Karlsruher Institut für Technologie

Module Handbook
Economathematics (M.Sc.)

SPO 2009/2016
Summer term 2017
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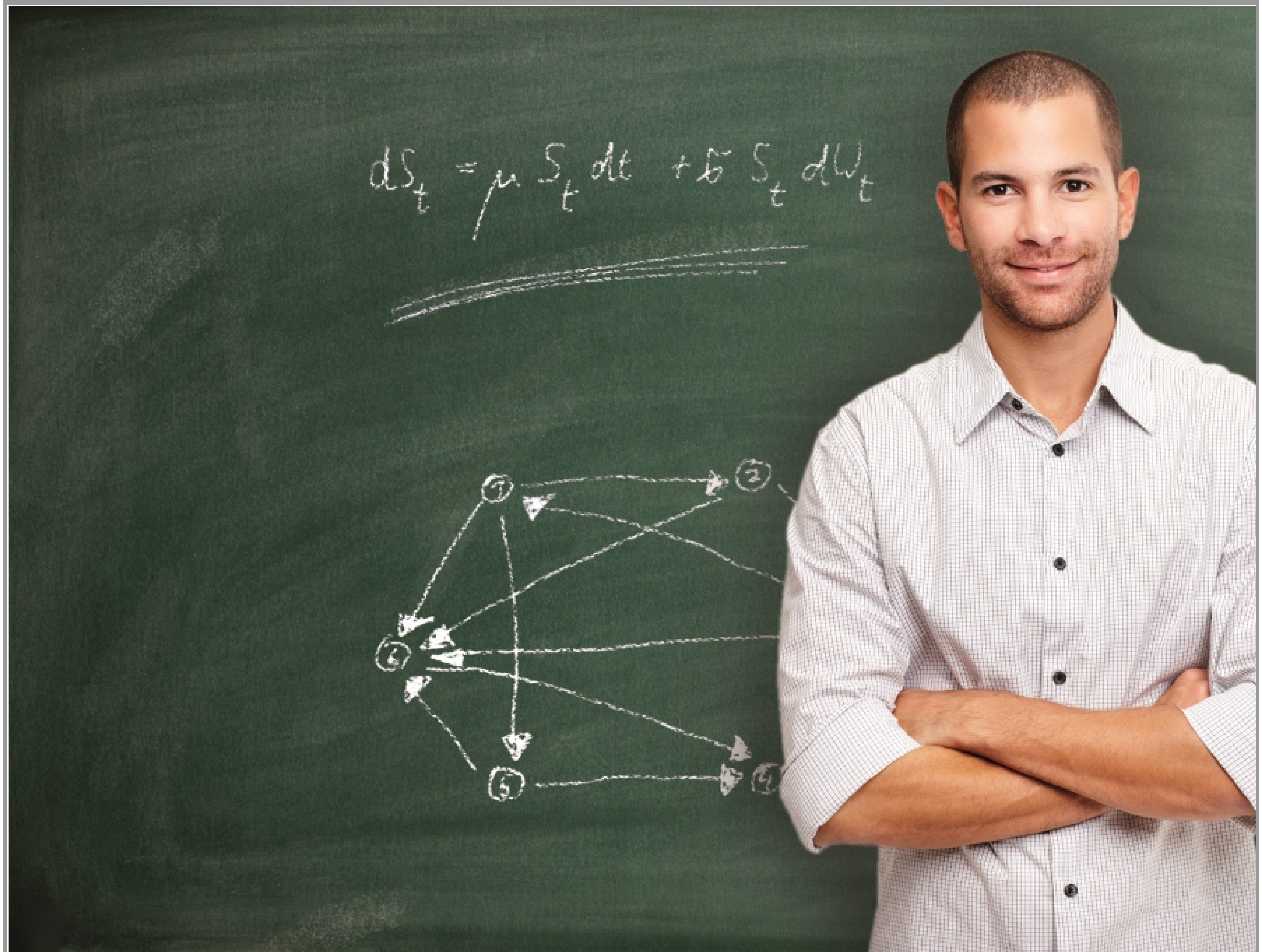
KIT Department of Economics and Business Engineering / KIT Department of Mathematics



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About this handbook

1 New Wiwi-modules

M-WIWI-10335 Machine Learning

Responsible: J. Marius Zöllner
Credits: 9
Part of:

- Information Engineering and Management Master: Informatics

M-WIWI-103278/M-WIWI-103337 Optimization under Uncertainty

Responsible: Steffen Rebennack
Credits: 9
Part of:

- Economics Engineering Bachelor: Compulsory Elective Modules/Compulsory Modules 1+2/Operations Research
- Industrial Engineering and Management Bachelor: Operations Research/Specialisation program, Compulsory Elective Modules/Compulsory Modules 2/Operations Research
- Information Engineering and Management Bachelor: Advanced Studies in Economics and Management/Elective Modules in Economics and Management

M-WIWI-103289 Stochastic Optimization

Responsible: Steffen Rebennack
Credits: 9
Part of:

- Information Engineering and Management Master: Economics and Management/Elective Modules in Economics and Management
- Economics Engineering Master: Operations Research, Compulsory Elective Modules 1+2/Compulsory Modules/Operations Research
- Industrial Engineering and Management Master: Operations Research, Compulsory Elective Modules/Compulsory Modules 1+2/Operations Research
- Economathematics Master: Operations Management - Data Analysis - Informatics, Elective Field

M-WIWI-103243 Optimization under uncertainty in Information Engineering and Management

Responsible: Steffen Rebennack
Credits: 5
Part of:

- Information Engineering and Management Master: Economics and Management/Compulsory Modules

M-WIWI-103200 Designing Interactive Systems

Responsible: Alexander Mädche
Credits: 9
Part of:

- Industrial Engineering and Management Master: Business Administration, Compulsory Elective Modules/Compulsory Modules 1+2/Business Administration

- Economics Engineering Master: Business Administration, Compulsory Elective Modules 1+2/Compulsory Modules/Business Administration
- Information Engineering and Management Master: Economics and Management/Elective Modules in Economics and Management, Economics and Management/Elective Modules in Business Administration

M-WIWI-103247 Intelligent Risk and Investment Advisory

Responsible: Maxim Ulrich
Credits: 9
Part of:

- Industrial Engineering and Management Master: Business Administration, Compulsory Elective Modules/Compulsory Modules 1+2/Business Administration
- Economics Engineering Master: Business Administration, Compulsory Elective Modules 1+2/Compulsory Modules/Business Administration
- Information Engineering and Management Master: Economics and Management/Elective Modules in Economics and Management, Economics and Management/Elective Modules in Business Administration
- Economathematics Master: Finance - Risk Management - Managerial Economics, Elective Field

