in:** [M-WIWI-103118] Data Science: Data-Driven User Modeling

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2595502 | | Übung (Ü) | 1 | Hansjörg Fromm, Thomas Setzer |
| SS 2016 | 2595501 | Service Analytics | Vorlesung (V) | 2 | Hansjörg Fromm, Thomas Setzer |

**Learning Control / Examinations**
The assessment consists of practical work in the field of crowd analytics, 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**
At least one module offered by the institute should have been chosen before attending this seminar.

**Remarks**
The course is held in English.

*The following informations are from the event Service Analytics (SS 2016):*

**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: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

**Responsibility:** Christof Weinhardt, Alexander Mädche, Thomas Setzer
**Contained in:** [M-WIWI-103117] Data Science: Data-Driven Information Systems

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Semester | 1 |

### 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

At least one module offered by the institute should have been chosen before attending this seminar.

### Remarks

The course is held in english.

## T Course: Practical Seminar: Digital Service Design [T-WIWI-105774]

**Responsibility:** Norbert Koppenhagen, Alexander Mädche
**Contained in:** [M-WIWI-102806] Service Innovation, Design & Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540554 | | Seminar (S) | | Silvia Schacht, Norbert Koppenhagen, 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).

### 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.

## T Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Semester | 2 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550498 | Practical seminar: Health Care Management (with Case Studies) | Seminar (S) | 5 | Melanie Reuter-Oppermann, Anne Zander, Stefan Nickel |

### 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.

*The following informations are from the event Practical seminar: Health Care Management (with Case Studies) (SS 2016):*

### Aim
The student

- is familiar with real problems arising in a hospital
- develops solution approaches for these problems by using well-known methods of Operations Research,
- is able to analyze processes and structures, to collect relevant data as well as to develop and solve models for hospital-specific problems.

### Content
Processes in a hospital are often grown historically ("We have always done it this way"), so that there has not been the need to analyze processes until reforms of the health system have put increasing pressure on hospitals. Consequently, nowadays hospitals look for possibilities to improve their processes. The students are confronted with case studies and are asked to develop a solution. Therefore they have to collect and analyze relevant data , processes and structures. When developing the solution the students have to bear in mind that besides the economic efficiency also the quality of care and patient satisfaction (e.g. measured in waiting time) may not be neglected in the health care sector.

### Workload
The total workload for this course is approximately 210 hours. For further information see German version.

### Literature
**Elective literature:**

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007

- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
- Hall: Patient flow: reducing delay in healthcare delivery, Springer, 2006

## T Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

**Responsibility:** Arndt Last
**Contained in:** [M-MACH-101291] Microfabrication
[M-MACH-101294] Nanotechnology
[M-MACH-101287] Microsystem Technology
[M-MACH-101290] BioMEMS
[M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2143875 | Introduction to Microsystem Technology - Practical Course | Praktikum (P) | 2 | Arndt Last |
| WS 16/17 | 2143875 | Introduction to Microsystem Technology - Practical Course | Praktikum (P) | 2 | Arndt Last |

**Learning Control / Examinations**
The assessment consists of a written exam

**Conditions**
none

*The following informations are from the event Introduction to Microsystem Technology - Practical Course (WS 16/17):*

**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 | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Conditions**
None

**Remarks**
See German version

## T Course: Prerequisite for Facility Location and Strategic Supply Chain Management [T-WIWI-103061]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Version |
|---|---|
| | 1 |

### Learning Control / Examinations

Proof of successful participation in the practical lessons.

### Conditions

None

## T Course: Prerequisite for Nonlinear Optimization I (Master) [T-WIWI-103635]

**Responsibility:**
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Version |
|---|---|
| | 1 |

**Learning Control / Examinations**
See German version

**Conditions**
None

## Course: Prerequisite for Nonlinear Optimization II (Master) [T-WIWI-103636]

**Responsibility:**
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Version |
|---|---|
| | 1 |

**Learning Control / Examinations**
see german version

**Conditions**
None

## T Course: Prerequisite for Tactical and Operational Supply Chain Management [T-WIWI-105940]

**Responsibility:** Stefan Nickel

**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Version |
|---|---|
| | 1 |

### Learning Control / Examinations

Proof of successful participation in the practical lessons.

### Conditions

None

## T Course: Price Management [T-WIWI-105946]

**Responsibility:** Paul Glenn, Andreas Geyer-Schulz
**Contained in:** [M-WIWI-101409] Electronic Markets

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540530 | Exercise Price Management | Übung (Ü) | 1 | Paul Glenn |
| SS 2016 | 2540529 | Price Management | Vorlesung (V) | 2 | 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.

**Conditions**
None

**Recommendations**
None

**Remarks**
The lecture is offered for the first time in summer term 2016.

*The following informations are from the event Price Management (SS 2016):*

**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. Price-Sales Function und Price Elasticity
4. Willingness of Payment, Value and Methods of Measuring Value
5. Methods of Price Formation
6. Multidimensional Pricing and Price Differentiation
7. Product-Spanning Price Optimization and Bundling
8. B2B and B2C Pricing
9. Price Management for Services and Solutions

10. Pricing on the Internet
11. Excursion: Yield Management
12. Enforcing Prices, Discounting and Systems of Terms and Conditions
13. Price Communication and Controlling
14. International Price Management
15. Excursion: Pricing and European Competition Law
16. Pricing Processes and Organization of Pricing 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**

## Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

**Responsibility:** Martin Klarmann, Marc Schröder
**Contained in:** [M-WIWI-101487] Sales Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2572198 | Price Negotiation and Sales Presentations | Block (B) | 1 | Martin Klarmann, Marc Schröder |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Price Negotiation and Sales Presentations (WS 16/17):*

**Aim**
Students

- gain a clear impression of the theoretical knowledge about price negotiations and sales presentations
- improve their own negotiation abilities

**Content**
Der Kurs "Preisverhandlungen und Verkaufspräsentationen" diskutiert zunächst theoretisches Wissen über das Verhalten in Verkaufssituationen. In einem zweiten Schritt werden in einem praktischen Teil Verhandlungen von den Studenten selbst geführt.

**Workload**
The total workload for this course is approximately 45.0 hours. For further information see German version.

## T Course: Pricing [T-WIWI-102883]

**Responsibility:** Ju-Young Kim

**Contained in:**
[M-WIWI-101489] Strategy, Communication, and Data Analysis
[M-WIWI-101509] Strategic Decision Making and Organization
[M-WIWI-101487] Sales Management
[M-WIWI-101649] Services Marketing
[M-WIWI-101510] Cross-functional Management Accounting

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2572157 | Pricing | Vorlesung (V) | 2 | Ju-Young Kim |
| WS 16/17 | 2572169 | | Übung (Ü) | 1 | N.N., Ju-Young Kim, Maik Schulze |

### Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

### Conditions
None

### Recommendations
None

*The following informations are from the event Pricing (WS 16/17):*

### 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 (2012), Marketingmanagement, 4. Aufl., Wiesbaden.
Simon, Hermann, Fassnacht, Martin (2008), Preismanagement, 3. Aufl., Wiesabden.

## Course: Principles of Ceramic and Powder Metallurgy Processing [T-MACH-102111]

**Responsibility:** Rainer Oberacker
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2193010 | Basic principles of powder metallurgical and ceramic processing | Vorlesung (V) | 2 | Rainer Oberacker |

**Learning Control / Examinations**
The assessment consists of an oral exam (20-30 min) taking place at the agreed date. The re-examination is offered upon agreement.

**Conditions**
none

*The following informations are from the event Basic principles of powder metallurgical and ceramic processing (WS 16/17):*

**Aim**
The students know the basics of characterization of powders, pastes and suspensions. They have a fundamental understanding of the process technology for shaping of particulate systems. They are able to use these fundamentals to design selected wet- and dry forming processes.

**Content**
The course covers fundamentals of the process technology for shaping of ceramic or metal particle systems. Important shaping methods are reviewed. The focus is on characterization and properties of particulate systems, and, in particular, on process technology for shaping of powders, pastes, and suspensions.

**Workload**
regular attendance: 25 hours
self-study: 95 hours

**Literature**

- R.J. Brook: Processing of Ceramics I+II, VCH Weinheim, 1996
- M.N. Rahaman: Cermamic Processing and Sintering, 2nd Ed., Marcel Dekker, 2003
- W. Schatt ; K.-P. Wieters ; B. Kieback. ".Pulvermetallurgie: Technologien und Werkstoffe", Springer, 2007
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
- F. Thümmler, R. Oberacker. "Introduction to Powder Metallurgy", Institute of Materials, 1993

## T Course: Principles of Food Process Engineering [T-CIWVT-101874]

**Responsibility:** Volker Gaukel
**Contained in:** [M-CIWVT-101120] Principles of Food Process Engineering

| ECTS | Language | Version |
|---|---|---|
| 9 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 22214 | | Vorlesung (V) | 2 | Volker Gaukel |
| SS 2016 | 22215 | | Vorlesung (V) | 2 | Peter Braun, Frank Müller, Ulrich Bröckel, Guenter Esper, Heike Schuchmann, Reinhold Scherer, Matthias Kind, Michael Türk, Hermann Nirschl, Matthias Sass |
| WS 16/17 | 22213 | | Vorlesung (V) | 2 | Volker Gaukel |
| WS 16/17 | 22207 | | Vorlesung (V) | 2 | Bernhard Watzl |

**Conditions**
none

## T Course: Principles of Information Engineering and Management [T-WIWI-102638]

**Responsibility:** Christof Weinhardt, Timm Teubner
**Contained in:** [M-WIWI-101411] Information Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540451 | | Übung (Ü) | 1 | Timm Teubner |
| WS 16/17 | 2540450 | Principles of Information Engineering and Management | Vorlesung (V) | 2 | Timm Teubner |

**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

*The following informations are from the event Principles of Information Engineering and Management (WS 16/17):*

**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 | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2530055 | Principles of Insurance Management | Vorlesung (V) | 3 | Ute Werner |

### 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

*The following informations are from the event Principles of Insurance Management (SS 2016):*

### Aim
See German version.

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

### Literature

- D. Farny. *Versicherungsbetriebslehre.* Karlsruhe 2011.
- P. Koch. *Versicherungswirtschaft - ein einführender Überblick.* 2005.
- M. Rosenbaum, F. Wagner. Versicherungsbetriebslehre. Grundlegende Qualifikationen. Karlsruhe 2002.

### Elective literature:
Will be announced during the lecture.

# T Course: Problem Solving, Communication and Leadership [T-WIWI-102871]

**Responsibility:** Hagen Lindstädt
**Contained in:** [M-WIWI-101450] Strategic Corporate Management and Organization

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 2 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2577910 | Problem solving, communication and leadership | Vorlesung (V) | 1 | Kerstin Fehre, Hagen Lindstädt |

**Learning Control / Examinations**
The assessment consists of a written exam (30 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**
None

*The following informations are from the event Problem solving, communication and leadership (SS 2016):*

**Aim**
After passing this course students are able to

- structure problem solving processes.
- apply the principles of focused communication based on charts and presentations.
- understand leadership in the context of situation and personality.

**Content**
The course deals with various aspects of problem solving and communication processes and is divided into two parts. The first part of the course addresses the fundamental steps in the problem-solving process; namely, problem identification, problem structuring, problem analysis and communication of solution. Ideas for structuring problem solving processes will be discussed and the perquisites for and principles of structured communication based on charts and presentations will be explained. The second part of the course addresses important concepts in leadership, including the context-specificity of influence, the choice of leader and the characteristics of employees. The course content reflects current issues in management and communication practice and is oriented toward the practical application of theoretical insights to these issues. In this respect, the course aims to develop interdisciplinary skills.

**Workload**
The total workload for this course is approximately 60 hours. For further information see German version.

**Literature**
The relevant excerpts and additional sources are made known during the course.

## T Course: Process Engineering [T-BGU-101844]

**Responsibility:** Harald Schneider
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241703 | | Vorlesung (V) | 2 | Harald Schneider, Uwe Görisch, Heinrich Schlick |

**Conditions**
none

## T Course: Process Technologies in Storm Water Treatment [T-BGU-100633]

**Responsibility:** Stephan Fuchs
**Contained in:** [M-BGU-101001] Water Supply and Sanitation

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6223801 | | Vorlesung / Übung (VÜ) | 2 | Stephan Fuchs |

**Conditions**
none

## T Course: Process Technologies in Water Supply and Wastewater Disposal [T-BGU-100634]

**Responsibility:** Erhard Hoffmann
**Contained in:** [M-BGU-101001] Water Supply and Sanitation

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6223803 | | Vorlesung / Übung (VÜ) | 2 | Erhard Hoffmann |

**Conditions**
none

## T Course: Product and Innovation Marketing [T-WIWI-102812]

**Responsibility:** Martin Klarmann
**Contained in:** [M-WIWI-101490] Marketing Management
[M-WIWI-101510] Cross-functional Management Accounting
[M-WIWI-101514] Innovation Economics

| ECTS | Language | Recurrence | Version |
| --- | --- | --- | --- |
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
| --- | --- | --- | --- | --- | --- |
| SS 2016 | 2571154 | Product and Innovation Marketing | 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

**Remarks**
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

*The following informations are from the event Product and Innovation Marketing (SS 2016):*

**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 | Recurrence | Version |
|---|---|---|
| 3 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2500005 | | Vorlesung (V) | 2 | Roland Lerch |

**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

## T Course: Production and Logistics Management [T-WIWI-102632]

**Responsibility:** Frank Schultmann
**Contained in:** [M-WIWI-101412] Industrial Production III

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2581955 | | Übung (Ü) | 2 | Andreas Rudi, Tobias Zimmer |
| SS 2016 | 2581954 | Production and Logistics Management | Vorlesung (V) | 2 | Frank Schultmann |

**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

*The following informations are from the event Production and Logistics Management (SS 2016):*

**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: Production Technology and Management in Automotive Industry [T-MACH-102189]

**Responsibility:** Volker Michael Stauch
**Contained in:** [M-MACH-101284] Specialization in Production Engineering
[M-MACH-101282] Global Production and Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2149001 | Production Technology and Management in Automotive | Vorlesung / Übung (VÜ) | 2 | Volker Michael Stauch |

### Learning Control / Examinations
written exam

### Conditions
none

*The following informations are from the event Production Technology and Management in Automotive (WS 16/17):*

### Aim
The students . . .

- are capable to specify the current challenges in automotive industry and to explain approaches to solve them.
- are able to classify the main parts of an automotive plant and its key elements (production facilities).
- are qualified to identify interlinkages between development processes and production systems (such as lean production).
- have the ability to classify modern concepts of logistics and tasks in management and design of value added networks.
- are enabled to explain the importance of an integrated quality management in product development and production as well as related methods.
- are able to characterize methodical approaches of analytical assessment and optimization of production planning tasks.

### Content
The lecture deals with the technical and organizational aspects of automotive production. The course starts with an introduction to the automotive industry, current trends in vehicle technology and integrated product development. A selection of manufacturing processes are subjects of the second lecture block. Experiences of the applications of the Mercedes Production System in production, logistics and maintenance are the subject of the third event. During the last block approaches to quality management, global networks and current analytical planning methods in research are discussed. The course is strongly oriented towards the practice and is provided with many current examples. Mr. Stauch was Head of Powertrain Production Mercedes Benz Cars and plant manager Untertürkheim until 2010.
The following topics will be covered:

- Introduction to Automotive Industry and Technology
- Basics of Product Development
- Selected Automotive Manufacturing Technologies
- Automotive Production Systems
- Logistics
- Quality Assurance
- Global Networks
- Analytical Approaches of Production Planning

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Lecture Slides

## T Course: Programming Internship: Solving Computational Risk and Asset Management Problems [T-WIWI-103110]

**Responsibility:** Maxim Ulrich
**Contained in:** [M-WIWI-101512] Computational Finance

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Learning Control / Examinations**

There are weekly learning controls in the form of weekly programming problem sets. During the first three weeks, problem sets are voluntary to set expectations on the workload and degree of difficulty that is to be expected. Starting in week 4, all weekly problem sets are part of the course wide exam. The final course grade coincides with the equal weighted average across all weekly programming problem sets (starting in week 4). It is planned that programming problem sets can be solved in a group of 2 students. Every student has to submit his own solution and must document for which part of the solution he has been responsible (to satisfy KIT exam regulations). More information will be shared at the first day of class.