M-WIWI-103261 Disruptive FinTech Innovations

Responsible: Maxim Ulrich
Credits: 9
Part of:

- Industrial Engineering and Management Master: Business Administration, Compulsory Elective Modules/Compulsory Modules 1+2/Business Administration
- Economics Engineering Master: Business Administration, Compulsory Elective Modules 1+2/Compulsory Modulese/Business Administration
- Information Engineering and Management Master: Economics and Management/Elective Modules in Economics and Management, Economics and Management/Elective Modules in Business Administration
- Economathematics Master: Finance - Risk Management - Managerial Economics, Elective Field

2 Notes and rules

The programme 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 programme. their structure and extent (in CP), their dependencies, their learning outcomes, their learning control and examinations. Therefore it serves as a necessary orientation and as a helpful guide throughout the studies. The module handbook does not replace the **course catalogue**, which provides important information concerning each semester and variable course details (e.g. time and location of the course).

Begin and completion of a module

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

Module versions

It is not uncommon for modules to be revised due to, for example, new courses or cancelled examinations. As a rule, a new module version is created, which applies to all students who are new to the module. On the other hand, students who have already started the module enjoy confidence and remain in the old module version. This students can complete the module on the same conditions as at the beginning of the module (exceptions are regulated by the examination committee). The date of the student's "'binding declaration"' on the choice of the module in the sense of §5(2) of the Study and Examination Regulation is decisive. This binding declaration is made by registering for the first examination in this module.
In the module handbook, all modules are presented in their current version. The version number is given in the module description. Older module versions can be accessed via the previous module handbooks in the archive at http://www.wiwi.kit.edu/Archiv_MHB.php.

General and partial examinations

Module examinations can be either taken in a general examination or in partial examinations. If the module examination is offered as a **general** examination, the entire learning content of the module will be examined in a single examamination. If the module examination is subdivided into **partial** examinations, the content of each course will be examined in corresponding partial examinations. Registration for examinations can be done online via the self-service function for students (https://campus.studium.kit.edu/).
For students of the master programme the registration currently takes place at the **advisory service** of the faculty or at the respective institutes.

Types of exams

Following **SPO 2015** exams are split into written exams, oral exams and alternative exam assessments. Exams are always graded. Non exam assessments can be repeated several times and are not graded. According to **SPO 2007/2009** exams are split into written exams, oral exams and non exam assessments. Non exam assessments are graded or not.

Repeating exams

Principally, a failed written exam, oral exam or alternative exam assessment can repeated only once. If the **repeat examination** (including an eventually provided verbal repeat examination) will be failed as well, the **examination claim** is lost. A request for a second repetition has to be made in written form to the examination comitee two months after loosing the examination claim. A counseling interview is mandatory.
For further information see http://www.wiwi.kit.edu/hinweiseZweitwdh.php.

Bonus accomplishments and additional accomplishments

Bonus accomplishments can be achieved on the basis of entire modules or within modules, if there are alternatives at choice. Bonus accomplishments can improve the module grade and overall grade by taking into account only the best possible combination of all courses when calculating the grades. The student has to declare a Bonus accomplishment as such at the time of registration for the exams. Exams, which have been registered as Bonus accomplishments, are subject to examination regulations. Therefore, a failed exam has to be repeated. Failing the repeat examination implies the loss of the examination claim.
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. Up to 2 modules with a minimum of 9 CP may appear additionally in the certificate. After the approval of the examination committee, it is also possible to include modules in the certificate, which are not defined in the module handbook. Single additional courses will be recorded in the transcript of records. Courses and modules, which have been declared as bonus accomplishments, can be changed to additional accomplishments.

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).

3 Online Version

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

- Industrial Engineering and Management (B.Sc.): http://www.wiwi.kit.edu/english/mhbWiingBsc_en.php
- Industrial Engineering and Management (M.Sc.): http://www.wiwi.kit.edu/english/mhbWiingMsc_en.php
- Economics Engineering (B.Sc.): http://www.wiwi.kit.edu/english/mhbTVWLBsc_eng.php
- Economics Engineering (M.Sc.): http://www.wiwi.kit.edu/english/mhbTVWLMsc_en.php
- Information Engineering and Management (B.Sc.): http://www.wiwi.kit.edu/english/mhbInwiBsc_en.php
- Information Engineering and Management (M.Sc.): http://www.wiwi.kit.edu/english/mhbInwiMsc_en.php
- Economathematics (M.Sc.): http://www.wiwi.kit.edu/english/mhbWimaMsc_en.php

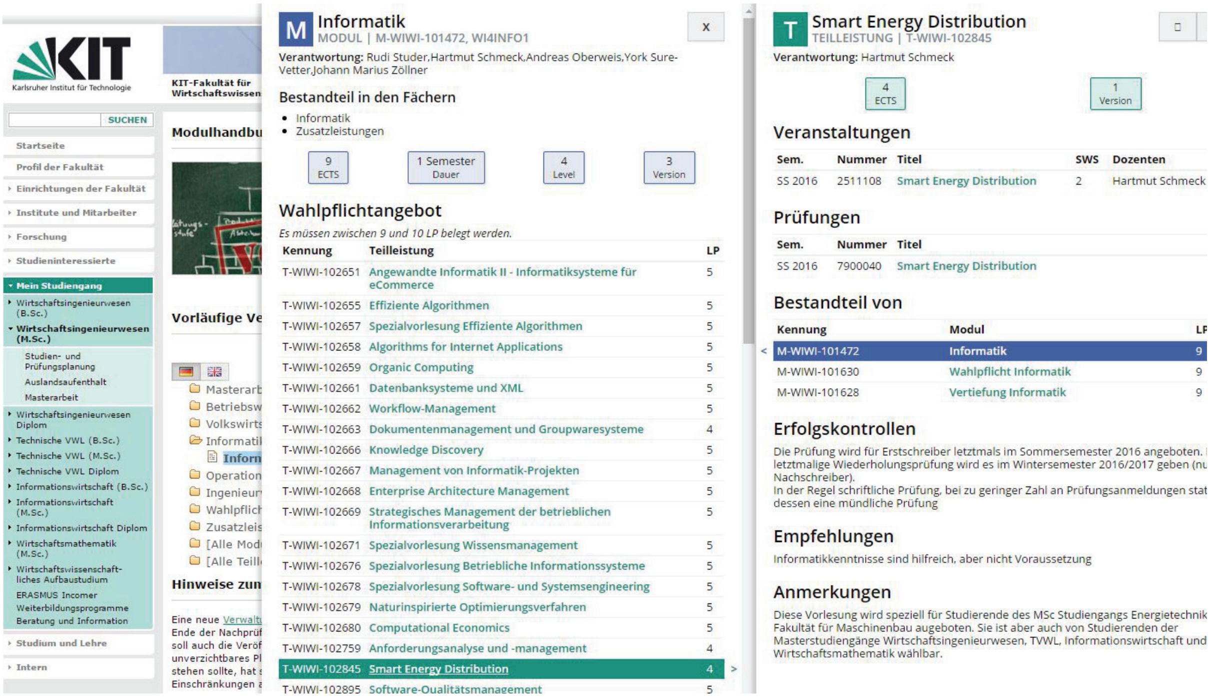

Figure 1: Screenshot of the webbased module handbook

4 Contact

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

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If you have any questions about modules or exams with **MATH**-ID, please contact at the KIT Department of Mathematics:

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Part II
The Master's degree program in Economathematics

1 Study plan according to SPO 2016

Preface

This study plan is intended to supplement the study and examination regulations of the Master's degree program in Economathematics, and to provide students with concrete examples of the organization of their studies.

1. Qualification objectives and profile of the degree program

The aim of the interdisciplinary Master's degree program in Economathematics is the qualification for a professional activity in the areas of industry, banking, insurance, logistics, software development and research. Through the research-oriented training, the graduates are prepared especially for lifelong learning.

Professional key qualifications

Graduates have a broad knowledge of mathematical and economic sciences, including specific methods and techniques in the fields of analysis / numerics / optimization, stochastics, finance / risk management / managerial economics and operations management / data analysis / Informatics. They are able to analyze and explain current, complex questions in these areas. They can use methods from economics and mathematics, combine them and work interdisciplinarily. Based on these methods, they are able to handle practical and research-relevant questions. Graduates have trained analytical thinking and can work independently and reflectively. They are also able to acquire additional knowledge for further questions themselves.

Interdisciplinary qualifications

Graduates can analyze, evaluate and solve problems in new and unfamiliar situations, which are in a multidisciplinary context. They are able to integrate their knowledge independently, deal with high complexity, and they have endurance in solving difficult problems. The results obtained are documented, illustrated and interpreted. They always take into account social, scientific and ethical conditions. They can argue, argue and defend a position with experts as well as with laymen, on problems and solutions at a scientific level. In addition, they have the ability to work in a team and can use their knowledge effectively.

Learning outcomes

The graduates can name, explain and apply deepening mathematical methods in economics. They are also able to identify the application of these methods. The graduates have an understanding of economic processes and can relate to economic issues. They will gain an in-depth understanding of mathematical methods in the fields of analysis / numerics / optimization and stochastics.

2. Structure of the degree program

The courses are held in the form of modules, with most modules consisting of at least one course (with or without an exercise) or a seminar. Each module closes with a learning control. The average workload is measured in credit points (CP). In general, modules are graded. The grade is included in the final score. The master thesis consists of a separate module with 30 CP. In total, 120 credits must be earned in the Master's degree, approximately evenly distributed over four semesters.
The Master's degree in Economathematics is based on the two subjects *Mathematics* and *Economics and Management*, which are offered by the respective departments. Modules from both disciplines must be selected as follows.

1. Subject Mathematical Methods

There are the following four mathematical domains:

1. Stochastics
2. Applied and Numerical Mathematics / Optimization
3. Analysis
4. Algebra and Geometry

A minimum of 36 credits must be purchased, with 8 credits from the field of Stochastics and 8 credits from one of the fields of Applied and Numerical Mathematics / Optimization or Analysis. The remaining credits must be proved by means of any examination from the four mathematical fields. The modules belonging to the areas can be found in the module handbook.

2. Finance - Risk Management - Managerial Economics

18 CP from must be aquired. The modules belonging to the areas can be found in the module handbook.

3. Operations Management - Data Analysis - Informatics

18 CP from must be aquired. The modules belonging to the areas can be found in the module handbook.

Seminars

Furthermore, two seminar modules with 3 CP have to be taken. Each one has to be chosen from the two subjects Mathematics and Economics and Management.

Electives

A further 12 credits are to be provided flexibly from the above-mentioned mathematical or economics modules or as a maximum of one seminar in Economics and Management. In particular, this gives the possibility of professional deepening in preparation for the Master Thesis. All modules in the elective area must be graded.

Master Thesis

The Master Thesis is usually written in the fourth semester and has 30 credits. Prerequisite for admission to the Master Thesis module is that the student successfully completed module examinations of 70 credits. The Master Thesis can be supervised in both participating departments and should, as far as possible, deal with a topic relevant to content and methodology for economic mathematics. A prerequisite is an appropriate deepening in the subject area of the work.

3. Key qualifications

Part of the degree program is also the acquisition of key and superficial qualifications. This area includes over-arching events on social topics, complementary scientific programs, the application of specialist knowledge in the field of work, competence training for the targeted training of soft skills as well as foreign language training in the scientific context.
The master's degree program in Economathematics at the Departments for Mathematics and Economics and Management is characterized by an exceptionally high degree of interdisciplinarity. With the combination of mathematical and economics subjects, the acquisition of knowledge from different disciplines is an integral part of the course. Interdisciplinary thinking in connections is thereby naturally promoted. In addition, the seminars of the Master's degree program contribute significantly to the promotion of the soft skills by the training of scientifically highly qualified editing and presentation of special topics.
The key competencies integrally shared within the degree program can be assigned to the following areas:

Basic skills (soft skills)

1. Teamwork, social communication and creativity techniques (for example, working in small groups, working together on the homework and reworking the course material)
2. Presentation creation and techniques
3. Logical and systematic argumentation and writing (for example, in exercises, seminars, courses and writing homework)
4. Structured problem solving and communication

Practice orientation (enabling skills)

1. Empowerment in a professional context
2. Competences in project management
3. Business basic knowledge
4. English as a technical language

Orientation knowledge

1. Mediation of interdisciplinary knowledge
2. Institutional knowledge about economic and legal systems
3. Knowledge about international organizations
4. Media, technology and innovation

In addition to the integrative placement of key qualifications, the additional acquisition of key qualifications with a minimum of 3 credit points is envisaged. Courses that provide the necessary competencies are summarized in the module for key qualifications and are regularly updated in the relevant module description of the module handbook. This list is coordinated with the House of Competence.