**Conditions**

The lecture Computational Risk and Asset Management has to be attended in the same semester.

**Recommendations**

None

**Remarks**

New course starting winter term 2015/16.

## 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 | Version |
|---|---|---|---|
| 3,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581964 | | Übung (Ü) | 1 | Carmen Mayer, Kira Schumacher, Rebekka Volk, Marcus Wiens, Felix Hübner |
| WS 16/17 | 2581963 | The Management of R&D Projects with Case Studies | Vorlesung (V) | 2 | Carmen Mayer, Kira Schumacher, Rebekka Volk, Marcus Wiens, Felix Hübner, Frank Schultmann |

### 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

### Remarks
The course will be offered from winter term 2015/16 and replace the course "The Management of RandD Projects with Case Studies [2581963]".

*The following informations are from the event The Management of R&D Projects with Case Studies (WS 16/17):*

### Aim

- Students shall be able to discuss different tasks of R&D-management.
- Students shall be able to apply common approaches to solve these general problems.

### Content

- The communication between R&D, production and marketing.
- Problems concerning measuring the productivity of the R&D system.
- Methods for improving the productivity of R&D systems.
- Planning of R&D projects with the help of the Communication-Matrix-Methods for controlling R&D projects' progress.
- The marketing of scientific skills.
- The communication matrix as a tool for the implementation of simultaneous engineering.
- Case studies.

### 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241702 | | Übung (Ü) | 1 | Jürgen Sittinger, Susanne Hirschberger, Shervin Haghsheno |
| WS 16/17 | 6241701 | | Vorlesung (V) | 3 | Jürgen Sittinger, Susanne Hirschberger, Shervin Haghsheno |

**Conditions**
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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241702 | | Übung (Ü) | 1 | Jürgen Sittinger, Susanne Hirschberger, Shervin Haghsheno |
| WS 16/17 | 6241701 | | Vorlesung (V) | 3 | Jürgen Sittinger, Susanne Hirschberger, Shervin Haghsheno |

**Conditions**
none

## T Course: project paper Lean Construction [T-BGU-101007]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101884] Lean Management in Construction

| ECTS | Version |
|---|---|
| 1,5 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241901 | | Vorlesung (V) | 2 | KIT Mitarbeiter, Annett Schöttle, Shervin Haghsheno |
| WS 16/17 | 6241902 | | Übung (Ü) | 2 | KIT Mitarbeiter, Annett Schöttle, Shervin Haghsheno |

**Conditions**
none

## T Course: Project Studies [T-BGU-101847]

**Responsibility:** Sascha Gentes
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6241827 | | Übung (Ü) | 1 | Sascha Gentes |
| SS 2016 | 6241826 | | Vorlesung (V) | 1 | Stephan Haupenthal |

**Conditions**
none

## T Course: Project Workshop: Automotive Engineering [T-MACH-102156]

**Responsibility:** Martin Gießler, Frank Gauterin, Michael Frey
**Contained in:** [M-MACH-101266] Automotive Engineering
[M-MACH-101265] Vehicle Development
[M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2115817 | Project Workshop: Automotive Engineering | Vorlesung (V) | 3 | Martin Gießler, Frank Gauterin, Michael Frey |
| WS 16/17 | 2115817 | Project Workshop: Automotive Engineering | Vorlesung (V) | 3 | Martin Gießler, Frank Gauterin, Michael Frey |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Project Workshop: Automotive Engineering (WS 16/17):*

**Aim**
The students are familiar with typical industrial development processes and working style. They are able to apply knowledge gained at the university to a practical task. They are able to analyze and to judge complex relations. They are ready to work self-dependently, to apply different development methods and to work on approaches to solve a problem, to develop practice-oriented products or processes.

**Content**
During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

**Workload**
regular attendance: 49 hours
self-study: 131 hours

**Literature**
Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

The scripts will be supplied in the start-up meeting.

## T Course: Projectseminar [T-GEISTSOZ-101958]

**Responsibility:** Gerd Nollmann
**Contained in:** [M-GEISTSOZ-101169] Sociology

| ECTS | Version |
| --- | --- |
| 4 | 1 |

**Conditions**
None.

## T Course: Public Management [T-WIWI-102740]

**Responsibility:** Berthold Wigger
**Contained in:** [M-WIWI-101509] Strategic Decision Making and Organization
[M-WIWI-101504] Collective Decision Making
[M-WIWI-101511] Advanced Topics in Public Finance

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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.

*The following informations are from the event Public Management (WS 16/17):*

**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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 24082 | Public Media Law | Vorlesung (V) | 2 | Christian Kirchberg |

*The following informations are from the event Public Media Law (WS 16/17):*

**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 Regelungsdichte 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 Informationsfreiheit 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 Jugendschutzes 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560121 | | Übung (Ü) | 1 | Berthold Wigger |
| SS 2016 | 2560120 | Public Revenues | Vorlesung (V) | 2 | 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.

*The following informations are from the event Public Revenues (SS 2016):*

**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 Control I [T-WIWI-102728]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**Learning Control / Examinations**
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Remarks**
The lecture is offered irregularly. The curriculum of the next two years is available online.

## Course: Quality Control II [T-WIWI-102729]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**Learning Control / Examinations**
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Remarks**
The lecture is offered irregularly. The curriculum of the next two years is available online.

## 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2149667 | Quality Management | Vorlesung (V) | 2 | Gisela Lanza |

### Learning Control / Examinations
written exam

### Conditions
none

*The following informations are from the event Quality Management (WS 16/17):*

### 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 service-related 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

### Literature
Lecture Notes

## Course: Quantitative Methods in Energy Economics [T-WIWI-102889]

**Responsibility:** Dogan Keles, Patrick Plötz
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581007 | Quantitative Methods in Energy Economics | Vorlesung (V) | 2 | Dogan Keles, Patrick Plötz |
| WS 16/17 | 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

*The following informations are from the event Quantitative Methods in Energy Economics (WS 16/17):*

### 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 | Version |
|---|---|
| 3 | 1 |

**Conditions**
none

## T Course: Real Estate Economics and Sustainability Part 1: Basics and Valuation [T-WIWI-102838]

**Responsibility:**
**Contained in:** [M-WIWI-101508] Real Estate Economics and Sustainability

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2586408 | | Übung (Ü) | 1 | David Lorenz |
| WS 16/17 | 2586407 | Real Estate Economics and Sustainability Part 1: Basics and Valuation | Vorlesung (V) | 2 | David Lorenz |

**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

*The following informations are from the event Real Estate Economics and Sustainability Part 1: Basics and Valuation (WS 16/17):*

**Aim**
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;

**Content**
This course is concerned with the implementation of sustainable development principles within the real estate industry. The focus lies on the role of property valuation and of property professionals.

The basics, key methods and tools of property valuation are explained in detail and are discussed within the context of the sustainable development debate.
The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems; i.e. valuation assignments.

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

## 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2585406 | Real Estate Economics and Sustainability Part 2: Reporting and Rating | Vorlesung (V) | 2 | David Lorenz |
| SS 2016 | 2585407 | | Übung (Ü) | 1 | David Lorenz |

### 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

*The following informations are from the event Real Estate Economics and Sustainability Part 2: Reporting and Rating (SS 2016):*

### 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540507 | Exercise Recommender Systems | Übung (Ü) | 1 | Victoria-Anne Schweigert |
| SS 2016 | 2540506 | Recommender Systems | Vorlesung (V) | 2 | Andreas Sonnenbichler |

**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.

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Recommender Systems (SS 2016):*

**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**

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Richard O. Duda, Peter E. Hart, and David G. Stork. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.
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**Elective literature:**

Antoinette Alexander. The return of hardware: A necessary evil? Accounting Technology, 15(8):46 – 49, Sep 1999.
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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.
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Mark-Edward Grey. Recommendersysteme auf Basis linearer Regression, 2004.
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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.
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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.

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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-101451] Energy Economics and Energy Markets
[M-WIWI-101406] Network Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560234 | Regulation Theory and Practice | Vorlesung (V) | 2 | 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 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.

*The following informations are from the event Regulation Theory and Practice (SS 2016):*

**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: Regulatory Management and Grid Management - Economic Efficiency of Network Operation [T-WIWI-103131]

**Responsibility:**
**Contained in:** [M-WIWI-101446] Market Engineering

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2540494 | | Vorlesung (V) | 2 | Christof Weinhardt, N.N. |
| WS 16/17 | 2540495 | | Übung (Ü) | 1 | Christof Weinhardt, N.N. |

**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**
New course starting winter term 2015/2016

## T Course: Replication Technologies in Micro System Technology [T-MACH-102168]

**Responsibility:** Matthias Worgull
**Contained in:** [M-MACH-101291] Microfabrication
[M-MACH-101290] BioMEMS

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

## T Course: Requirements Analysis and Requirements Management [T-WIWI-102759]

**Responsibility:** Ralf Kneuper
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511218 | Requirements Analysis and Requirements Management | Vorlesung (V) | 2 | Ralf Kneuper |

**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

*The following informations are from the event Requirements Analysis and Requirements Management (WS 16/17):*

**Aim**
The students have a full understanding of the foundations of the analysis and management of requirements as part of the development process of software and systems. They know the main terminology and approaches of this topic, and are able to express requirements themselves using different description methods.

**Content**
The analysis and management of requirements is a central task in the development of software and systems, addressing the border between the application discipline and computer science. The adequate performance of this task has a decisive influence on the whether or not a development project will be successful. The lecture provides an introduction to this topic, using the syllabus for the "Certified Professional for Requirements Engineering" (CPRE) as a guideline.
Lecture structure:
1. Introduction and overview, motivation
2. Identifying requirements
3. Documenting requirements (in natural language or using a modelling language such as UML)
4. Verification and validation of requirements
5. Management of requirements
6. Tool support

**Workload**
Workload: 120h overall,
Lecture 30h
Review and preparation of lectures 60h
Exam preparation 29h
Exam 1h

**Literature**
Literature will be given in the lecture.

## 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 | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2530395 | | Vorlesung (V) | 3 | Ute Werner |

**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: 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 | Version |
|---|---|---|---|
| 3,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581992 | Risk Management in Industrial Supply Networks | Vorlesung (V) | 2 | 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

*The following informations are from the event Risk Management in Industrial Supply Networks (WS 16/17):*

**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 | Version |
|---|---|---|
| 3 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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 | Version |
|---|---|---|
| 3 | Jedes Sommersemester | 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: Safe mechatronic systems [T-MACH-105277]

**Responsibility:** Markus Golder
**Contained in:** [M-MACH-101284] Specialization in Production Engineering
[M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2118077 | Safe mechatronic systems | Vorlesung / Übung (VÜ) | 3 | Markus Golder |
| WS 16/17 | 2118077 | Safe mechatronic systems | Vorlesung / Übung (VÜ) | 3 | Markus Golder |

**Learning Control / Examinations**
The assessment is carried out as oral exam (30min.) or written exam (60min.) (according to Section 4(2), 1 of the examination regulation). The examinations are offered every semester. Re-examinations are offered at every ordinary examination date.

**Remarks**
The lecture will be held in the winter term in German language and in the summer term in English language.

*The following informations are from the event Safe mechatronic systems (WS 16/17):*

**Aim**
The students are capable to

- describe the general meaning of safety and safety technology
- name and apply the technical rules and standards in the area of machine safety
- define the term "risk" in a safety-related context
- describe and apply the approach of risk assessment
- distinguish and apply relevant approaches to quantify safety
- demonstrate well-established safety concepts
- describe safety functions and to validate them
- name examples of different safety-related aspects

**Content**
This course provides in-depth knowledge on safety technology, in particular safety-related terminology and their definitions will be discussed and distinguished from each other. Besides an introduction on relevant technical rules and standards, the emphasis will be on their application in order to be capable to identify and assess risks. Thus, the quantification of safety with the help of mathematical models will be studied in details. In this respect, this course will discuss and highlight the importance of the parameters Performance Level (PL) vs. Safety Integrity Level (SIL). Especially the application of PL and SIL on real-life cases will be emphasized. Furthermore, safety concepts and their possible implementation in design will be discussed as well as safety functions of mechatronic systems. In particular, safe bus systems, safe sensors, safe actuators and safe controls will be highlighted and in this respect, a differentiation between safety systems and assistance systems will be conducted. Further examples of safe mechatronic systems from the area of material handling, drive technology, control technology or even signal transmission and processing will demonstrate the safety aspects as described above and show possible implementation approaches of integrated safety in an industrial environment.

**Workload**
Attendance: 32 hours
Self-study: approx. 88 hours

**Literature**
Recommendations along the lessons

# Course: Safe structures for machines in material handling [T-MACH-105200]

**Responsibility:** Markus Golder
**Contained in:** [M-MACH-101263] Introduction to Logistics
[M-MACH-101279] Technical Logistics

| ECTS | Recurrence | Version |
|---|---|---|
| 4 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117065 | Safe structures for machines in material handling | Vorlesung / Übung (VÜ) | 3 | Markus Golder |

**Learning Control / Examinations**
The assessment of this course is an oral examination (20-30 min) according to §4(2) of the examination regulation. Exam dates on appointment.

**Recommendations**
Knowledge of the course „Basics of Technical Logistics“ are beneficial but not a requirement

*The following informations are from the event Safe structures for machines in material handling (WS 16/17):*

**Aim**
Students are capable to

- explain and apply relevant terms and their definitions like load, stress and strain
- name technical rules and standards applicable in machines for material handling
- explain and discuss the importance of safety factors and dynamic factors
- name and describe the required verification measures in design of material handling equipment
- describe the objective, approach and aspects when transferring the dynamic behaviour of a structure into an elasto-kinetic model

**Content**
This course discusses the safe dimensioning of structures for machines in material handling.
Using the example of industrial bridge cranes relevant terms, their definitions and relationships, as well as content from important technical rules, standards and guidelines will be discussed and demonstrated. Special attention will be put on safety factors and dynamic factors, verification measures and applicable methods with regards to the dimensioning of supporting structures.
Using selected examples (bridge cranes, tower cranes, stacker cranes), operating conditions and environmental/influencing factors on material handling system are concretized and their impacts on stress, strain, stability and fatigue strength of material handling machines are highlighted. The resulting dynamic behaviour of supporting structures will be transferred into models which illustrate the approach of determining the dynamic factors. Based on these models, the importance of simulations and its possibilities to evaluate the quality of different parameter values are highlighted.

**Workload**
Attendance: 32 hours
Self-study: approx. 88 hours

## 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117061 | Safety Engineering | Vorlesung (V) | 2 | Hans-Peter Kany |

**Learning Control / Examinations**
oral / written

**Conditions**
none

*The following informations are from the event Safety Engineering (WS 16/17):*

**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: Safety Management in Highway Engineering [T-BGU-101674]

**Responsibility:** Matthias Zimmermann
**Contained in:** [M-BGU-101066] Safety, Computing and Law in Highway Engineering

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6233906 | | Vorlesung / Übung (VÜ) | 2 | Matthias Zimmermann |

**Conditions**
none

*The following informations are from the event (WS 16/17):*

**Aim**
Die Absolventinnen und Absolventen können grundsätzlich Methoden und Verfahren zur Erhöhung der Verkehrssicherheit auf Straßen anwenden, die Verkehrssicherheit von Straßennetzen, Streckenabschnitten und Knotenpunkten beurteilen, Unfallschwerpunkte identifizieren, Unfälle und deren Ursachen analysieren sowie Maßnahmen zur Erhöhung der Verkehrssicherheit entwickeln und in ihrer Wirkung bewerten.