4. Exemplary study courses

The following versions are just a few of the many options of available study courses.

version 1

Semester 1: 30 CP, 5 Examinations

Subject 1: Analysis 8 CP, Stochastics 8 CP, choice 5 CP = 21 CP
Subject 2: Finance 1 9 CP (SS) and Insurance Management I 9 CP (WS)

Semester 2: 28 CP, 6 Examinations

Subject 1: Choice 6 CP + Choice 4 CP (or 5 + 5 or 7 + 5) = 10 CP
Subject 2: Finance 2 9 CP (WS) or Finance 1 (SS)
Subject 3: Informatics 9 CP

Semester 3: 32 CP, 6 Examinations, 1 Non exam assessment

Subject 1: choice 5 CP
Subject 3: Stochastic Methods and Simulation 9 CP
Subject 4: 3 CP (Seminar WiWi)
Subject 5: 3 CP (Seminar Math)
Optional compulsory: 8 CP + 4 CP (or other denomination) = 12 CP

Semester 4: 30 CP

Master Thesis

version 2

Semester 1: 33 CP, 5 Examinations

Subject 1: Analysis 8 CP, Stochastics 8 CP, choice 8 CP = 24 CP
Subject 2: Finance 1 9 CP (SS) and Insurance Management I 9 CP (WS)

Semester 2: 30 CP, 6 Examinations

Subject 1: Option 8 CP + choice 4 CP (or other denomination like 6 + 6 or 7 + 5) = 12 CP
Subject 2: Finance 2 9 CP (WS) or Finance 1 (SS)
Subject 3: Informatics 9 CP

Semester 3: 27 CP, 5 Examinations, 1 Non exam assessment

Subject 3: Stochastic Methods and Simulation 9 CP
Subject 4: 3 CP (Seminar WiWi)
Subject 5: 3 CP (Seminar Math)
Optional: 8 CP + 4 CP (or other denomination such as 6 + 6 or 7 + 5) = 12 CP

Semester 4: 30 CP

Master Thesis

version 3

Semester 1: 30 CP, 5 Examinations

Subject 1: Analysis 8 CP, Stochastics 8 CP, choice 5 CP = 21 CP
Subject 2: Finance 1 9 CP

Semester 2: 30 CP, 6 Examinations, 1 Non exam assessment

Subject 2: Finance 2 9 CP
Subject 3: Informatics 9 CP, Stochastic Methods and Simulation 9 CP = 18 CP
Subject 5: 3 CP (Seminar Math)

semester 3: 30 credits, 5 - 6 Examinations (depending on denomination)

Subject 1: Option 15 CP (conceivable in various forms, for example 5 + 5 + 5, 8 + 7, 6 + 4 + 5)
Optional compulsory: 12 CP (e.g., 8 + 4 CP or 9 + 3 CP)
Subject 4: 3 CP (Seminar WiWi)

Semester 4: 30 CP

Master Thesis

Version 4: Beginning summer term (with very concrete, possible choice)

Semester 1: 29 CP, 5 Examinations

Subject 1: Introduction to Scientific Computing (Numerics and Applied Mathematics) 8 CP, Mathematics of Financial Mathematics in Stochastics 8 CP, Time Series (Stochastics) 4 CP = 20 CP
Subject 2: Finance 1: Derivatives 4.5 CP, Asset Pricing 4.5 CP = 9 CP

Semester 2: 30 CP, 5 Examinations

Subject 1: Functional Analysis (Analysis) 8 CP, Spatial Stochastics (Stochastics) (8 CP) = 16 CP
Subject 2: Finance 2: Fixed-income securities 4.5 CP, Credit Risks 4.5 CP = 9 CP
Subject 3: Informatics: Algorithms for Internet Applications 5 CP

Semester 3: 31 CP, 6 Examinations, 1 Non exam assessment

Subject 3: Informatics: Smart Energy Distribution 4 CP
Subject 3: Operations Research in Supply Chain Management and Healthcare Management: Tactical and Operational Supply Chain Management 4.5 CP + Event Discrete Simulation in Production and Logistics 4.5 CP = 9 CP
Subject 4: Seminar WiWi 3 CP (examination)
Subject 5: Seminar Math 3 CP (non exam assessment)
Optional subject: Stochastic Geometry (Stochastics) 8 CP, Generalized Regression Models (Stochastics) 4 CP = 12 CP

Semester 4: 30 CP

Master Thesis

Version 5: Beginning summer term (with very concrete, possible choice)

Semester 1: 29 CP, 5 Examinations

Subject 1: Introduction to Scientific Computing (Numerics and Applied Mathematics) 8 CP, Mathematics of Financial Mathematics in Stochastics 8 CP, Time Series (Stochastics) 4 CP = 20 CP
Subject 2: Finance 1: Derivatives 4.5 CP, Asset Pricing 4.5 CP = 9 CP

Semester 2: 33 CP, 5 Examinations, 1 Non exam assessment

Subject 1: Functional analysis (analysis) 8 CP, asymptotic stochastics (stochastics) 8 CP = 16 CP
Subject 2: Finance 2: Fixed-income securities 4.5 CP, credit risks 4.5 CP = 9 CP
Subject 3: Informatics: Algorithms for Internet Applications 5 CP
Subject 5: 3 CP (Seminar math) 3 CP (Non exam assessment)

Semester 3: 28 CP, 6 Examinations

Subject 3: Informatics: Smart Energy Distribution 4 CP
Subject 3: Operations Research in Supply Chain Management and Health Care Management: Tactical and Operational Supply Chain Management 4.5 CP + Event Discrete Simulation in Production and Logistics 4.5 CP = 9CP
Subject 4: Seminar WiWi 3 CP (examination)
Optional subject: boundary and eigenvalue problems (analysis) 8 CP, generalized regression models (stochastics) 4 CP = 12 CP

Semester 4: 30 CP

Master Thesis

Version 6: Beginning winter term (with very concrete, possible choice)

Semester 1: 31.5 CP, 5 Examinations

Subject 1: Functional Analysis (Analysis) 8 CP, Financial Mathematics in Discrete Time (Stochastics) 8 CP, Algebra 8 CP = 24 CP
Subject 2: Finance 1: Valuation 4.5 CP
Subject 4: Seminar WiWi 3 CP