**Content**
In dieser Lehrveranstaltung werden die Inhalte der Verkehrssicherheitsarbeit von Seiten der Baulastträger, der Straßenverkehrsbehörden und der Polizei (Unfallaufnahme, Unfallanalyse, Beurteilung der Verkehrssicherheit von Netzen, Strecken und Knotenpunkten etc.), von Seiten der Wissenschaft (sicherheitsrelevante Aspekte im technischen Regelwerk) und im Lebenszyklus einer Straße (Sicherheitsaudits in der Planung, im Entwurf und während des Betriebs) vorgestellt, erörtert und grundsätzliche Verbesserungsmöglichkeiten diskutiert.

## T Course: Sales Management and Retailing [T-WIWI-102890]

**Responsibility:** Martin Klarmann
**Contained in:** [M-WIWI-101487] Sales Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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**
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

*The following informations are from the event Sales Management and Retailing (WS 16/17):*

**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 (2012), Marketingmanagement, 4. Aufl., Wiesbaden.

## T Course: Selected Applications of Technical Logistics [T-MACH-102160]

**Responsibility:** Vladimir Madzharov, Martin Mittwollen
**Contained in:** [M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2118087 | Selected Applications of Technical Logistics | Vorlesung (V) | 3 | 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** / **Elements and Systems of Technical Logistics** preconditioned.

*The following informations are from the event Selected Applications of Technical Logistics (SS 2016):*

### 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 and Project [T-MACH-102161]

**Responsibility:** Vladimir Madzharov, Martin Mittwollen
**Contained in:** [M-MACH-101279] Technical Logistics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2118088 | Selected Applications of Technical Logistics and Project | Seminar (S) | 4 | 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.

**Recommendations**
Knowledge out of **Basics of Technical Logistics** / **Elements and Systems of Technical Logistics** preconditioned

*The following informations are from the event Selected Applications of Technical Logistics and Project (SS 2016):*

**Aim**
Students are able to:

- Model the dynamic behaviour of material handling systems and based on this calculate the dynamical behaviour
- Transfer this approach autonomous to further, different material handling installations,
- Discuss the knowledge with subject related persons
- Judge about systems in place and justify it in front of 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: 48h
rework: 132h

**Literature**
Recommendations during lessons

## T Course: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

**Responsibility:** Timo Mappes
**Contained in:** [M-MACH-101287] Microsystem Technology
[M-MACH-101290] BioMEMS
[M-MACH-101292] Microoptics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2143892 | Selected Topics on Optics and Microoptics for Mechanical Engineers | Block-Vorlesung (BV) | 2 | Timo Mappes |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Selected Topics on Optics and Microoptics for Mechanical Engineers (SS 2016):*

**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:** Rudi Studer, Andreas Harth
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511311 | Exercises to Semantic Web Technologies | Übung (Ü) | 1 | Rudi Studer, Maribel Acosta Deibe, Andreas Harth, York Sure-Vetter |
| SS 2016 | 2511310 | Semantic Web Technologies | Vorlesung (V) | 2 | Rudi Studer, Andreas Harth, 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.

*The following informations are from the event Semantic Web Technologies (SS 2016):*

**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 in Business Administration A (Master) [T-WIWI-103474]

**Responsibility:** Martin Klarmann, Marliese Uhrig-Homburg, Christof Weinhardt, Andreas Geyer-Schulz, Ju-Young Kim, Torsten Luedecke, Hagen Lindstädt, Thomas Lützkendorf, Stefan Nickel, Marcus Wouters, Petra Nieken, Wolf Fichtner, Alexander Mädche, Hansjörg Fromm, Thomas Setzer, Ute Werner, David Lorenz, Gerhard Satzger, Frank Schultmann, Bruno Neibecker, Orestis Terzidis, Marion Weissenberger-Eibl, Martin Ruckes, Maxim Ulrich, Peter Knauth

**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2579904 | Seminar Management Accounting | Seminar (S) | 2 | Marcus Wouters |
| SS 2016 | 2581977 | | Seminar (S) | 2 | Felix Hübner, Richard Carl Müller, Elias Naber, Frank Schultmann |
| SS 2016 | 2579905 | Special Topics in Management Accounting | Seminar (S) | 2 | Ana Mickovic |
| SS 2016 | 2540510 | | Seminar (S) | 2 | Andreas Sonnenbichler |
| SS 2016 | 2573010 | Seminar Human Resources and Organizations | Seminar (S) | | Petra Nieken, Mitarbeiter |
| SS 2016 | 2573011 | Seminar Human Resource Management | Seminar (S) | | Petra Nieken, Mitarbeiter |
| WS 16/17 | 2581976 | | Seminar (S) | 2 | Sophia Radloff, Frank Schultmann |
| WS 16/17 | 2581980 | | Seminar (S) | 2 | Dogan Keles |
| WS 16/17 | 2581981 | | Seminar (S) | 2 | Armin Ardone |
| WS 16/17 | 2530326 | | Vorlesung (V) | 3 | Ute Werner |
| WS 16/17 | 2573011 | | Seminar (S) | 2 | Petra Nieken, Mitarbeiter |
| WS 16/17 | 2573010 | | Seminar (S) | 2 | Petra Nieken, Mitarbeiter |
| WS 16/17 | 2581030 | | Seminar (S) | 2 | Russell McKenna, Marcus Wiens |
| WS 16/17 | 2581990 | | Seminar (S) | 2 | Rebekka Volk, Frank Schultmann |
| WS 16/17 | 2530395 | | Vorlesung (V) | 3 | Ute Werner |
| WS 16/17 | 2581977 | | Seminar (S) | 2 | Frank Schultmann, Jérémy Rimbon |
| WS 16/17 | 2581978 | | Seminar (S) | 2 | Marcus Wiens, Frank Schultmann |
| WS 16/17 | 2572197 | Seminar in strategic and behavioral marketing | Seminar (S) | | Bruno Neibecker |
| WS 16/17 | 2572181 | | Seminar (S) | | Martin Klarmann |
| WS 16/17 | 2400013 | Seminar: Energy Informatics | Seminar (S) | 2 | Hartmut Schmeck, Patrick Jochem, Christian Hirsch, Dorothea Wagner, Franziska Wegner, Guido Brückner, Veit Hagenmeyer |

**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.

*The following informations are from the event (WS 16/17):*

**Aim**
Learning to identify, to analyse and to assess business risks; this serves as a basis for strategy and policy design regarding risks and opportunities of an enterprise. Introduction to approaches that allow to consider area-specific risk objectives, risk-bearing capacity and risk acceptance.

**Content**

1. Concepts and practice of risk management, based on decision theory
2. Goals, strategies and policies for the identification, analysis, assessment and management of risks
3. Insurance as an instrument for loss-financing
4. Selected aspects of risk management: e.g. environmental protection, organizational failure and D&O-coverage, development of a risk management culture
5. Organisation of risk management
6. Approaches for determining optimal combinations of risk management measures considering their investment costs and outcomes.

**Workload**
The overall amount of work necessary for this course is approx. 135 hours (4.5 ECTS-Credits).

**Literature**

- K. Hoffmann. Risk Management - Neue Wege der betrieblichen Risikopolitik. 1985.
- R. Hölscher, R. Elfgen. Herausforderung Risikomanagement. Identifikation, Bewertung und Steuerung industrieller Risiken. Wiesbaden 2002.
- W. Gleissner, F. Romeike. Risikomanagement - Umsetzung, Werkzeuge, Risikobewertung. Freiburg im Breisgau 2005.
- H. Schierenbeck (Hrsg.). Risk Controlling in der Praxis. Zürich 2006.

**Elective literature:**
Additional literature is recommended during the course.

*The following informations are from the event Seminar Management Accounting (SS 2016):*

**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.

*The following informations are from the event Special Topics in Management Accounting (SS 2016):*

**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.

*The following informations are from the event Seminar in strategic and behavioral marketing (WS 16/17):*

**Aim**
Students

- 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 oft he research,
- present results of the research in a seminar thesis as a scientific publication using format requirements such as those recommended by well-known publishers.

**Content**
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in marketing. This problem analysis requires a interdisciplinary examination. As a special option, the implementation of methodological solutions for market research can be accomplished and discussed with respect to its application.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Will be allocated according the individual topics.

*The following informations are from the event (WS 16/17):*

**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**
Im Rahmen des Seminars sollen die Teilnehmer lernen, sich einen systematischen Überblick über ein Literaturgebiet im Marketing zu verschaffen – eine wichtige Grundvoraussetzung für eine erfolgreiche Masterarbeit. Zentrale Aspekte der Leistung sind die Identifikation relevanter Quellen, die Systematisierung der Literatur, das Herausarbeiten zentraler Erkenntnisse, die klare und einfache sprachliche Darstellung der Ergebnisse und die Identifikation interessanter Forschungslücken

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

*The following informations are from the event Seminar: Energy Informatics (WS 16/17):*

**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.

*The following informations are from the event Seminar Human Resources and Organizations (SS 2016):*

**Aim**
The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

**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

**Literature**
Selected journal articles and books.

*The following informations are from the event Seminar Human Resource Management (SS 2016):*

**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.

**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

**Literature**
Selected journal articles and books.

## T Course: Seminar in Business Administration B (Master) [T-WIWI-103476]

**Responsibility:** Martin Klarmann, Marliese Uhrig-Homburg, Christof Weinhardt, Andreas Geyer-Schulz, Ju-Young Kim, Torsten Luedecke, Hagen Lindstädt, Thomas Lützkendorf, Stefan Nickel, Marcus Wouters, Petra Nieken, Wolf Fichtner, Alexander Mädche, Hansjörg Fromm, Thomas Setzer, Ute Werner, David Lorenz, Gerhard Satzger, Frank Schultmann, Bruno Neibecker, Orestis Terzidis, Marion Weissenberger-Eibl, Martin Ruckes, Maxim Ulrich, Peter Knauth

**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2579904 | Seminar Management Accounting | Seminar (S) | 2 | Marcus Wouters |
| SS 2016 | 2581977 | | Seminar (S) | 2 | Felix Hübner, Richard Carl Müller, Elias Naber, Frank Schultmann |
| SS 2016 | 2579905 | Special Topics in Management Accounting | Seminar (S) | 2 | Ana Mickovic |
| SS 2016 | 2540510 | | Seminar (S) | 2 | Andreas Sonnenbichler |
| SS 2016 | 2573010 | Seminar Human Resources and Organizations | Seminar (S) | | Petra Nieken, Mitarbeiter |
| SS 2016 | 2573011 | Seminar Human Resource Management | Seminar (S) | | Petra Nieken, Mitarbeiter |
| WS 16/17 | 2581976 | | Seminar (S) | 2 | Sophia Radloff, Frank Schultmann |
| WS 16/17 | 2581980 | | Seminar (S) | 2 | Dogan Keles |
| WS 16/17 | 2581981 | | Seminar (S) | 2 | Armin Ardone |
| WS 16/17 | 2530326 | | Vorlesung (V) | 3 | Ute Werner |
| WS 16/17 | 2573011 | | Seminar (S) | 2 | Petra Nieken, Mitarbeiter |
| WS 16/17 | 2573010 | | Seminar (S) | 2 | Petra Nieken, Mitarbeiter |
| WS 16/17 | 2581030 | | Seminar (S) | 2 | Russell McKenna, Marcus Wiens |
| WS 16/17 | 2581990 | | Seminar (S) | 2 | Rebekka Volk, Frank Schultmann |
| WS 16/17 | 2530395 | | Vorlesung (V) | 3 | Ute Werner |
| WS 16/17 | 2581977 | | Seminar (S) | 2 | Frank Schultmann, Jérémy Rimbon |
| WS 16/17 | 2581978 | | Seminar (S) | 2 | Marcus Wiens, Frank Schultmann |
| WS 16/17 | 2572197 | Seminar in strategic and behavioral marketing | Seminar (S) | | Bruno Neibecker |
| WS 16/17 | 2572181 | | Seminar (S) | | Martin Klarmann |
| WS 16/17 | 2400013 | Seminar: Energy Informatics | Seminar (S) | 2 | Hartmut Schmeck, Patrick Jochem, Christian Hirsch, Dorothea Wagner, Franziska Wegner, Guido Brückner, Veit Hagenmeyer |

**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.

*The following informations are from the event (WS 16/17):*

**Aim**
Learning to identify, to analyse and to assess business risks; this serves as a basis for strategy and policy design regarding risks and opportunities of an enterprise. Introduction to approaches that allow to consider area-specific risk objectives, risk-bearing capacity and risk acceptance.

**Content**

1. Concepts and practice of risk management, based on decision theory
2. Goals, strategies and policies for the identification, analysis, assessment and management of risks
3. Insurance as an instrument for loss-financing
4. Selected aspects of risk management: e.g. environmental protection, organizational failure and D&O-coverage, development of a risk management culture
5. Organisation of risk management
6. Approaches for determining optimal combinations of risk management measures considering their investment costs and outcomes.

**Workload**
The overall amount of work necessary for this course is approx. 135 hours (4.5 ECTS-Credits).

**Literature**

- K. Hoffmann. Risk Management - Neue Wege der betrieblichen Risikopolitik. 1985.
- R. Hölscher, R. Elfgen. Herausforderung Risikomanagement. Identifikation, Bewertung und Steuerung industrieller Risiken. Wiesbaden 2002.
- W. Gleissner, F. Romeike. Risikomanagement - Umsetzung, Werkzeuge, Risikobewertung. Freiburg im Breisgau 2005.
- H. Schierenbeck (Hrsg.). Risk Controlling in der Praxis. Zürich 2006.

**Elective literature:**
Additional literature is recommended during the course.

*The following informations are from the event Seminar Management Accounting (SS 2016):*

**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.

*The following informations are from the event Special Topics in Management Accounting (SS 2016):*

**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.

*The following informations are from the event Seminar in strategic and behavioral marketing (WS 16/17):*

**Aim**
Students

- 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 oft he research,
- present results of the research in a seminar thesis as a scientific publication using format requirements such as those recommended by well-known publishers.

**Content**
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in marketing. This problem analysis requires a interdisciplinary examination. As a special option, the implementation of methodological solutions for market research can be accomplished and discussed with respect to its application.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Will be allocated according the individual topics.

*The following informations are from the event (WS 16/17):*

**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**
Im Rahmen des Seminars sollen die Teilnehmer lernen, sich einen systematischen Überblick über ein Literaturgebiet im Marketing zu verschaffen – eine wichtige Grundvoraussetzung für eine erfolgreiche Masterarbeit. Zentrale Aspekte der Leistung sind die Identifikation relevanter Quellen, die Systematisierung der Literatur, das Herausarbeiten zentraler Erkenntnisse, die klare und einfache sprachliche Darstellung der Ergebnisse und die Identifikation interessanter Forschungslücken

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

*The following informations are from the event Seminar: Energy Informatics (WS 16/17):*

**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.

*The following informations are from the event Seminar Human Resources and Organizations (SS 2016):*

**Aim**
The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

**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

**Literature**
Selected journal articles and books.

*The following informations are from the event Seminar Human Resource Management (SS 2016):*

**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.

**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

**Literature**
Selected journal articles and books.

## T Course: Seminar in Economic Policy [T-WIWI-102789]

**Responsibility:** Ingrid Ott
**Contained in:** [M-WIWI-101514] Innovation Economics

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**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.

## T Course: Seminar in Economics A (Master) [T-WIWI-103478]

**Responsibility:** Nora Szech, Kay Mitusch, Ingrid Ott, Jan Kowalski, Clemens Puppe, Johannes Philipp Reiß, Berthold Wigger, Johannes Brumm
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560282 | | Seminar (S) | 2 | Ingrid Ott, Assistenten |
| WS 16/17 | 2560140 | | Seminar (S) | 2 | Nora Szech, Jeroen Jannis Engel |
| WS 16/17 | 2560141 | | Seminar (S) | 2 | Nora Szech, Leonie Fütterer |

### 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.

*The following informations are from the event (WS 16/17):*

### Aim
The student develops an own idea for an economic experiment in this research direction.

### Workload
About 90 hours.

### Literature
James Heckman (fostering of young children), Ernst Fehr (egalitarianism and fairness), Uri Gneezy (gender differences), Matthias Sutter (delay of gratification), and Walter Mischel (the famous Marshmallow Experiment).

## T Course: Seminar in Economics B (Master) [T-WIWI-103477]

**Responsibility:** Nora Szech, Kay Mitusch, Ingrid Ott, Jan Kowalski, Clemens Puppe, Johannes Philipp Reiß, Berthold Wigger, Johannes Brumm
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560282 | | Seminar (S) | 2 | Ingrid Ott, Assistenten |
| WS 16/17 | 2560140 | | Seminar (S) | 2 | Nora Szech, Jeroen Jannis Engel |
| WS 16/17 | 2560141 | | Seminar (S) | 2 | Nora Szech, Leonie Fütterer |

**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.

*The following informations are from the event (WS 16/17):*

**Aim**
The student develops an own idea for an economic experiment in this research direction.

**Workload**
About 90 hours.

**Literature**
James Heckman (fostering of young children), Ernst Fehr (egalitarianism and fairness), Uri Gneezy (gender differences), Matthias Sutter (delay of gratification), and Walter Mischel (the famous Marshmallow Experiment).

## T Course: Seminar in Engineering Science (Master) [T-WIWI-103147]

**Responsibility:** Fachvertreter ingenieurwissenschaftlicher Fakultäten
**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 16/17 | 23233 | | Seminar (S) | 2 | Wolfgang Menesklou |

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

**Conditions**
See module description.

**Recommendations**
None

## T Course: Seminar in Informatics A (Master) [T-WIWI-103479]

**Responsibility:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2513306 | Event Processing: Processing of Real-Time Data and their Business Potential | Seminar / Praktikum (S/P) | 2 | Ljiljana Stojanovic, Rudi Studer, Suad Sejdovic, Dominik Riemer, York Sure-Vetter |
| SS 2016 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, York Sure-Vetter, Gerhard Satzger |
| SS 2016 | 2512300 | | Seminar / Praktikum (S/P) | 3 | Aditya Mogadala, Achim Rettinger, Rudi Studer, York Sure-Vetter, Andreas Thalhammer |
| SS 2016 | 2513206 | | Seminar (S) | 2 | Andreas Schoknecht, Jonas Lehner, Andreas Oberweis, Ugur Cayoglu |
| SS 2016 | 2513103 | | Seminar (S) | 2 | Hartmut Schmeck, Marlon Braun, Fabian Rigoll |
| SS 2016 | 2513200 | | Seminar (S) | 2 | Jan Ullmer, Sascha Alpers, Manuela Wagner, Andreas Oberweis, Oliver Raabe, Gunther Schiefer, Stefanie Betz |
| SS 2016 | 2513300 | Technology-enhanced Learning | Seminar (S) | 2 | Daniel Szentes, Martin Mandausch, Matthias Frank, Wolfgang Roller, Rudi Studer, Jürgen Beyerer, Klemens Böhm, Carmen Wolf, Gerd Gidion, York Sure-Vetter, Alexander Streicher |
| SS 2016 | 2513307 | Cognitive Computing in the Medical Domain | Seminar (S) | 2 | Patrick Philipp, Steffen Thoma, Rudi Studer, York Sure-Vetter |

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|---|---|---|---|---|---|
| WS 16/17 | 2513305 | Developing IT-based Business Models | Seminar (S) | 2 | Rudi Studer, Maria Maleshkova, York Sure-Vetter, Felix Leif Keppmann |
| WS 16/17 | 2512310 | Smart Services and the IoT | Seminar / Praktikum (S/P) | | Tobias Weller, Maria Maleshkova, Johannes Kunze von Bischhoff-shausen, York Sure-Vetter |
| WS 16/17 | 2512307 | Applications of Semantic MediaWiki | Seminar / Praktikum (S/P) | 3 | Tobias Weller, Matthias Frank, Achim Rettinger, Rudi Studer, Maria Maleshkova, York Sure-Vetter |
| WS 16/17 | 2513104 | | Seminar (S) | 2 | Hartmut Schmeck, Christian Hirsch, Marlon Braun, Fabian Rigoll |
| WS 16/17 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Hansjörg Fromm |
| WS 16/17 | 2400013 | Seminar: Energy Informatics | Seminar (S) | 2 | Hartmut Schmeck, Patrick Jochem, Christian Hirsch, Dorothea Wagner, Franziska Wegner, Guido Brückner, Veit Hagenmeyer |
| WS 16/17 | 2512301 | | Seminar / Praktikum (S/P) | 3 | Tobias Christof Käfer, Rudi Studer, Maribel Acosta Deibe, Andreas Harth, York Sure-Vetter |

**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.

*The following informations are from the event Event Processing: Processing of Real-Time Data and their Business Potential (SS 2016):*

**Content**
Topics of interest include, but are not limited to:

- Prediction of lucrative areas / routes
- Real-time visualization of event streams
- Fraud Detection
- Sales forecast

Gladly, data with other data (e.g.weather or event data for NYC) can be linked.

*The following informations are from the event Developing IT-based Business Models (WS 16/17):*

**Content**
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

*The following informations are from the event Seminar Service Science, Management & Engineering (WS 16/17):*

**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.

*The following informations are from the event (SS 2016):*

**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.

*The following informations are from the event Smart Services and the IoT (WS 16/17):*

**Content**
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

*The following informations are from the event Applications of Semantic MediaWiki (WS 16/17):*

**Content**
Topics of interest include, but are not limited to:

- Analysis of Medical Processes
- Correlation analysis of medical data
- Visualization of data in SMW
- Sentiment analysis of Twitter data
- Upload Interface for SMW
- Process Matching of process data

*The following informations are from the event Seminar: Energy Informatics (WS 16/17):*

**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.

*The following informations are from the event Cognitive Computing in the Medical Domain (SS 2016):*

**Aim**
The purpose of this seminar is to collect and analyses popular medical datasets, to compare an contrast existing medical systems, to explore approaches for supporting patient diagnosis and to determine the potential of adopting already exciting solutions and algorithms to the medical domain.

**Content**
Topics of interest include, but are not limited to:

- Decision Support Systems
- Clinical Pathway Analysis
- AI Systems in the Medical Domain
- Ontology Analysis

**Literature**
Relevant Literatur will be announced during the Seminar.

*The following informations are from the event (WS 16/17):*

**Workload**
Topicsof interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

## T Course: Seminar in Informatics B (Master) [T-WIWI-103480]

**Responsibility:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch/englisch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2513306 | Event Processing: Processing of Real-Time Data and their Business Potential | Seminar / Praktikum (S/P) | 2 | Ljiljana Stojanovic, Rudi Studer, Suad Sejdovic, Dominik Riemer, York Sure-Vetter |
| SS 2016 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, York Sure-Vetter, Gerhard Satzger |
| SS 2016 | 2512300 | | Seminar / Praktikum (S/P) | 3 | Aditya Mogadala, Achim Rettinger, Rudi Studer, York Sure-Vetter, Andreas Thalhammer |
| SS 2016 | 2513206 | | Seminar (S) | 2 | Andreas Schoknecht, Jonas Lehner, Andreas Oberweis, Ugur Cayoglu |
| SS 2016 | 2513103 | | Seminar (S) | 2 | Hartmut Schmeck, Marlon Braun, Fabian Rigoll |
| SS 2016 | 2513200 | | Seminar (S) | 2 | Jan Ullmer, Sascha Alpers, Manuela Wagner, Andreas Oberweis, Oliver Raabe, Gunther Schiefer, Stefanie Betz |
| SS 2016 | 2513300 | Technology-enhanced Learning | Seminar (S) | 2 | Daniel Szentes, Martin Mandausch, Matthias Frank, Wolfgang Roller, Rudi Studer, Jürgen Beyerer, Klemens Böhm, Carmen Wolf, Gerd Gidion, York Sure-Vetter, Alexander Streicher |
| SS 2016 | 2513307 | Cognitive Computing in the Medical Domain | Seminar (S) | 2 | Patrick Philipp, Steffen Thoma, Rudi Studer, York Sure-Vetter |

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|---|---|---|---|---|---|
| WS 16/17 | 2513305 | Developing IT-based Business Models | Seminar (S) | 2 | Rudi Studer, Maria Maleshkova, York Sure-Vetter, Felix Leif Keppmann |
| WS 16/17 | 2512310 | Smart Services and the IoT | Seminar / Praktikum (S/P) | | Tobias Weller, Maria Maleshkova, Johannes Kunze von Bischhoff-shausen, York Sure-Vetter |
| WS 16/17 | 2512307 | Applications of Semantic MediaWiki | Seminar / Praktikum (S/P) | 3 | Tobias Weller, Matthias Frank, Achim Rettinger, Rudi Studer, Maria Maleshkova, York Sure-Vetter |
| WS 16/17 | 2513104 | | Seminar (S) | 2 | Hartmut Schmeck, Christian Hirsch, Marlon Braun, Fabian Rigoll |
| WS 16/17 | 2595470 | Seminar Service Science, Management & Engineering | Seminar (S) | 2 | Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Hansjörg Fromm |
| WS 16/17 | 2400013 | Seminar: Energy Informatics | Seminar (S) | 2 | Hartmut Schmeck, Patrick Jochem, Christian Hirsch, Dorothea Wagner, Franziska Wegner, Guido Brückner, Veit Hagenmeyer |
| WS 16/17 | 2512301 | | Seminar / Praktikum (S/P) | 3 | Tobias Christof Käfer, Rudi Studer, Maribel Acosta Deibe, Andreas Harth, York Sure-Vetter |

**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.

*The following informations are from the event Event Processing: Processing of Real-Time Data and their Business Potential (SS 2016):*

**Content**
Topics of interest include, but are not limited to:

- Prediction of lucrative areas / routes
- Real-time visualization of event streams
- Fraud Detection
- Sales forecast

Gladly, data with other data (e.g.weather or event data for NYC) can be linked.

*The following informations are from the event Developing IT-based Business Models (WS 16/17):*

**Content**
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

*The following informations are from the event Seminar Service Science, Management & Engineering (WS 16/17):*

**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.

*The following informations are from the event (SS 2016):*

**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.

*The following informations are from the event Smart Services and the IoT (WS 16/17):*

**Content**
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

*The following informations are from the event Applications of Semantic MediaWiki (WS 16/17):*

**Content**
Topics of interest include, but are not limited to:

- Analysis of Medical Processes
- Correlation analysis of medical data
- Visualization of data in SMW
- Sentiment analysis of Twitter data
- Upload Interface for SMW
- Process Matching of process data

*The following informations are from the event Seminar: Energy Informatics (WS 16/17):*

**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.

*The following informations are from the event Cognitive Computing in the Medical Domain (SS 2016):*

**Aim**
The purpose of this seminar is to collect and analyses popular medical datasets, to compare an contrast existing medical systems, to explore approaches for supporting patient diagnosis and to determine the potential of adopting already exciting solutions and algorithms to the medical domain.

**Content**
Topics of interest include, but are not limited to:

- Decision Support Systems
- Clinical Pathway Analysis
- AI Systems in the Medical Domain
- Ontology Analysis

**Literature**
Relevant Literatur will be announced during the Seminar.

*The following informations are from the event (WS 16/17):*

**Workload**
Topicsof interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

## T Course: Seminar in Mathematics (Master) [T-MATH-105944]

**Responsibility:** Günter Last, Martin Folkers
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 3 | 1 |

## T Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

**Responsibility:** Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550462 | | Seminar (S) | | Oliver Stein, Steffen Rebennack |

**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 Operations Research B (Master) [T-WIWI-103482]

**Responsibility:** Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550462 | | Seminar (S) | | Oliver Stein, Steffen Rebennack |

**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 Statistics A (Master) [T-WIWI-103483]

**Responsibility:** Melanie Schienle, Oliver Grothe
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**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:** Melanie Schienle, Oliver Grothe
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Semester | 1 |

**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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6232903 | | Seminar (S) | 2 | Bastian Chlond, Peter Vortisch |
| WS 16/17 | 6232903 | | Seminar (S) | 2 | Bastian Chlond, Peter Vortisch |

**Conditions**
none

# T Course: Seminar Mobility Services (Master) [T-WIWI-103174]

**Responsibility:** Carola Stryja, Gerhard Satzger

**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management
[M-BGU-101064] Fundamentals of Transportation

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Wintersemester | 1 |

**Learning Control / Examinations**
A final written exam will be conducted.

**Conditions**
None

## T Course: Seminar Sensors [T-ETIT-100707]

**Responsibility:** Wolfgang Menesklou
**Contained in:** [M-ETIT-101158] Sensor Technology I
[M-ETIT-101159] Sensor Technology II

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23233 | | Seminar (S) | 2 | Wolfgang Menesklou |

## 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 | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2400054 | | Seminar (S) | | Oliver Raabe |
| SS 2016 | 2400079 | | Seminar (S) | 2 | Benjamin Raue, Michael Bartsch |
| SS 2016 | 2400041 | Governance, Risk & Compliance | Seminar (S) | 2 | Hans-Rudolf Röhm |
| SS 2016 | 24820 | Current Issues in Patent Law | Seminar (S) | 2 | Klaus-Jürgen Melullis |
| SS 2016 | 2400087 | | Seminar (S) | 2 | Benjamin Raue |
| SS 2016 | 2400088 | | Seminar (S) | 2 | Franziska Boehm |
| WS 16/17 | 2400125 | | Seminar (S) | 2 | Franziska Boehm |

*The following informations are from the event Governance, Risk & Compliance (SS 2016):*

**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.

*The following informations are from the event Current Issues in Patent Law (SS 2016):*

**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.

## T Course: Seminar: Legal Studies II [T-INFO-105945]

**Responsibility:** Thomas Dreier
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 3 | 1 |

## T Course: Sensor Systems [T-ETIT-100709]

**Responsibility:** Wolfgang Menesklou
**Contained in:** [M-ETIT-101158] Sensor Technology I
[M-ETIT-101159] Sensor Technology II

| ECTS | Version |
|---|---|
| 3 | 1 |

## T Course: Sensors [T-ETIT-101911]

**Responsibility:** Wolfgang Menesklou
**Contained in:** [M-ETIT-101158] Sensor Technology I

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 23231 | | Vorlesung (V) | 2 | Wolfgang Menesklou |

# T Course: Sensors and Actuators Laboratory [T-ETIT-100706]

**Responsibility:** Wolfgang Menesklou
**Contained in:** [M-ETIT-101158] Sensor Technology I
[M-ETIT-101159] Sensor Technology II

| ECTS | Version |
|---|---|
| 6 | 1 |

## T Course: Service Analytics [T-WIWI-102809]

**Responsibility:** Hansjörg Fromm, Thomas Setzer
**Contained in:** [M-WIWI-103117] Data Science: Data-Driven Information Systems

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2595502 | | Übung (Ü) | 1 | Hansjörg Fromm, Thomas Setzer |
| SS 2016 | 2595501 | Service Analytics | Vorlesung (V) | 2 | Hansjörg Fromm, Thomas Setzer |

**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). The bonus only applies to the first and second exam of the semester in which it was obtained.

**Conditions**
None

**Recommendations**
The lecture is addresed to students with interests and basic knowledge in the topics of Operations Research, decritptive and inductive statistics.

*The following informations are from the event Service Analytics (SS 2016):*

**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 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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2595502 | | Übung (Ü) | 1 | Hansjörg Fromm, Thomas Setzer |
| SS 2016 | 2595501 | Service Analytics | Vorlesung (V) | 2 | Hansjörg Fromm, Thomas Setzer |

**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). The bonus only applies to the first and second exam of the semester in which it was obtained.

**Conditions**
None

**Recommendations**
The lecture is addresed to students with interests and basic knowledge in the topics of Operations Research, decritptive and inductive statistics.

*The following informations are from the event Service Analytics (SS 2016):*

**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 Analytics B - Enterprise Data Reduction and Prediction [T-WIWI-105779]

**Responsibility:** Christof Weinhardt, Thomas Setzer
**Contained in:** [M-WIWI-101506] Service Analytics

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2540499 | | Übung (Ü) | 1 | Thomas Setzer |
| SS 2016 | 2540498 | | Vorlesung (V) | 2 | Thomas Setzer |

### 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). The bonus only applies to the first and second exam of the semester in which it was obtained.