Semester 2: 32.5 CP, 6 Examinations

Subject 1: Financial Mathematics in Steadfast Time (Stochastics) 8 CP, Time Series (Stochastics) 4 CP = 12 CP
Subject 2: Finance 1: Derivatives 4.5 CP
Subject 3: Informatics: Document Management and Groupware Systems 4 CP
Scope: Limitations and eigenvalue problems (analysis) 8 CP, Generalized regression models (stochastics) 4 CP = 12 CP

semester 3: 26 CP, 5 Examinations, 1 study achievement

Subject 2: Finance 2: Financial Intermediation 4.5 CP + eFinance: Information Management for Securities Trading 4.5 CP = 9 CP
Subject 3: Informatics: Algorithms for Internet Applications 5 CP
Subject 3: Operations Research in Supply Chain Management and Healthcare Management: Location Planning and Strategic Supply Chain Management 4.5 CP + Supply Chain Management in the Process Industry 4.5 CP = 9 CP
Subject 5: Seminar Math 3 CP

Semester 4: 30 CP

Master Thesis

Version 7: Beginning winter term (with very concrete, possible choice)

Semester 1: 31.5 CP, 5 Examinations

Subject 1: Functional Analysis (Analysis) 8 CP, Financial Mathematics in Discrete Time (Stochastics) 8 CP, Algebra 8 CP = 24 CP
Subject 2: Finance 1: Valuation 4.5 CP
Subject 4: Seminar WiWi 3 CP

Semester 2: 32.5 CP, 6 Examinations

Subject 1: Financial Mathematics in Steadfast Time (Stochastics) 8 CP, Time Series (Stochastics) 4 CP = 12 CP
Subject 2: Finance 1: Derivatives 4.5 CP
Subject 3: Informatics: Document Management and Groupware Systems 4 CP
Compulsory subject: Introduction to scientific computing (numerics and applied mathematics) 8 CP, Generalized Regression Models (Stochastics) 4 CP = 12 CP

Semester 3: 26.5 CP, 5 Examinations, 1 Non exam assessment

Subject 2: Finance 2: Financial Intermediation 4.5 CP + eFinance: Information Management for Securities Trading 4.5 CP = 9 CP
Subject 3: Informatics: Algorithms for Internet Applications 5 CP
Subject 3: Operations Research in Supply Chain Management and Healthcare Management: Location Planning and Strategic Supply Chain Management 4.5 CP + Supply Chain Management in the Process Industry 4.5 CP = 9 CP
Subject 5: Seminar Math 3 CP

Semester 4: 30 CP

Master Thesis

Version 8: Beginning winter term (with very concrete, possible choice)

Semester 1: 31.5 CP, 5 Examinations

Subject 1: Functional Analysis (Analysis) 8 CP, Financial Mathematics in Discrete Time (Stochastics) 8 CP, Algebra 8 CP = 24 CP
Subject 2: Finance 1: Valuation 4.5 CP
Subject 4: Seminar WiWi 3 CP

Semester 2: 29.5 CP, 6 Examinations

Subject 1: Financial Mathematics in Steadfast Time (Stochastics) 8 CP, Time Series (Stochastics) 4 CP = 12 CP
Subject 2: Finance 1: Derivatives 4.5 CP
Subject 3: Informatics: Document Management and Groupware Systems 4 CP + Efficient Algorithms 5 CP = 9 CP
Compulsory subject: Generalized regression models (stochastics) 4 CP

Semester 3: 29 CP, 5 Examinations, 1 Non exam assessment

Subject 2: Finance 2: Financial Intermediation 4.5 CP + eFinance: Information Management for Securities Trading 4.5 CP = 9 CP
Subject 3: Operations Research in Supply Chain Management: Graph Theory and Advanced Location Models 4.5 CP, Site Planning and Strategic Supply Chain Management 4.5 CP = 9 CP
Subject 5: Seminar Math 3 CP
Required field: differential geometry (algebra and geometry) 8 CP

Semester 4: 30 CP

Master Thesis

Version 9: Beginning winter term (with very concrete, possible choice)

Semester 1: 31.5 CP, 5 Examinations

Subject 1: Functional Analysis (Analysis) 8 CP, Financial Mathematics in Discrete Time (Stochastics) 8 CP, Algebra 8 CP = 24 CP
Subject 2: Insurance Management I: Insurance Production 4.5 CP
Subject 4: Seminar WiWi 3 CP

Semester 2: 29.5 CP, 6 Examinations

Subject 1: Financial Mathematics in Steadfast Time (Stochastics) 8 CP, Time Series (Stochastics) 4 CP = 12 CP
Subject 2: Insurance Management I: Insurance Marketing 4.5 CP
Subject 3: Stochastic modeling and optimization: Simulation I 4,5 CP + Simulation II 4,5 CP = 9 CP
Required field: Computer science: Smart Energy Distribution 4 CP

Semester 3: 29 CP, 6 Examinations, 1 Non exam assessment

Subject 2: Decision-making and game theory: auction theory 4.5 CP + experimental economic research 4,5 CP = 9 CP
Subject 3: Operations Research in Supply Chain Management: Graph Theory and Advanced Location Models 4.5 CP, Site Planning and Strategic Supply Chain Management 4.5 CP = 9 CP
Subject 5: Seminar Math 3 CP
Required field: Informatics: Knowledge Discovery 5 CP + Seminar Informatik B (Master) 3 CP = 8 CP

Semester 4: 30 CP

Master Thesis

2 Study plan according to SPO 2009

Preface

This study plan is intended to supplement the study and examination regulations of the Master's degree program in Economathematics, and to provide students with concrete examples of the organization of their studies.

1. Qualification objectives and profile of the degree program

The aim of the interdisciplinary Master's degree program in Economathematics is the qualification for a professional activity in the areas of industry, banking, insurance, logistics, software development and research. Through the research-oriented training, the graduates are prepared especially for lifelong learning.

Professional key qualifications

Graduates have a broad knowledge of mathematical and economic sciences, including specific methods and techniques in the fields of analysis / numerics / optimization, stochastics, finance / risk management / managerial economics and operations management / data analysis / Informatics. They are able to analyze and explain current, complex questions in these areas. They can use methods from economics and mathematics, combine them and work interdisciplinarily. Based on these methods, they are able to handle practical and research-relevant questions. Graduates have trained analytical thinking and can work independently and reflectively. They are also able to acquire additional knowledge for further questions themselves.

Interdisciplinary qualifications

Graduates can analyze, evaluate and solve problems in new and unfamiliar situations, which are in a multidisciplinary context. They are able to integrate their knowledge independently, deal with high complexity, and they have endurance in solving difficult problems. The results obtained are documented, illustrated and interpreted. They always take into account social, scientific and ethical conditions. They can argue, argue and defend a position with experts as well as with laymen, on problems and solutions at a scientific level. In addition, they have the ability to work in a team and can use their knowledge effectively.