### Conditions
None

### Recommendations
None

### Remarks
The course has beed added summer term 2016.
Limited number of slots

## 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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2595468 | Service Innovation | Vorlesung (V) | 2 | Ronny Schüritz, Gerhard Satzger, Niels Feldmann, Fabian Hunke |

**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

*The following informations are from the event Service Innovation (SS 2016):*

**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 or agriculture 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, understand how innovation diffusion works, examine case studies on service innovation, compare open vs. closed innovation, learn how to use a wide variety of tools that can be used in a service innovation context such as the human-centric approach service design thinking and a collection of tools to make assumption of the impact of technology.

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.

**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:** Barry Norton, Sudhir Agarwal, Rudi Studer
**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch/englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511308 | Service Oriented Computing | Vorlesung (V) | 2 | Rudi Studer, Maria Maleshkova |
| SS 2016 | 2511309 | Exercises to Service Oriented Computing | Übung (Ü) | 1 | Rudi Studer, Maria Maleshkova, Felix Leif Keppmann |

**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.

**Conditions**
None

*The following informations are from the event Service Oriented Computing (SS 2016):*

**Aim**
Students will extend their knowledge and proficiency in the area of modern service-oriented technologies. Thereby, they acquire the capability to understand, apply and assess concepts and methods that are of innovative and scientific nature.

**Content**
Building upon basic Web service technologies the lecture introduces selected topics fromadvanced service computing and service engineering. In particular, focus will be placed on new Web-based architectures and applications leveraging Web 2.0, Cloud Computing, Semantic Web and other emerging technologies.

**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**
Literature will be announced in the lecture.

## T Course: Services Marketing [T-WIWI-103140]

**Responsibility:** Ju-Young Kim
**Contained in:** [M-WIWI-101649] Services Marketing

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2572202 | | Vorlesung (V) | 2 | Ju-Young Kim |

**Learning Control / Examinations**
The assessment consists of a written exam (60 min) (according to §4(2).

**Conditions**
None

**Recommendations**
None

**Remarks**
new course starting summer term 2016

*The following informations are from the event (SS 2016):*

**Aim**
Students

- understand the importance of a customer relationship management
- learn the standards of service design
- learn about the 4ps in the service context
- gain knowledge about content and strategies of services marketing
- learn about methods and models to measure service quality

**Content**
The aim of this lecture is to provide an overview of marketing management in the service context. The lecture starts with foundations for service marketing such as consumer behavior and expectations in services. Then students learn about the importance of the customer relationship for services. They also learn about the 4ps in the service context and gain knowledge about content and strategies of services marketing. They further learn about methods and models for services marketing.

**Workload**
Gesamtaufwand bei 3 Leistungspunkten: ca. 90 Stunden Präsenzzeit: 30 Stunden Vor – und Nachbereitung der LV: 45.0 Stunden Prüfung und Prüfungsvorbereitung: 15.0 Stunden

**Literature**
Fitzsimmons, J. A., & Fitzsimmons, M. J. (2010). Service management: operations, strategy, and information technology. Singapore: McGraw-Hill.
Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2006). Services marketing: Integrating customer focus across the firm.
Weitere Literaturempfehlungen (Research Papers) finden Sie direkt in den Vorlesungsfolien.

## T Course: Simulation Game in Energy Economics [T-WIWI-102693]

**Responsibility:** Massimo Genoese
**Contained in:** [M-WIWI-101451] Energy Economics and Energy Markets

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2581025 | Simulation Game in Energy Economics | Vorlesung / Übung (VÜ) | 2 | Massimo Genoese |

**Learning Control / Examinations**
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

**Conditions**
None

**Recommendations**
Visiting the course "Introduction to Energy Economics"

**Remarks**
See German version.

*The following informations are from the event Simulation Game in Energy Economics (SS 2016):*

**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 I [T-WIWI-102627]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550663 | | Übung (Ü) | | Karl-Heinz Waldmann |
| SS 2016 | 2550662 | Simulation I | Vorlesung (V) | | Ellen Platt, Karl-Heinz Waldmann, André Lust |
| SS 2016 | 2550664 | | Übung (Ü) | | Karl-Heinz Waldmann |

### Learning Control / Examinations
The examination Simulation I will be offered latest until winter term 2016/2017 (for beginners).
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

### Conditions
None

### Recommendations
None

### Remarks
The course will be offered in the summer term 2015 and the summer term 2016.

*The following informations are from the event Simulation I (SS 2016):*

### Aim
The participants will be enabled to model discrete event systems that underlie stochastic influences and to analyze them using simulation. The discussion of practice-oriented case studies pursues two goals. On the one hand, the participants will be sensitized for different criteria to evaluate the performance of a stochastic discrete-event system. On the other hand, an overview of application areas of stochastic simulation is provided. In the context of the course, the basic elements of discrete-event simulation are introduced and a procedure model for the execution of simulation studies is developed. Properties of existing mathematical methods for the generation of random variables are discussed and are assigned to concrete application cases. Statistical methods for the description of simulation input data and for the interpretation of simulation results will be exemplified. The facultative computer exercise course using a simulation software comprises a practice-oriented case study that illustrates the opportunities and limitations of stochastic simulation.

### Content
Generation of random numbers, Monte Carlo Integration, discrete event simulation, discrete random variables, continuous random variables, statistical analysis of simulated data.

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

### Literature

- Lecture Notes

- K.-H. Waldmann/U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung, Springer (2012), 2. Auflage
- Elective literature: A. M. Law/W.D. Kelton: Simulation Modeling and Analysis (3rd ed), McGraw Hill (2000)

## T Course: Simulation II [T-WIWI-102703]

**Responsibility:** Karl-Heinz Waldmann
**Contained in:** [M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2550665 | | Vorlesung (V) | 2 | Ellen Platt, Karl-Heinz Waldmann, André Lust |
| WS 16/17 | 2550666 | | Übung (Ü) | | Karl-Heinz Waldmann |
| WS 16/17 | 2550667 | | Übung (Ü) | | Karl-Heinz Waldmann |

**Learning Control / Examinations**
The examination T-WIWI-102703 Simulation II will be offered latest until summer term 2017 (for beginners).
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Recommendations**
Foundations in the field of *Simulation I* [2550662] are desired.

**Remarks**
The course will be offered in the winter term 2015/2016.

## T Course: Simulation of Coupled Systems [T-MACH-105172]

**Responsibility:** Marcus Geimer
**Contained in:** [M-MACH-101265] Vehicle Development
[M-MACH-101267] Mobile Machines

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114095 | Simulation of Coupled Systems | Vorlesung (V) | 2 | Benedikt Reick, Marcus Geimer |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Simulation of Coupled Systems (SS 2016):*

**Aim**
After completion of the course, students are able to:

- building a coupled simulation
- parameterize models
- Perform simulations
- do Troubleshooting
- check results for plausibility

**Content**

- Knowledge of the basics of multi-body and hydraulic simulation programs
- Possibilities of coupled simulations
- Development of a simulation model by using the example of a wheel loader
- Documentation of the result in a short report

**Workload**

- regular attendance: 21 hours
- total self-study: 92 hours

**Literature**
**Elective literature:**

- miscellaneous guides according the software-tools pdf-shaped
- information to the wheel-type loader

## 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 | Version |
|---|---|
| 1,5 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6241832 | | Vorlesung (V) | 1 | Peter Steffek |

**Conditions**
none

## T Course: Smart Energy Distribution [T-WIWI-102845]

**Responsibility:** Hartmut Schmeck

**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511108 | Smart Energy Distribution | Vorlesung (V) | 2 | Hartmut Schmeck |

**Learning Control / Examinations**
The examination will be offered latest until summer term 2017 (repeaters only).
Written exam, unless the number of registered students is too small.

**Conditions**
None

**Recommendations**
The students should have an understanding of informatics, they would benefit from some previous knowledge of self-organisation and methods for optimisation, but this is not mandatory

**Remarks**
This course is offered to students of the (KIC) MSc program EnTech but may also be taken by students of the Master programs Industrial Engineering, Economics Engineering, Information Engineering and Management, and Mathematics in Economics.

*The following informations are from the event Smart Energy Distribution (SS 2016):*

**Aim**
The students will develop an understanding of the basic problems that arise from decentralisation and an increased share of renewables in the power mix and they will know how to deal with these problems by using concepts like virtualisation and self-organisation. They will know how to design and apply adequate methods for smart energy distribution in various related problem settings and they will be capable to explain the appropriate use of these methods. The students will get to know the scope of topics in energy informatics.

**Content**
The course addresses the role of information and communication technologies for the distribution of energy. The increasing share of power generation from renewable sources and the decentralisation of power generation lead to an increasing need for local balancing of power supply and demand. While traditional power management was based on the assumption that power consumption is not controllable and that electric power cannot be stored effectively, future power management will depend significantly on much more flexibility in demand and in innovative ways of storing energy.
The course will present concepts for smart energy management that have been developed in projects on "e-energy" and electric mobility, like virtual power plants, local agent-based power management, concepts of load shifting, autonomic and organic approaches to power management in smart homes, utilization of mobile and stationary batteries for stabilization of the power grid.
The concepts presented in this course are essential for the new disciplin of energy informatics.

**Workload**
The workload is about 120 hours (4 LP)

## 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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2520539 | | Übung (Ü) | 1 | Anselma Wörner, Clemens Puppe, Tobias Dittrich |
| SS 2016 | 2520537 | Social Choice Theory | Vorlesung (V) | 2 | Clemens Puppe, Johannes Philipp Reiß, Michael Müller |

**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

*The following informations are from the event Social Choice Theory (SS 2016):*

**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. An introduction into tournament theory concludes the course.

**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

## Course: Social Network Analysis in CRM [T-WIWI-102642]

**Responsibility:** Andreas Geyer-Schulz
**Contained in:** [M-WIWI-101470] Data Science: Advanced CRM

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 1 |

**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.

**Conditions**
None

**Recommendations**
None

**Remarks**
The course is currently not offered.

## 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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511209 | | Übung (Ü) | 1 | Meike Ullrich, Andreas Oberweis, Timm Caporale |
| SS 2016 | 2511208 | Software Quality Management | Vorlesung (V) | 2 | 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".

*The following informations are from the event Software Quality Management (SS 2016):*

**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 | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2561261 | | Übung (Ü) | 1 | Ingrid Ott, David Bälz |
| WS 16/17 | 2561260 | Spatial Economics | Vorlesung (V) | 2 | Ingrid Ott |

### 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.

*The following informations are from the event Spatial Economics (WS 16/17):*

### Aim
The student

- analyses how spatial distribution of economic activity is determined
- uses quantitative methods within the context of economic models
- has basic knowledge of formal-analytic methods
- understands the link between economic theory and its empirical applications
- understands to what extent concentration processes result from agglomeration and dispersion forces
- is able to determine theory based policy recommendations

### Content
Geography, trade and development
Geography and economic theory
Core models of economic geography and empirical evidence
Agglomeration, home market effect, and spatial wages
Applications and extensions

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

### Literature
Steven Brakman, Harry Garretsen, Charles van Marrewijk (2009), The New Introduction to Geographical Economics
Further literature recommendations will be announced in the course of the lecture.

## T Course: Special Sociology [T-GEISTSOZ-101957]

**Responsibility:** Gerd Nollmann
**Contained in:** [M-GEISTSOZ-101169] Sociology

| ECTS | Version |
|---|---|
| 4 | 1 |

**Conditions**
None.

## T Course: Special Topics in Highway Engineering and Environmental Impact Assessment [T-BGU-101860]

**Responsibility:** Ralf Roos
**Contained in:** [M-BGU-100999] Highway Engineering

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6233804 | | Vorlesung (V) | 1 | Ralf Roos |
| SS 2016 | 6233807 | | Vorlesung (V) | 1 | Ralf Roos |

**Conditions**
none

## 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 | Version |
|---|---|---|
| 4,5 | Jedes Semester | 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 in Optimization I [T-WIWI-102721]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 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*Special Topics in Optimization II*[25126]. 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 (www.ior.kit.edu).

## Course: Special Topics in Optimization II [T-WIWI-102722]

**Responsibility:** Oliver Stein
**Contained in:** [M-WIWI-101473] Mathematical Programming

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Unregelmäßig | 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*Special Topics in Optimization I*[25128]. 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 (www.ior.kit.edu).

## 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 | Version |
|---|---|---|
| 5 | Jedes Semester | 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 | Version |
|---|---|---|
| 5 | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511224 | | Vorlesung (V) | 2 | Stefanie Betz |

**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

## T Course: Special Topics of Knowledge Management [T-WIWI-102671]

**Responsibility:** Rudi Studer

**Contained in:** [M-WIWI-101472] Informatics
[M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

| ECTS | Recurrence | Version |
|---|---|---|
| 5 | Jedes Semester | 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: 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 | Version |
|---|---|---|
| 5 | Jedes Semester | 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: Specialization in Food Process Engineering [T-CIWVT-101875]

**Responsibility:** Volker Gaukel
**Contained in:** [M-CIWVT-101119] Specialization in Food Process Engineering

| ECTS | Language | Version |
|---|---|---|
| 9 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 22933 | | Vorlesung (V) | 2 | Thomas Schwartz |
| SS 2016 | 6601 | | Vorlesung (V) | 2 | Mirko Bunzel |
| SS 2016 | 22215 | | Vorlesung (V) | 2 | Peter Braun, Frank Müller, Ulrich Bröckel, Guenter Esper, Heike Schuchmann, Reinhold Scherer, Matthias Kind, Michael Türk, Hermann Nirschl, Matthias Sass |
| WS 16/17 | 22246 | Extrusion technology in food processing | Vorlesung (V) | 1 | Azad Emin |
| WS 16/17 | 22209 | | Vorlesung (V) | 1 | Ulrike van der Schaaf |
| WS 16/17 | 22207 | | Vorlesung (V) | 2 | Bernhard Watzl |

### 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: Specific Aspects in Taxation [T-WIWI-102790]

**Responsibility:** Armin Bader, Berthold Wigger
**Contained in:** [M-WIWI-101511] Advanced Topics in Public Finance

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2560129 | Specific Aspects in Taxation | Vorlesung / Übung (VÜ) | 3 | Armin Bader, 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**
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course "Öffentliche Einnahmen" beforehand.

*The following informations are from the event Specific Aspects in Taxation (WS 16/17):*

**Aim**
See German version.

**Content**
The lecture "Special Aspects of Taxation" focuses on the effects of different taxes. The main emphasis is on German tax legislation. In addition to that, international aspects of taxation, in particular with respect to the European integration, will be discussed.
The lecture consists of four parts: First specific tax problems of corporate, income and consumption taxes are treated. Part two introduces the advantages and disadvantages of each of these taxes, in particular their incidence ("Who actually carries the tax burden?") and their effects within the value chain. The third part then deals with the question how the different taxes contribute to public revenues. Finally, the last part compares tax systems within and outside Europe.
As a special feature, guest lecturers will provide insight into practical aspects of taxation.

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

**Literature**
**Elective literature:**


- Andel, N. (1998): *Finanzwissenschaft*, 4th ed., Mohr Siebeck.
- Betsch, O., Groh, A.P. und Schmidt, K. (2000): *Gründungs- und Wachstumsfinanzierung innovativer Unternehmen*, Oldenbourg.
- Cloer, A. und Lavrelashvili, N. (2008): *Einführung in das Europäische Steuerrecht*, Schmidt Erich.
- Homburg, S.(2007) : *Allgemeine Steuerlehre*, 5th ed.,Vahlen.
- Kravitz, N. (Ed.) (2010) : *Internationale Aspekte der Unternehmensbesteuerung,* Journal of Business Economics, Special Issue 2/2010
- Scheffler, W. (2009) : *Besteuerung von Unternehmen I – Ertrags- Substanz- und Verkehrssteuern*, 11th ed., Müller Jur..

- Scheffler, W. (2009): *Besteuerung von Unternehmen II – Steuerbilanz*, 11th ed., Müller Jur..
- Wigger, B.U. (2006): *Grundzüge der Finanzwissenschaft*; 2nd ed., Springer.

## 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 | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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]

## Course: Stochastic Calculus and Finance [T-WIWI-103129]

**Responsibility:** Mher Safarian
**Contained in:** [M-WIWI-101639] Econometrics and Statistics II

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2521331 | | Vorlesung (V) | 2 | Mher Safarian |

**Learning Control / Examinations**
The assessment of this course consists of a written examination (§4(2), 1 SPOs) and of possibble additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**
None

**Remarks**
For more information see http://statistik.econ.kit.edu/

*The following informations are from the event (WS 16/17):*

**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 and Innovative Decision Making in Marketing [T-WIWI-102618]

**Responsibility:** Bruno Neibecker
**Contained in:** [M-WIWI-101489] Strategy, Communication, and Data Analysis
[M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2571166 | | Übung (Ü) | 1 | Bruno Neibecker |
| SS 2016 | 2571165 | Strategic and Innovative Decision Making in Marketing | Vorlesung (V) | 2 | Bruno Neibecker |

**Learning Control / Examinations**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The examination will be offered latest until winter term 2016/2017 (repeaters only).

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Strategic and Innovative Decision Making in Marketing (SS 2016):*

**Aim**
Students have learned the following outcomes and competences:
- To specify the key terms in strategic management and innovation research, based on methodological and behavioral approaches
- To apply statistical tools to analyze and interpret strategic problems in marketing
- To indentify the main research trends
- To analyze and interpret high level academic articles
- To learn interactive skills to work in teams and to follow a goal-oriented approach
- To gain understanding of methodological research to develop concrete plans for marketing decision-making

**Content**
The course places emphasis on the role of marketing in strategic planning. The planning and implementation stages are discussed using a case study in business portfolio analysis, talking about experience effects, approaches in defining strategic business units. A critical view on market orientation and sustainable competitive advantage is given according to Kumar et al. Further topics are innovation and diffusion models, behavioral approaches to innovative decision processes and a discussion on Porter's single diamond theory and globalization.

**Workload**
The total workload for this course is approximately 140.0 hours. For further information see German version.

**Literature**


- Backhaus, K. und M. Voeth: Industriegütermarketing. München: Vahlen 2010.
- Baier, D. und M. Brusch (Hrsg.): Conjointanalyse. Berlin: Springer 2009.
- Cestre, G. und R. Y. Darmon: Assessing consumer preferences in the context of new product diffusion. In: International Journal of Research in Marketing 15, 1998, 123-135.
- Dunning, J. H.: Internationalizing Porter's Diamond. In: mir Management International Review, Special Issue 1993/2, 7-15.
- Gatignon, H. und T. S. Robertson: Innovative Decision Processes. In: Robertson T. S. und H. H. Kassarjian (Hrsg.), Handbook of Consumer Behavior, Englewood Cliffs: Prentice-Hall 1991.

- Homburg, C. und H. Krohmer: Marketingmanagement. Wiesbaden: Gabler 2009 (4. Aufl. 2012).
- Kuhfeld, W.: Multinomial Logit – Discrete Choice Modeling. SAS Institute, TS-650E (http://support.sas.com4.10.2004)
- Kumar, V., E. Jones, R. Venkatesan und R. P. Leone: Is Market Orientation a Source of Sustainable Competitive Advantage or Simply the Cost of Competing? In: Journal of Marketing 75, 2011, 16-30.
- Lilien, G. L., P. Kotler und K. S. Moorthy: Marketing Models. Englewood Cliffs: Prentice Hall 1992.
- Porter, M. E.: Der Wettbewerb auf globalen Märkten. In: Porter, M. E. (Hrsg.), Globaler Wettbewerb, Gabler 1989, 17-63.
- Porter, M. E.: The Competitive Advantage of Nations. New York: Free Press 1990 (zur Ergänzung).
- Prahalad, C. K.: Weak Signals versus Strong Paradigms. In: Journal of Marketing Research 32, 1995, III-VIII..
- Rugman, A. M. und D'Cruz J. R.: The "Double Diamond" Model of International Competitiveness: The Canadian Experience. In: mir Management International Review, Special Issue 1993/2, 17-39.
- Walker, R.: Analysing the business portfolio in Black & Decker Europe. In: Taylor, B. und J. Harrison (Hrsg.), The Manager's Casebook of Business Strategy, Butterworth-Heinemann: Oxford 1991, 19-36.

## T Course: Strategic Brand Management [T-WIWI-102842]

**Responsibility:** Joachim Blickhäuser, Martin Klarmann
**Contained in:** [M-WIWI-101490] Marketing Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 1,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2571185 | Strategic Brand Management | Block (B) | 1 | Joachim Blickhäuser, Martin Klarmann |

**Learning Control / Examinations**
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

**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. Exception: In summer term 2016 exceptionally two courses can be chosen or, in case one course has already been chosen previously, a second course can be chosen.
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.

*The following informations are from the event Strategic Brand Management (SS 2016):*

**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.

## 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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511602 | Strategic Management of Information Technology | Vorlesung (V) | 2 | Thomas Wolf |
| SS 2016 | 2511603 | | Übung (Ü) | 1 | Thomas Wolf |

### 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

*The following informations are from the event Strategic Management of Information Technology (SS 2016):*

### 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6232808 | | Vorlesung (V) | 2 | Volker Waßmuth |

**Conditions**
none

## T Course: Strategical Aspects of Energy Economy [T-WIWI-102633]

**Responsibility:** Armin Ardone
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581958 | Strategical Aspects of Energy Economy | 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

*The following informations are from the event Strategical Aspects of Energy Economy (WS 16/17):*

**Aim**
Students

- have in-depth knowledge of current and future technologies for power generation,
- know methods and approaches regarding short- to long-term electricity system planning and market modeling - in particular the cost of generating electricity.

**Content**
1) Energy supply
1.1 Basic concepts
1.2 Global supply & demand (oil, coal, gas, electricity)
2) Power plant types
2.1 Thermal power plants
2.2 Renewables
3) Cost of electricity generation
3.1 Cost depending on the investment (CAPEX)
3.2 Operational fixed cost (OPEX)
3.3 Variable cost
3.4 Full cost of power generation
4) Electricity markets
4.1 Development of power markets
5) Energy system planning
5.1 basic concepts
5.2 Drivers
5.3 Stages of power planning
5.4 Short-term optimization: dispatch decisions
5.5 Mid-term optimization: fuel procurement and overhaul planning
5.6 Long-term optimization: additions & Retirements
5.7 Mathematical tools for system planning and market modeling

**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: Structural and Phase Analysis [T-MACH-102170]

**Responsibility:** Susanne Wagner
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2125763 | Structural and phase analysis | Vorlesung (V) | 2 | Susanne Wagner |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Structural and phase analysis (WS 16/17):*

**Aim**
The students know the fundamentals of crystallography, the generation and detection of x-rays as well as their interaction with the microstructure of crystalline materials. They have detailed knowledge about the different methods of x-ray diffraction measurements and are able to analyse x-ray spectra using modern methods of x-ray analysis both qualitatively and quantitatively.

**Content**
The course gives an overview to generation and detection of x-rays as well as their interaction with matter. It provides an introduction to crystallography and describes modern measurement and analysis methods of x-ray diffraction.
It is arranged in the following units:

- Generation and properties of X-Ray's
- Crystallography
- Fundamentals and application of different measuring methods
- Qualitative and quantitative phase analysis
- Texture analysis (pole figures)
- Residual stress measurements

**Workload**
regular attendance: 30 hours
self-study: 90 hours

**Literature**


1. Moderne Röntgenbeugung - Röntgendiffraktometrie für Materialwissenschaftler, Physiker und Chemiker, Spieß, Lothar / Schwarzer, Robert / Behnken, Herfried / Teichert, Gerd B.G. Teubner Verlag 2005
2. H. Krischner: Einführung in die Röntgenfeinstrukturanalyse. Vieweg 1990.
3. B.D. Cullity and S.R. Stock: Elements of X-ray diffraction. Prentice Hall New Jersey, 2001.

## T Course: Structural Ceramics [T-MACH-102179]

**Responsibility:** Michael Hoffmann
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2126775 | Structural Ceramics | Vorlesung (V) | 2 | Michael Hoffmann |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Structural Ceramics (SS 2016):*

**Aim**
The students know the most relevant structural ceramics (silicon carbide, silicon nitride, alumina, boron nitride, zirconia, fibre-reinforced ceramics) and their applications. They are familar with the microstructural features, fabrication methods, and mechanical properties.

**Content**
The lecture gives an overview on structure and properties of the technical relevant structural ceramics silicon nitride, silicon carbide, alumina, zirconia, boron nitride and fibre-reinforced ceramics. All types of structural ceramics will be discussed in detail in terms of preparation methods of the raw materials, shaping techniques, densification, microstructural development, mechanical properties and application fields.

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
W.D. Kingery, H.K. Bowen, D.R. Uhlmann, "Introduction to Ceramics", John Wiley & Sons, New York, (1976)

E. Dörre, H. Hübner, "Aluminia", Springer Verlag Berlin, (1984)

M. Barsoum, "Fundamentals of Ceramics", McGraw-Hill Series in Material Science and Enginewering (2003)

## T Course: Superhard Thin Film Materials [T-MACH-102103]

**Responsibility:** Sven Ulrich
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2177618 | Superhard Thin Film Materials | Vorlesung (V) | 2 | Sven Ulrich |

**Learning Control / Examinations**
oral examination

**Conditions**
none

*The following informations are from the event Superhard Thin Film Materials (WS 16/17):*

**Aim**
Superhard materials are solids with a hardness higher than 4000 HV 0,05. The main topics of this lecture are modelling, deposition, characterization and application of superhard thin film materials.

**Content**
Introduction

Basics

Plasma diagnostics

Particle flux analysis

Sputtering and ion implantation

Computer simulations

Properties of materials, thin film deposition technology,
thin film analysis and modelling of superhard materials

Amorphous hydrogenated carbon

Diamond like carbon

Diamond

Cubic Boronnitride

Materials of the system metall-boron-carbon-nitrogen-silicon

**Workload**
regular attendance: 22 hours
self-study: 98 hours

**Literature**
G. Kienel (Ed.): Vakuumbeschichtung 1 - 5, VDI Verlag, Düsseldorf, 1994

Copies with figures and tables will be distributed

## T Course: Supplementary Claim Management [T-BGU-103428]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101888] Project Management in Construction

| ECTS | Version |
|---|---|
| 1,5 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6241822 | | Vorlesung (V) | 1 | Ralph Bartsch |

**Conditions**
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 | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2117062 | Supply chain management | Vorlesung (V) | 3 | Knut Alicke |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Supply chain management (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 3,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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

*The following informations are from the event Supply Chain Management in the automotive industry (WS 16/17):*

**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-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102805] Service Operations

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 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.

*The following informations are from the event Supply Chain Management in the Process Industry (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 3,5 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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

*The following informations are from the event Supply Chain Management with Advanced Planning Systems (SS 2016):*

**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.

## T Course: Systematic Materials Selection [T-MACH-100531]

**Responsibility:** Stefan Dietrich
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2174577 | | Übung (Ü) | 1 | Mitarbeiter, Stefan Dietrich |
| SS 2016 | 2174576 | Systematic Materials Selection | Vorlesung (V) | 3 | Stefan Dietrich |

**Learning Control / Examinations**
written exam

**Conditions**
none

*The following informations are from the event Systematic Materials Selection (SS 2016):*

**Aim**
The students are able to select the best material for a given application. They are proficient in selecting materials on base of performance indices and materials selection charts. They can identify conflicting objectives and find sound compromises. They are aware of the potential and the limits of hybrid material concepts (composites, bimaterials, foams) and can determine whether following such a concept yields a useful benefit.

**Content**
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are deeloped. The following topics are covered:

- Information and introduction
- Necessary basics of materials
- Selected methods / approaches of the material selection
- Examples for material indices and materials property charts
- Trade-off and shape factors
- Sandwich materials and composite materials
- High temperature alloys
- Regard of process influences
- Material selection for production lines
- Incorrect material selection and the resulting consequences
- Abstract and possibility to ask questions

**Workload**
regular attendance: 33 hours
self-study: 87 hours

**Literature**
Lecture notes; Problem sheets; Textbook: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.);
Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen
Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006
ISBN: 3-8274-1762-7

## T Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

**Responsibility:** Stefan Nickel
**Contained in:** [M-WIWI-101415] Operations Research in Supply Chain Management and Health Care Management
[M-WIWI-102832] Operations Research in Supply Chain Management

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2550486 | | Vorlesung (V) | 2 | Stefan Nickel |
| SS 2016 | 2550487 | | Übung (Ü) | 1 | Brita Rohrbeck, 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.

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

- The course [T-WIWI-105940] *Prerequisite for Tactical and Operational Supply Chain Management* must have been passed.

**Recommendations**
None

**Remarks**
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

*The following informations are from the event (SS 2016):*

**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

## 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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 24168 | Tax Law I | Vorlesung (V) | 2 | Detlef Dietrich |

*The following informations are from the event Tax Law I (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24646 | Tax Law II | Vorlesung (V) | 2 | Detlef Dietrich |

*The following informations are from the event Tax Law II (SS 2016):*

**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: Team Work in the Area of Service Oriented Architectures [T-WIWI-102849]

**Responsibility:** Christof Weinhardt, Gerhard Satzger
**Contained in:** [M-WIWI-101503] Service Design Thinking

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 9 | englisch | Unregelmäßig | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2595600 | Service Design Thinking | Vorlesung (V) | 6 | Christof Weinhardt, Michael Knierim, Gerhard Satzger, Niels Feldmann |

**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**
See German version.

**Remarks**
Due to the project nature of the course, the number of participants is limited. For further information see german version.

*The following informations are from the event Service Design Thinking (SS 2016):*

**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.

## T Course: Technological Change in Energy Economics [T-WIWI-102694]

**Responsibility:** Martin Wietschel
**Contained in:** [M-WIWI-101452] Energy Economics and Technology

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2581000 | Technological Change in Energy Economics | Vorlesung (V) | 2 | Martin Wietschel |

**Learning Control / Examinations**
The assessment consists of a written exam.

**Conditions**
None

**Recommendations**
None

*The following informations are from the event Technological Change in Energy Economics (WS 16/17):*

**Aim**
The student

- has an understanding of innovation theory, innovation economy, and innovation systems,
- has skills in different quantitative method for the forecast of technology change in the energy sector, such as technology cycle models, optimization and simulation models as well as indicators and is able to select the adequate approach depending from the task,
- is able to evaluate most important technological developments in the energy sector (energy supply, energy demand, alternative fuels and propulsion systems in the transport sector, and infrastructure (storage, grids)) from a techno-economic perspective.

**Content**
I. Wichtige Rahmenbedingungen für den technologischen Wandel
Energienachfrageentwicklung und Ressourcensituation
Der Klimawandel und weitere umweltpolitische Herausforderungen
Charakteristika der Energiewirtschaft und Liberalisierung in der Energiewirtschaft
Grundlagen zur Innovationsökonomie
Innovationssytem
II. Methoden zur Abbildung des technologischen Wandels
Wachstumskurven
Einführung in die Modellbildung
Optimiermethoden
Simulationsmethoden
Indikatorik
Foresight und Delphi-Methode
III. Übersicht zu neuen technologischen Entwicklungen
Kernspaltung und -fusion
Konventionelle Kraftwerke
Erneuerbare Kraftwerke
Rationelle Energienutzung
Wasserstoff und Brennstoffzelle
Energy-to-Mobility (Elektromobilität, Biokraftstoffe)

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Wird in der Vorlesung bekannt gegeben.

## T Course: Technologies for Innovation Management [T-WIWI-102854]

**Responsibility:** Daniel Jeffrey Koch
**Contained in:** [M-WIWI-101507] Innovation Management

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2545018 | | Block (B) | 2 | 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.