Learning outcomes

The graduates can name, explain and apply deepening mathematical methods in economics. They are also able to identify the application of these methods. The graduates have an understanding of economic processes and can relate to economic issues. They will gain an in-depth understanding of mathematical methods in the fields of analysis / numerics / optimization and stochastics.
In the profile *Financial Engineering*, graduates have a broad knowledge of financial mathematical models and methods as well as financial concepts and concepts. This enables them to analyze complex and innovative tasks in this area and to assess the results.
In the Profile *Operations Research*, graduates acquire a broad knowledge of mathematical and economic models and methods of corporate management. This enables them to analyze complex and innovative tasks in this area and to assess the results.

2. Structure of the degree program

The courses are held in the form of modules, with most modules consisting of at least one course (with or without an exercise) or a seminar. Each module closes with a learning control. The average workload is measured in credit points (CP). In general, modules are graded. The grade is included in the final score. The master thesis consists of a separate module with 30 CP. In total, 120 credits must be earned in the Master's degree, approximately evenly distributed over four semesters.
The Master's degree in Economathematics is based on the two subjects *Mathematics* and *Economics and Management*, which are offered by the respective departments. Modules from both disciplines must be selected as follows.

Subject Mathematics

There are the following four mathematical domains:

1. Stochastics
2. Applied and Numerical Mathematics / Optimization
3. Analysis
4. Algebra and Geometry

A minimum of 36 credits must be purchased, with 8 credits from the field of Stochastics and 8 credits from one of the fields of Applied and Numerical Mathematics / Optimization or Analysis. In the Financial Engineering study profile, there must be a minimum of 8 additional points in the field of Stochastics. The remaining 20 credits (or 12 credits in the study profile of Financial Engineering) must be proved by means of any examination from the four mathematical fields.

Subject Business economics

18 CP from each of the two areas must be aquired:

1. Finance - Risk Management - Managerial Economics
2. Operations Management - Data Analysis - Informatics

Seminars

Furthermore, two seminar modules with 3 CP have to be taken. Each one has to be chosen from the two subjects Mathematics and Economics and Management.

Electives and key qualifications

A further 12 CP are flexible. In particular, this gives the possibility of professional deepening in preparation for the master thesis. At least 8 of the 12 credits have to come from the above-mentioned mathematical or economics modules or from a vocational internship. At least 3 credits must be provided by key qualifications.

Master Thesis

The Master Thesis is usually written in the fourth semester and has 30 credits. It can be supervised in both participating departments and should, as far as possible, deal with a topic relevant to content and methodology for economic mathematics. A prerequisite is an appropriate deepening in the subject area of the work.

3. Definition of the study profile

One of the three possible study profiles *Financial Engineering* or *Operations Research* or *Classical Economic Mathematics* is chosen in the Master's degree in Economathematics. While the last profile offers maximum flexibility in assembling the modules, the two other study profiles are focused on the choice of modules from specific areas. The scope and content for the individual study profiles are specified below. In the field of Mathematics, the module names correspond to the course names, while in Economics and Management usually different courses can be combined into one module. The combinations are described in the module handbook.

Study Profile Financial Engineering

In the study profile *Financial Engineering*, courses from modern Stochastics and Analysis of the Department of Mathematics are combined with method-oriented courses from the financial services offered by the Department of Economics and Management. The special role of stochastics in this course is emphasized by the binding choice of 16 credits from this area from the list below. The compulsory 8 credits in Applied and Numerical Mathematics / Optimization or Analysis should also be taken from the list below. The following lists are also available for the 18 credits from the fields of Finance-Risk Management-Managerial Economics and Operations Management-Data Analysis-Informatics.
Additional modules may be approved upon request to the "Prüfungsausschuss". For the remaining 12 credits from Mathematics, modules can be selected from the entire mathematical offer of the module handbook.

Stochastics (16 CP)

Applied and Numerical Mathematics / Optimization or Analysis (8 CP)

Finance - Risk Management - Managerial Economics (18 CP)

Operations Management - Data Analysis - Informatics (18 CP)

Study Profile Operations Research

In the profile *Operations Research*, courses of modern optimization and high-performance calculations from the Department of Mathematics are combined with method-oriented courses in Operations Research and Data Analysis from the Department of Economics and Management.
The following modules are intended for compulsory 8 credits in Stochastics and / or Applied and Numerical Mathematics / Optimization or Analysis. The following lists are also available for the 18 credits from the fields of Finance-Risk Management-Managerial Economics and Operations Management-Data Analysis-Informatics.

Additional modules may be approved upon request to the "Prüfungsausschuss". For the remaining 20 credits from Mathematics, modules can be chosen from the entire mathematical offer of the module handbook.

Stochastics (8 CP)

Applied and Numerical Mathematics / Optimization or Analysis (8 CP)

Finance - Risk Management - Managerial Economics (18 CP)

Operations Management - Data Analysis - Informatics (18 CP)

Study profile Classical Economathematics

In the study profile *Classical Economathematics*, the greatest flexibility exists in the choice of modules. Details of the offer can be found in the module handbook.

4. Module Overlaps and Duties

For certain modules, the content overlap is very large. Therefore, the following exclusion rules apply:

- If the module *Markov-Chains* is integrated from the bachelor's mathematics, none of the courses *Stochastic decision models I and II* in the modules *Stochastic Methods and Simulation* and *Stochastic Modeling and Optimization* can be selected.
- If the module *Numerical Optimization Methods* is integrated, none of the courses *Nonlinear Optimization I* and *II* can be selected in the modules *Methodical Principles of OR* and *Mathematical Optimization*.
- If the module *Game Theory* is integrated into the subject Mathematics, the course *Introduction to the game theory* within the modules *Decision and Game Theory*, *Mathematical Optimization*, *OR in Supply Chain Management and Health Care Management* and *Stochastic Modeling and Optimization* may not be selected.

For the module *Energy Economy and Technology*, the assignment of the course *Energy System Analysis* is mandatory for the study program of Economathematics. For the module *Marketing Management*, the assignment of the courses *Product and Innovation Management* and *Market Research* is obligatory for the degree program in Economathematics.