## Course: Technology Assessment [T-WIWI-102858]

**Responsibility:** Daniel Jeffrey Koch
**Contained in:** [M-WIWI-101507] Innovation Management

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2545017 | | Seminar (S) | 2 | 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-101409] Electronic Markets
[M-WIWI-101406] Network Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2561232 | Telecommunication and Internet Economics | Vorlesung (V) | 2 | Kay Mitusch, Cornelia Gremm |
| WS 16/17 | 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.

*The following informations are from the event Telecommunication and Internet Economics (WS 16/17):*

**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:** Matthias Bäcker
**Contained in:** [M-INFO-101217] Public Business Law

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 24632 | | Vorlesung (V) | 2 | Matthias Bäcker |

*The following informations are from the event (SS 2016):*

**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 Inhalts-dienste. 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 telekommunikation-srechtlichen 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6232807 | | Vorlesung (V) | 2 | Alexander Pischon |

**Conditions**
none

## T Course: Theoretical Sociology [T-GEISTSOZ-101962]

**Responsibility:** Gerd Nollmann
**Contained in:** [M-GEISTSOZ-101169] Sociology

| ECTS | Version |
|---|---|
| 2 | 1 |

**Conditions**
None.

## T Course: Theory of Business Cycles [T-WIWI-102824]

**Responsibility:** Marten Hillebrand
**Contained in:** [M-WIWI-101462] Macroeconomic Theory

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Wintersemester | 1 |

**Learning Control / Examinations**
Please note: There are no further examination dates for this course.
The assessment consists of 60 min. written exam (according to Section 4 (2), 1 of the examination regulation).
Exams are confined to the following dates: Beginning of the recess period (mid February) and beginning of the summer semester (early April).

**Recommendations**
Basic knowledge in micro- and macroeconomics, as conveyed in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014], is assumed.
Participants are expected to bring a strong interest in mathematical economics and quantitative model building.

**Remarks**
All classes will be held in English.

## T Course: Theory of Economic Growth [T-WIWI-102825]

**Responsibility:** Marten Hillebrand
**Contained in:** [M-WIWI-101462] Macroeconomic Theory

| ECTS | Recurrence | Version |
|---|---|---|
| 4,5 | Jedes Sommersemester | 1 |

**Learning Control / Examinations**
Please note: There are no further examination dates for this course.
The assessment consists of a 60 min. written exam (according to Section 4 (2), 1 of the examination regulation).
Examinations are confined to the following dates: At the beginning of the recess period (mid July) and of the winter semester (early October).

**Conditions**
None

**Recommendations**
The courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014] have to be completed beforehand.
According the focus of the course quantitativ-mathematical modelling should be in participiant's interest.

**Remarks**
All classes will be held in English.

## T Course: Theory of Endogenous Growth [T-WIWI-102785]

**Responsibility:** Ingrid Ott
**Contained in:** [M-WIWI-101478] Innovation and growth
[M-WIWI-101462] Macroeconomic Theory
[M-WIWI-101496] Growth and Agglomeration

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2561504 | | Übung (Ü) | 1 | Ingrid Ott, Levent Eraydin |
| WS 16/17 | 2561503 | Theory of endogenous growth | Vorlesung (V) | 2 | 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.

*The following informations are from the event Theory of endogenous growth (WS 16/17):*

### Aim

Students shall be given the ability to understand, analyze and evaluate selected models of endogenous growth theory.

### Content

- Basic models of endogenous growth
- Human capital and economic growth
- Modelling of technological progress
- Diversity Models
- Schumpeterian growth
- Directional technological progress
- Diffusion of technologies

### Workload

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

### Literature

Excerpt:


- Acemoglu, D. (2008): Introduction to modern economic growth. Princeton University Press, New Jersey.
- Aghion, P., Howitt, P. (2009): Economics of growth, MIT-Press, Cambridge/MA.
- Barro, R.J., Sala-I-Martin, X. (2003): Economic Growth. MIT-Press, Cambridge/MA.

- Sydsaeter, K., Hammond, P. (2008): Essential mathematics for economic analysis. Prentice Hall International, Harlow.
- Sydsæter, K., Hammond, P., Seierstad, A., Strom, A., (2008): Further Mathematics for Economic Analysis, Second Edition, Pearson Education Limited, Essex.

## T Course: Tires and Wheel Development for Passenger Cars [T-MACH-102207]

**Responsibility:** Günter Leister
**Contained in:** [M-MACH-101265] Vehicle Development

| ECTS | Recurrence | Version |
|---|---|---|
| 3 | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114845 | Tires and Wheel Development for Passenger Cars | Vorlesung (V) | 2 | Günter Leister |

**Learning Control / Examinations**
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Tires and Wheel Development for Passenger Cars (SS 2016):*

**Aim**
The students are informed about the interactions of tires, wheels and chassis. They have an overview of the processes regarding the tire and wheel development. They have knowledge of the physical relationships.

**Content**

1. The role of the tires and wheels in a vehicle
2. Geometrie of Wheel and tire, Package, load capacity and endurance, Book of requirement
3. Mobility strategy, Minispare, runflat systems and repair kit.
4. Project management: Costs, weight, planning, documentation
5. Tire testing and tire properties
6. Wheel technology incuding Design and manifacturing methods, Wheeltesting
7. Tire presssure: Indirect and direct measuring systems
8. Tire testing subjective and objective

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
Manuscript to the lecture

## T Course: Topics in Experimental Economics [T-WIWI-102863]

**Responsibility:** Johannes Philipp Reiß
**Contained in:** [M-WIWI-101505] Experimental Economics

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4,5 | englisch | Unregelmäßig | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 25602333 | Übungen zu Topics in Experimental Economics | Übung (Ü) | 1 | Martin Schmidt, Johannes Philipp Reiß |
| SS 2016 | 2560232 | Topics in Experimental Economics | Vorlesung (V) | 2 | Martin Schmidt, Johannes Philipp Reiß |

**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 2016 for the first time. The course is not offered in every academic year.

## T Course: Track Guided Transport Systems - Operational Logistics & Management [T-BGU-100060]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101111] Public Transportation Operations

| ECTS | Language | Version |
|---|---|---|
| 6 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6234805 | Management in Public Transport | Vorlesung (V) | 2 | Eberhard Hohnecker |
| SS 2016 | 6234804 | Operation Systems abd Track Guided Infrastructure Capacity | Vorlesung (V) | 2 | Mitarbeiter/innen, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Management in Public Transport (SS 2016):*

**Literature**
Fiedler, Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf
Pachl, Systemtechnik des Schienenverkehrs, Teubner-Verlag, Stuttgart
Janicki, Fahrzeugtechnik, Eisenbahn-Fachverlag, Heidelberg

*The following informations are from the event Operation Systems abd Track Guided Infrastructure Capacity (SS 2016):*

**Content**
- Blocking Time and Minimum Headway Time
- Signal Box Technologies
- Capacity of Railway Infrastructure
- Modelling Operational Processes

**Literature**
Fiedler, Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf
Hausmann, Enders, Grundlagen des Bahnbetriebs, Bahn-Fachverlag, Heidelberg
Pachl, Systemtechnik des Schienenverkehrs, Teubner-Verlag, Stuttgart

## T Course: Track Guided Transport Systems - Technical Design and Components [T-BGU-100052]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101112] Track Guided Transport Systems / Engineering

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6234701 | Track Guided Transport Systems - Technical Design and Components | Vorlesung (V) | 3 | Eberhard Hohnecker |
| WS 16/17 | 6234702 | Exercises in Track Guided Transport Systems - Technical Design and Components | Übung (Ü) | 1 | KIT Mitarbeiter, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Track Guided Transport Systems - Technical Design and Components (WS 16/17):*

**Aim**
Die Studierenden sind in der Lage, das Fachgebiet „Spurgeführte Transportsysteme“ in seiner thematischen Komplexität zu analysieren, Zusammenhänge zu erkennen und daraus bei bei Problemstellungen Lösungsvorschläge zu erarbeiten.

**Content**
- Law, Organisation and History of Railways
- Basics of Running Dynamics
- Construction and Design of Railway Tracks
- Basics of Railway Stations
- Basics of Signal Systems
- Development of Railway Traffic

**Literature**
Zilch, Diederichs, Katzenbach: Handbuch f. Bauingenieure, Springer-Verlag

## T Course: Trademark and Unfair Competition Law [T-INFO-101313]

**Responsibility:** Yvonne Matz
**Contained in:** [M-INFO-101215] Intellectual Property Law

| ECTS | Language | Version |
|---|---|---|
| 3 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 24136 | Trademark and Unfair Competition Law | Vorlesung (V) | 2 | Yvonne Matz |

*The following informations are from the event Trademark and Unfair Competition Law (WS 16/17):*

**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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6232703 | | Vorlesung / Übung (VÜ) | 2 | KIT Mitarbeiter, Peter Vortisch |

**Conditions**
none

## T Course: Traffic Flow Simulation [T-BGU-101800]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6232804 | | Vorlesung / Übung (VÜ) | 2 | Mitarbeiter/innen, Peter Vortisch |

**Conditions**
none

## T Course: Traffic Infrastructure [T-BGU-100066]

**Responsibility:** Eberhard Hohnecker
**Contained in:** [M-BGU-101113] Project in Public Transportation

| ECTS | Language | Version |
|---|---|---|
| 6 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6234811 | Exercises on Determination of Demand, Timetable Construction and Alignment | Übung (Ü) | 2 | Mitarbeiter/innen, Eberhard Hohnecker |
| SS 2016 | 6234810 | Determination of Demand, Timetable Construction and Alignment | Vorlesung (V) | 1 | Mitarbeiter/innen, Eberhard Hohnecker |
| WS 16/17 | 6234904 | Standard Valuation in Public Transport. Using an Example | Übung (Ü) | 1 | KIT Mitarbeiter, Eberhard Hohnecker |

**Conditions**
none

*The following informations are from the event Determination of Demand, Timetable Construction and Alignment (SS 2016):*

**Literature**
Fiedler, Grundlagen der Bahntechnik, Werner-Verlag, Düsseldorf
Hausmann, Enders, Grundlagen des Bahnbetriebs, Bahn-Fachverlag, Heidelberg
Pachl, Systemtechnik des Schienenverkehrs, Teubner-Verlag, Stuttgar

## T Course: Traffic Management and Transport Telematics [T-BGU-101799]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101065] Transportation Modelling and Traffic Management

| ECTS | Version |
| --- | --- |
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
| --- | --- | --- | --- | --- | --- |
| SS 2016 | 6232802 | | Vorlesung / Übung (VÜ) | 2 | Peter Vortisch |

**Conditions**
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 | Version |
|---|---|---|---|
| 4,5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2560230 | Transport Economics | Vorlesung (V) | | Kay Mitusch, Eckhard Szimba |

**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.

**Conditions**
None

*The following informations are from the event Transport Economics (SS 2016):*

**Content**
The course shall provide an overview of transport economic aspects in referance to planning, asessment, and pricing of transport infrastructure. 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:

- Targets, areas and tools of transport policy,
- Project evaluation from the perspective of the public sector,
- Private sector costing and project evaluation,
- Transport system analysis,
- Macroscopic transport modelling,
- Microeconomic transport demand models, particularly logistics models,
- Case studies.

**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)
**Elective 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6232901 | | Vorlesung / Übung (VÜ) | 2 | Martin Kagerbauer |

**Conditions**
none

## T Course: Transportation Systems [T-BGU-101671]

**Responsibility:** Peter Vortisch
**Contained in:** [M-BGU-101064] Fundamentals of Transportation

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6200406 | | Übung (Ü) | | KIT Mitarbeiter, Peter Vortisch |
| SS 2016 | 6200405 | | Vorlesung (V) | 2 | Peter Vortisch |

**Conditions**
none

## T Course: Tunnel Construction and Blasting Engineering [T-BGU-101846]

**Responsibility:** Shervin Haghsheno
**Contained in:** [M-BGU-101110] Process Engineering in Construction

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 6241903 | | Vorlesung (V) | 2 | Leopold Scheuble, Shervin Haghsheno, Ulrich Matz |

**Conditions**
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 | Version |
|---|---|
| 1,5 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6241833 | | Vorlesung (V) | 1 | Klaus Teizer |

**Conditions**
none

# 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 | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6241834 | | Vorlesung / Übung (VÜ) | 2 | Klaus Teizer, Michael Denzer |

**Conditions**
none

## T Course: Urban Material Flows [T-BGU-103564]

**Responsibility:** Stephan Fuchs
**Contained in:** [M-BGU-101001] Water Supply and Sanitation

| ECTS | Version |
|---|---|
| 6 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6223702 | | Vorlesung / Übung (VÜ) | 4 | Stephan Fuchs |

**Conditions**
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 | Version |
|---|---|---|---|
| 4,5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2530213 | | Übung (Ü) | 1 | Peter Limbach, Martin Ruckes |
| WS 16/17 | 2530212 | | Vorlesung (V) | 2 | Martin Ruckes |

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

**Conditions**
None

**Recommendations**
None

*The following informations are from the event (WS 16/17):*

**Content**
Students learn to assess and compare corporate investment projects from a financial point of view.

**Literature**
**Elective Literature**
Titman/Martin (2007): Valuation - The Art and Science of Corporate Investment Decisions, Addison Wesley.

# T Course: Vehicle Comfort and Acoustics I [T-MACH-105154]

**Responsibility:** Frank Gauterin
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113806 | Vehicle Comfort and Acoustics I | Vorlesung (V) | 2 | Frank Gauterin |

**Learning Control / Examinations**
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

**Conditions**
Can not be combined with lecture T-MACH-102206

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

- The course [T-MACH-102206] *Vehicle Ride Comfort & Acoustics I* must not have been started.

*The following informations are from the event Vehicle Comfort and Acoustics I (WS 16/17):*

**Aim**
The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings.
They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

**Content**
1. Perception of noise and vibrations

3. Fundamentals of acoustics and vibrations

3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations

4. The relevance of tire and chasis for the acoustic and mechanical driving comfort:
phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**

1. Michael Möser, Technische Akustik, Springer, Berlin, 2005

2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

3. Manfred Mitschke, Dynamik der Kraftfahrzeuge, Band B: Schwingungen, Springer, Berlin, 1997

The script will be supplied in the lectures

## T Course: Vehicle Comfort and Acoustics II [T-MACH-105155]

**Responsibility:** Frank Gauterin
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114825 | Vehicle Comfort and Acoustics II | Vorlesung (V) | 2 | Frank Gauterin |

### Learning Control / Examinations
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

### Conditions
Can not be combined with lecture T-MACH-102205

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

- The course [T-MACH-102205] *Vehicle Ride Comfort & Acoustics II* must not have been started.

*The following informations are from the event Vehicle Comfort and Acoustics II (SS 2016):*

### Aim
The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

### Content
1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
- phenomena
- influencing parameters
- types of construction
- optimization of components and systems
- conflicts of goals
- methods of development
3. Noise emission of motor vehicles
- noise stress
- sound sources and influencing parameters
- legal restraints

- optimization of components and systems
- conflict of goals
- methods of development

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
The script will be supplied in the lectures.

## T Course: Vehicle Mechatronics I [T-MACH-105156]

**Responsibility:** Dieter Ammon
**Contained in:** [M-MACH-101265] Vehicle Development
[M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 3 | deutsch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2113816 | Vehicle Mechatronics I | Vorlesung (V) | 2 | Dieter Ammon |

**Learning Control / Examinations**
Written examination

Duration: 90 minutes

Auxiliary means: none

**Conditions**
none

*The following informations are from the event Vehicle Mechatronics I (WS 16/17):*

**Aim**
The students have an overview of the system science field of mechatronics and its application in the area of vehicle conception, especially in the context of vehicle system dynamics. They know the tools and methods for a systemactical analysis, conception, and design of mechatronic systems, focussing on mechatronically extended suspension systems. They are ready to analyze, to judge and to optimize mechatronic systems.