5. Key qualifications

Part of the degree program is also the acquisition of key and superficial qualifications. This area includes over-arching events on social topics, complementary scientific programs, the application of specialist knowledge in the field of work, competence training for the targeted training of soft skills as well as foreign language training in the scientific context.
The master's degree program in Economathematics at the Departments for Mathematics and Economics and Management is characterized by an exceptionally high degree of interdisciplinarity. With the combination of mathematical and economics subjects, the acquisition of knowledge from different disciplines is an integral part of the course. Interdisciplinary thinking in connections is thereby naturally promoted. In addition, the seminars of the Master's degree program contribute significantly to the promotion of the soft skills by the training of scientifically highly qualified editing and presentation of special topics.
The key competencies integrally shared within the degree program can be assigned to the following areas:

Basic skills (soft skills)

1. Teamwork, social communication and creativity techniques (for example, working in small groups, working together on the homework and reworking the course material)
2. Presentation creation and techniques
3. Logical and systematic argumentation and writing (for example, in exercises, seminars, courses and writing homework)
4. Structured problem solving and communication

Practice orientation (enabling skills)

1. Empowerment in a professional context
2. Competences in project management
3. Business basic knowledge
4. English as a technical language

Orientation knowledge

1. Mediation of interdisciplinary knowledge
2. Institutional knowledge about economic and legal systems
3. Knowledge about international organizations
4. Media, technology and innovation

In addition to the integrative placement of key qualifications, the additional acquisition of key qualifications with a minimum of 3 credit points is envisaged. Courses that provide the necessary competencies are summarized in the module for key qualifications and are regularly updated in the relevant module description of the module handbook. This list is coordinated with the House of Competence.

Financial Mathematics in Discrete Time	8 CP
Financial Mathematics in Steady Time	8 CP
Statistics	8 CP
Mathematical Statistics	4 CP
Asymptotic Stochastic	8 CP
Nonparametric Statistics	8 CP
Brownian Movement	4 CP
Generalized Regression Models	4 CP
Control of stochastic processes	4 CP
Time series analysis	4 CP
Financial Statistics	4 CP
Lévy Processes	4 CP

Optimization and optimal control for differential equations	4 CP
Numerical Methods for Differential Equations	8 CP
Control of stochastic processes	4 CP
Numerical Methods in Financial Mathematics	8 CP
Numerical Methods in Financial Mathematics II	8 CP
Functional analysis	8 CP
Stochastic differential equations	8 CP
Classical Methods for Partial Differential Equations	8 CP
Control theory	4 CP

Finance 1	9 CP
Finance 2	9 CP
Finance 3	9 CP
Insurance Management I	9 CP
Mathematical and Empirical Finance	9 CP
Economic theory and its application in Finance	9 CP

Informatics	9 CP
Methodical foundations of the OR	9 CP
Mathematical Optimization	9 CP
Stochastic Methods and Simulation	9 CP
Stochastic modeling and optimization	9 CP
Energy industry and technology	9 CP

Statistics	8 CP
Mathematical Statistics	4 CP
Asymptotic Stochastic	8 CP
Nonparametric Statistics	8 CP
Brownian Movement	4 CP
Generalized Regression Models	4 CP
Percolation	4 CP
Control of stochastic processes	4 CP
Time series analysis	4 CP

Optimization and optimal control for differential equations	4 CP
Parallel Calculation	5 CP
Numerical optimization methods	8 CP
Control of stochastic processes	4 CP
Functional analysis	8 CP
Variations calculation	8 CP
Classical Methods for Partial Differential Equations	8 CP
Control theory	4 CP
Optimization in Banach spaces	8 CP
Game Theory	4 CP
Graph theory	8 CP
Modeling and numerical simulation in practice	4 CP

Finance 1	9 CP
Finance 2	9 CP
Finance 3	9 CP
Insurance Management I	9 CP
Mathematical and Empirical Finance	9 CP
Decision-making and game theory	9 CP
Innovation and Growth	9 CP
Growth and agglomeration	9 CP
Strategic Management and Organization	9 CP
Microeconomic Theory	9 CP

Informatics	9 CP
Methodical foundations of the OR	9 CP
Mathematical Optimization	9 CP
Applications of the OR	9 CP
OR in Supply Chain Management and Health Care Management	9 CP
Stochastic Methods and Simulation	9 CP
Stochastic modeling and optimization	9 CP
Energy industry and technology	9 CP
Marketing Management	9 CP

Part III
Field structure

1 Master Thesis

Identifier	Module	ECTS	Responsibility
M-MATH-102917	Master Thesis (S. 40)	30	Sebastian Grensing

2 Mathematical Methods

2.1 Stochastics

Identifier	Module	ECTS	Responsibility
M-MATH-102902	Asymptotic Stochastics (S. 56)	8	Norbert Henze
M-MATH-102904	Brownian Motion (S. 41)	4	Nicole Bäuerle
M-MATH-102860	Continuous Time Finance (S. 58)	8	Nicole Bäuerle
M-MATH-102919	Discrete Time Finance (S. 60)	8	Nicole Bäuerle
M-MATH-102939	Extreme Value Theory (S. 52)	4	Vicky Fasen-Hartmann
M-MATH-102956	Forecasting: Theory and Practice (S. 43)	8	Tilmann Gneiting
M-MATH-102906	Generalized Regression Models (S. 47)	4	Bernhard Klar
M-MATH-102907	Markov Decision Processes (S. 54)	5	Nicole Bäuerle
M-MATH-102909	Mathematical Statistics (S. 42)	4	Bernhard Klar
M-MATH-102910	Nonparametric Statistics (S. 46)	4	Norbert Henze
M-MATH-102905	Percolation (S. 48)	6	Günter Last
M-MATH-102922	Poisson Processes (S. 57)	5	Günter Last
M-MATH-102947	Probability Theory and Combinatorial Optimization (S. 44)	8	Daniel Hug
M-MATH-102951	Random Graphs (S. 45)	6	Matthias Schulte
M-MATH-102903	Spatial Stochastics (S. 51)	8	Günter Last
M-MATH-102946	Stein's Method (S. 59)	5	Matthias Schulte
M-MATH-102908	Stochastic Control (S. 53)	4	Nicole Bäuerle
M-MATH-102942	Stochastic Evolution Equations (S. 49)	8	Lutz Weis
M-MATH-102865	Stochastic Geometry (S. 50)	8	Daniel Hug
M-MATH-102911	Time Series Analysis (S. 55)	4	Bernhard Klar

2.2 Analysis or Applied and Numerical Mathematics, Optimization

2.2.1 Analysis

Identifier	Module	ECTS	Responsibility
M-MATH-103259	Bifurcation Theory (S. 82)	5	Rainer Mandel
M-MATH-102871	Boundary and Eigenvalue Problems (S. 75)	8	Wolfgang Reichel
M-MATH-102882	Calculus of Variations (S. 69)	8	Wolfgang Reichel
M-MATH-102870	Classical Methods for Partial Differential Equations (S. 74)	8	Michael Plum
M-MATH-102878	Complex Analysis (S. 79)	8	Christoph Schmoeger
M-MATH-102883	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems (S. 61)	8	Michael Plum