**Content**
1. Introduction: Mechatronics in vehicle technology
2. Vehicle Control systems
Brake- and traction controls (ABS, ASR, automated power train controls)
Active and semiactive suspension systems, active stabilizor bars
Vehicle dynamics controls, driver assistence systems
3. Modelling technology
Mechanics - multi body dynamics
Electrical and electronical systems, control systems
Hydraulics
Interdisciplinary coupled systems
4. Computer simulation technology
Numerical integration methods
Quality (validation, operating areas, accuracy, performance)
Simulator-coupling (hardware-in-the-loop, software-in-the-loop)
5. Systemdesign (example: brake control)
Demands, requirements (funktion, safety, robustness)
Problem setup (analysis - modelling - model reduction)
Solution approaches
Evaluation (quality, efficiency, validation area, concept ripeness)

**Workload**
regular attendance: 22,5 hours

self-study: 97,5 hours

**Literature**

1. Ammon, D., Modellbildung und Systementwicklung in der Fahrzeugdynamik, Teubner, Stuttgart, 1997
2. Mitschke, M., Dynamik der Kraftfahrzeuge, Bände A-C, Springer, Berlin, 1984ff
3. Miu, D.K., Mechatronics - Electromechanics and Contromechanics, Springer, New York, 1992
4. Popp, K. u. Schiehlen, W., Fahrzeugdynamik - Eine Einführung in die Dynamik des Systems Fahrzeug-Fahrweg, Teubner, Stuttgart, 1993
5. Roddeck, W., Einführung in die Mechatronik, Teubner, Stuttgart, 1997
6. Zomotor, A., Fahrwerktechnik: Fahrverhalten, Vogel, Würzburg, 1987

## T Course: Vehicle Ride Comfort & Acoustics I [T-MACH-102206]

**Responsibility:** Frank Gauterin
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114856 | Vehicle Ride Comfort & Acoustics I | Vorlesung (V) | 2 | Frank Gauterin |

**Learning Control / Examinations**
Oral examination

**Conditions**
Can not be combined with lecture Fahrzeugkomfort und -akustik I T-MACH-105154

*The following informations are from the event Vehicle Ride Comfort & Acoustics I (SS 2016):*

**Aim**
The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings.
They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

**Content**
1. Perception of noise and vibrations

3. Fundamentals of acoustics and vibrations

3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations

4. The relevance of tire and chasis for the acoustic and mechanical driving comfort:
phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
1. Michael Möser, Technische Akustik, Springer, Berlin, 2005

2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

3. Manfred Mitschke, Dynamik der Kraftfahrzeuge, Band B: Schwingungen, Springer, Berlin, 1997

The script will be supplied in the lectures

## T Course: Vehicle Ride Comfort & Acoustics II [T-MACH-102205]

**Responsibility:** Frank Gauterin
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | englisch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2114857 | Vehicle Ride Comfort & Acoustics II | Vorlesung (V) | 2 | Frank Gauterin |

**Learning Control / Examinations**
Oral examination

**Conditions**
Can not be combined with lecture Fahrzeugkomfort und -akustik II T-MACH-105155

*The following informations are from the event Vehicle Ride Comfort & Acoustics II (SS 2016):*

**Aim**
The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

**Content**
1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
- phenomena
- influencing parameters
- types of construction
- optimization of components and systems
- conflicts of goals
- methods of development

3. Noise emission of motor vehicles
- noise stress
- sound sources and influencing parameters
- legal restraints
- optimization of components and systems
- conflict of goals
- methods of development

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**
The script will be supplied in the lectures.

## T Course: Virtual Engineering I [T-MACH-102123]

**Responsibility:** Jivka Ovtcharova
**Contained in:** [M-MACH-101283] Virtual Engineering A

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 6 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2121352 | Virtual Engineering I | Vorlesung (V) | 2 | Jivka Ovtcharova |
| WS 16/17 | 2121353 | Exercises Virtual Engineering I | Übung (Ü) | 3 | Jivka Ovtcharova, Mitarbeiter |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Virtual Engineering I (WS 16/17):*

**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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2122378 | Virtual Engineering II | Vorlesung (V) | 2 | Jivka Ovtcharova, Mitarbeiter |

**Learning Control / Examinations**
oral exam

**Conditions**
none

*The following informations are from the event Virtual Engineering II (SS 2016):*

**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 Reality Practical Course [T-MACH-102149]

**Responsibility:** Jivka Ovtcharova
**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 |
|---|---|---|---|---|---|
| WS 16/17 | 2123375 | Virtual Reality Practical Course | Praktikum (P) | 3 | Jivka Ovtcharova, Mitarbeiter |

**Learning Control / Examinations**
The assessment is carried out as assessment of another type and is made up of a Presentation of the project work (40%), the individual project participation (30%), a written test (20%) and soft skills (10%).

**Conditions**
none

*The following informations are from the event Virtual Reality Practical Course (WS 16/17):*

**Aim**
The students are able to operate and use virtual reality hardware and software. They can:

- design complex tasks as team members
- solve subtasks in specific work packages keeping the interfaces in mind
- combining all parts to the final product.

**Content**
The lab course consists of:

1. Introduction and basics in virtual reality (hardware, software, application)
2. Introduction in 3DVIA Virtools tool kit as an application development system
3. IMplermentation and practice by developing a driving simulator in small groups.

**Workload**
Präsenszeit: 31,5 Stunden
Selbststudium: 86 Stunden

## 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 | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 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

*The following informations are from the event Warehousing and distribution systems (SS 2016):*

**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 | Version |
|---|---|---|
| 6 | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 22621 | | Vorlesung (V) | 2 | Harald Horn |
| WS 16/17 | 22664 | | Praktikum (P) | 2 | Harald Horn, und Mitarbeiter, Gudrun Abbt-Braun |
| WS 16/17 | 22622 | | Übung (Ü) | 1 | 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 | Language | Version |
|---|---|---|
| 9 | englisch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 22618 | | Vorlesung (V) | 2 | Harald Horn |
| WS 16/17 | 22603 | | Vorlesung (V) | 2 | Gudrun Abbt-Braun |
| WS 16/17 | 22605 | | Vorlesung (V) | 2 | Harald Horn, Florencia Saravia |

**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: Water Resource Management and Engineering Hydrology [T-BGU-101805]

**Responsibility:** Jürgen Ihringer
**Contained in:** [M-WIWI-101642] Natural Hazards and Risk Management 1
[M-WIWI-101644] Natural Hazards and Risk Management 2

| ECTS | Version |
|---|---|
| 3 | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6200617 | | Vorlesung / Übung (VÜ) | 2 | Jürgen Ihringer |

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

**Conditions**
None

## T Course: Water Supply and Sanitation [T-BGU-101788]

**Responsibility:** Stephan Fuchs
**Contained in:** [M-BGU-101001] Water Supply and Sanitation

| ECTS | Language | Version |
|---|---|---|
| 4,5 | deutsch | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 6200603 | | Vorlesung / Übung (VÜ) | 3 | Stephan Fuchs |

**Conditions**
none

## 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 | Version |
|---|---|---|---|
| 5 | englisch | Jedes Wintersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2511312 | Web Science | Vorlesung (V) | 2 | York Sure-Vetter |
| WS 16/17 | 2511313 | Exercises to Web Science | Übung (Ü) | 1 | Tobias Weller, 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.

*The following informations are from the event Web Science (WS 16/17):*

### 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: Welding Technology [T-MACH-105170]

**Responsibility:** Majid Farajian
**Contained in:** [M-MACH-101268] Specific Topics in Materials Science

| ECTS | Language | Recurrence | Version |
|---|---|---|---|
| 4 | deutsch | Jedes Semester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| WS 16/17 | 2173571 | Welding Technology | Vorlesung (V) | 2 | Majid Farajian |

**Learning Control / Examinations**
Oral examination

**Conditions**
none

*The following informations are from the event Welding Technology (WS 16/17):*

**Aim**
The students have knowledge and understanding of the most important welding processes and its industrial application.

They are able to recognize, understand and handle problems occuring during the application of different welding processes relating to design, material and production.

They know the classification and the importance of welding technonolgy within the scope of connecting processes (advantages/disadvantages, alternatives).

**Content**
definition, application and differentiation: welding,
welding processes,
alternative connecting technologies.
history of welding technology
sources of energy for welding processes

Survey: fusion welding,
pressure welding.
seam preparation/design
welding positions
weldability
gas welding, thermal cutting

manual metal-arc welding
submerged arc welding
IV characteristics: arc/sources of energy
gas-shielded metal-arc welding

**Workload**
regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**
Handbuch der Schweißtechnik I bis III
Werkstoffe
Verfahren und Fertigung
Konstruktive Gestaltung der Bauteile
Jürgen Ruge
Springer-Verlag GmbH & Co, Berlin

Schweißtechnische Fertigungsverfahren 1 bis 3
Schweiß- und Schneidtechnologien
Verhalten der Werkstoffe beim Schweißen
Gestaltung und Festigkeit von Schweißkonstruktionen
Ulrich Dilthey (1-3), Annette Brandenburger(3)
Springer-Verlag GmbH & Co, Berlin

Fachbuchreihe Schweißtechnik Band 76/I und II
Killing, R.; Böhme, D.; Hermann, F.-H.
DVS-Verlag

DIN/DVS -TASCHENBÜCHER
Schweißtechnik 1,2 ff. . .
Beuth-Verlag GmbH, Berlin

## T Course: Wildcard Key Competences Seminar 1 [T-WIWI-104680]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 1 | 1 |

## T Course: Wildcard Key Competences Seminar 3 [T-WIWI-104682]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 3 | 1 |

## T Course: Wildcard Key Competences Seminar 4 [T-WIWI-104683]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 1 | 1 |

## T Course: Wildcard Key Competences Seminar 5 [T-WIWI-104684]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
| --- | --- |
| 2 | 1 |

## T Course: Wildcard Key Competences Seminar 6 [T-WIWI-104685]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 3 | 1 |

## T Course: Wildcard Key Competences Seminar 7 [T-WIWI-105955]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
|---|---|
| 4 | 1 |

## T Course: Wildcard Key Competences Seminar 8 [T-WIWI-105956]

**Responsibility:**
**Contained in:** [M-WIWI-101808] Seminar Module

| ECTS | Version |
| --- | --- |
| 4 | 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 | Version |
|---|---|---|---|
| 5 | deutsch | Jedes Sommersemester | 1 |

**Events**

| Term | Event-No. | Events | Type | SWS | Lecturers |
|---|---|---|---|---|---|
| SS 2016 | 2511204 | Workflow-Management | Vorlesung (V) | 2 | Andreas Oberweis |
| SS 2016 | 2511205 | | Übung (Ü) | 1 | Andreas Drescher, 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

*The following informations are from the event Workflow-Management (SS 2016):*

**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.

Universität des Landes Baden-Württemberg und
nationales Forschungszentrum in der Helmholtz-Gemeinschaft

# Amtliche Bekanntmachung

**2015** **Ausgegeben Karlsruhe, den 29. September 2015** **Nr. 91**

**I n h a l t** **Seite**

**Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Masterstudiengang Wirtschaftsingenieurwesen** **777**

# Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Masterstudiengang Wirtschaftsingenieurwesen

**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 Wirtschaftsingenieurwesen beschlossen.

Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 KITG iVm. § 32 Absatz 3 Satz 1 LHG am 24. September 2015 erteilt.

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## 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 Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen 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 | = | befriedi-gend |
| 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.

**(7)** 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.

**(8)** Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

**(9)** 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.

**(10)** Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

**(11)** 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 Bachelorstudiengang Wirtschaftsingenieurwesen, 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 Zusatzleistungen 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 Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen 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 der 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 Ingenieurwissenschaften 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 Wirtschaftsingenieurwesen 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 zuständigen 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. Betriebswirtschaftslehre: | Modul(e) im Umfang von | 18 LP, |
| 2. Volkswirtschaftslehre: | 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. Ingenieurwissenschaften: | Modul(e) im Umfang von | 18 LP, |
| 6. Wahlpflichtbereich: | Modul(e) im Umfang von | 27 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 Wirtschaftsingenieurwesen am KIT im ersten Fachsemester aufnehmen, sowie

2. für Studierende, die ihr Studium im Masterstudiengang Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen vom 06. März 2007 (Amtliche Bekanntmachung des KIT Nr. 34 vom 11. Juni 2007), neu bekannt gemacht durch Satzung vom 06. März 2007 (Amtliche Bekanntmachung des KIT Nr. 52 vom 18. Juli 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 Wirtschaftsingenieurwesen am KIT zuletzt im Sommersemester 2015 aufgenommen haben, sowie

2. für Studierende, die ihr Studium im Masterstudiengang Wirtschaftsingenieurwesen 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 für den Masterstudiengang Wirtschaftsingenieurwesen vom 06. März 2007 (Amtliche Bekanntmachung des KIT Nr. 34 vom 11. Juni 2007, neu bekannt gemacht durch Satzung vom 06. März 2007 (Amtliche Bekanntmachung des KIT Nr. 52 vom 18. Juli 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 Wirtschaftsingenieurwesen

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 Wirtschaftsingenieurwesen beschlossen.

Der Rektor hat seine Zustimmung am 06.03.2007 erteilt.

Aus Gründen der Lesbarkeit ist in dieser Satzung nur die männliche Sprachform gewählt worden. Alle personenbezogenen Aussagen gelten jedoch stets für Frauen und Männer gleichermaßen.

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# I. Allgemeine Bestimmungen

## § 1 Geltungsbereich, Ziele

(1) Diese Masterprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Masterstudiengang Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen 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 nächst bessere 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) über die 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 Wirtschaftsingenieurwesen 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 Wirtschaftsingenieurwesen 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. Betriebswirtschaftslehre: zwei Module im Umfang von je 9 Leistungspunkten,
2. Volkswirtschaftslehre: 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. Ingenieurwissenschaften: zwei Module im Umfang von je 9 Leistungspunkten,
6. Wahlbereich: zwei Module im Umfang von je 9 Leistungspunkten aus den Fächern Betriebswirtschaftslehre, Volkswirtschaftslehre, Informatik, Operations Research, Statistik, Ingenieurwissenschaften, Recht und Soziologie. Auf die Fächer Recht und Soziologie darf dabei 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 Mastergrades

(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 Grades 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 Wirtschaftsingenieurwesen vom 15. November 2001 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 29 vom 24. November 2001), zuletzt geändert durch Satzung vom 4. Juli 2004 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 36 vom 14. Juli 2004) 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 Wirtschaftsingenieurwesen vom 15. November 2001 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 29 vom 24. November 2001) 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 Wirtschaftsingenieurwesen vom 15. November 2001 (Amtliche Bekanntmachung der Universität Karlsruhe (TH), Nr. 29 vom 24. November 2001) 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 Wirtschaftsingenieurwesen

Die Regelstudienzeit im Masterstudiengang Wirtschaftsingenieurwesen 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 (LP) zu den Fächern. Im Wahlpflichtbereich sind zwei Module aus den Fächern Betriebswirtschaftslehre, Volkswirtschaftslehre, Informatik, Operations Research, Ingenieurwissenschaften, Statistik, Recht und Soziologie zu wählen. Auf die Fächer Recht und Soziologie darf aber in Summe höchstens ein Modul entfallen.

<table>
<tr><th>Semester</th><th></th><th></th><th></th><th></th><th>Summe LP</th></tr>
<tr><td>1.</td><td>Modul<br>BWL<br>9</td><td>Modul<br>ING<br>9</td><td>Modul<br>Info<br>9</td><td rowspan="4">Modul Wahlpflicht 9</td><td>30</td></tr>
<tr><td>2.</td><td>Modul<br>VWL<br>9</td><td>Modul<br>ING<br>9</td><td>Modul<br>OR<br>9</td><td>30</td></tr>
<tr><td>3.</td><td>Modul<br>BWL<br>8</td><td>Modul<br>Wahlpflicht<br>9</td><td>Modul<br>Seminare + SQ<br>6 + 3</td><td>30</td></tr>
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