M-MATH-102941	Control Theory (S. 68)	6	Roland Schnaubelt
M-MATH-103080	Dynamical Systems (S. 77)	8	Jens Rottmann-Matthes
M-MATH-102872	Evolution Equations (S. 66)	8	Roland Schnaubelt
M-MATH-102873	Fourier Analysis (S. 78)	8	Lutz Weis
M-MATH-101320	Functional Analysis (S. 80)	8	Roland Schnaubelt
M-MATH-102874	Integral Equations (S. 70)	8	Frank Hettlich
M-MATH-102890	Inverse Problems (S. 62)	8	Andreas Kirsch
M-MATH-102952	L2-Invariants (S. 72)	5	Holger Kammeyer
M-MATH-102885	Maxwell's Equations (S. 76)	8	Andreas Kirsch
M-MATH-103257	Nonlinear Maxwell Equations (S. 71)	3	Roland Schnaubelt
M-MATH-102924	Optimization in Banach Spaces (S. 65)	8	Andreas Kirsch
M-MATH-102879	Potential Theory (S. 64)	8	Andreas Kirsch
M-MATH-102926	Sobolev Spaces (S. 83)	5	Andreas Kirsch
M-MATH-101335	Special Functions and Applications in Potential Theory (S. 81)	5	Andreas Kirsch
M-MATH-101768	Spectral Theory (S. 67)	8	Lutz Weis
M-MATH-102881	Stochastic Differential Equations (S. 73)	8	Lutz Weis
M-MATH-102942	Stochastic Evolution Equations (S. 49)	8	Lutz Weis
M-MATH-102927	Traveling Waves (S. 63)	6	Jens Rottmann-Matthes

2.2.2 Applied and Numerical Mathematics, Optimization

Identifier	Module	ECTS	Responsibility
M-MATH-102900	Adaptive Finite Elemente Methods (S. 98)	6	Willy Dörfler
M-MATH-102955	Advanced Inverse Problems: Nonlinearity and Banach Spaces (S. 95)	5	Andreas Rieder
M-MATH-102935	Compressive Sensing (S. 108)	5	Andreas Rieder
M-MATH-102891	Finite Element Methods (S. 87)	8	Willy Dörfler,Christian Wieners
M-MATH-102937	Functions of Matrices (S. 107)	8	Volker Grimm
M-MATH-102936	Functions of Operators (S. 86)	6	Volker Grimm
M-MATH-102921	Geometric Numerical Integration (S. 96)	6	Tobias Jahnke
M-MATH-102874	Integral Equations (S. 70)	8	Frank Hettlich
M-MATH-102943	Introduction into Particulate Flows (S. 106)	3	Willy Dörfler
M-MATH-102945	Introduction to Matlab and Numerical Algorithms (S. 97)	5	Daniel Weiß
M-MATH-102889	Introduction to Scientific Computing (S. 105)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102890	Inverse Problems (S. 62)	8	Andreas Kirsch
M-MATH-102897	Mathematical Methods in Signal and Image Processing (S. 110)	8	Andreas Rieder
M-MATH-103260	Mathematical Methods of Imaging (S. 85)	5	Andreas Rieder
M-MATH-102929	Mathematical Modelling and Simulation in Practise (S. 109)	4	Gudrun Thäter
M-MATH-102885	Maxwell's Equations (S. 76)	8	Andreas Kirsch
M-MATH-102896	Medical Imaging (S. 102)	8	Andreas Rieder
M-MATH-102944	Numerical Continuation Methods (S. 93)	5	Jens Rottmann-Matthes
M-MATH-102888	Numerical Methods for Differential Equations (S. 88)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102915	Numerical Methods for Hyperbolic Equations (S. 94)	6	Willy Dörfler
M-MATH-102930	Numerical Methods for Integral Equations (S. 91)	8	Tilo Arens
M-MATH-102931	Numerical Methods for Maxwell's Equations (S. 84)	6	Marlis Hochbruck,Tobias Jahnke
M-MATH-102928	Numerical Methods for Time-Dependent Partial Differential Equations (S. 101)	8	Marlis Hochbruck
M-MATH-102894	Numerical Methods in Computational Electrodynamics (S. 89)	6	Willy Dörfler
M-MATH-102932	Numerical Methods in Fluid Mechanics (S. 100)	4	Willy Dörfler,Gudrun Thäter
M-MATH-102901	Numerical Methods in Mathematical Finance (S. 111)	8	Tobias Jahnke

M-MATH-102914	Numerical Methods in Mathematical Finance II (S. 104)	8	Tobias Jahnke
M-MATH-102892	Numerical Optimisation Methods (S. 112)	8	Christian Wieners
M-MATH-102899	Optimisation and Optimal Control for Differential Equations (S. 90)	4	Christian Wieners
M-MATH-102924	Optimization in Banach Spaces (S. 65)	8	Andreas Kirsch
M-MATH-102879	Potential Theory (S. 64)	8	Andreas Kirsch
M-MATH-102938	Project Centered Software-Lab (S. 92)	4	Gudrun Thäter
M-MATH-102926	Sobolev Spaces (S. 83)	5	Andreas Kirsch
M-MATH-101335	Special Functions and Applications in Potential Theory (S. 81)	5	Andreas Kirsch
M-MATH-102920	Special Topics of Numerical Linear Algebra (S. 99)	8	Marlis Hochbruck
M-MATH-102895	Wavelets (S. 103)	8	Andreas Rieder

2.3 Elective Field Mathematical Methods

2.3.1 Algebra and Geometry

Identifier	Module	ECTS	Responsibility
M-MATH-102960	The Riemann Zeta Function (S. 134)	4	Fabian Januszewski
M-MATH-101315	Algebra (S. 119)	8	Frank Herrlich
M-MATH-101724	Algebraic Geometry (S. 115)	8	Frank Herrlich
M-MATH-101725	Algebraic Number Theory (S. 121)	8	Claus-Günther Schmidt
M-MATH-102948	Algebraic Topology (S. 131)	8	Roman Sauer
M-MATH-102953	Algebraic Topology II (S. 122)	8	Roman Sauer
M-MATH-102950	Combinatorics (S. 123)	8	Maria Aksenovich
M-MATH-102925	Combinatorics in the Plane (S. 118)	7	Maria Aksenovich
M-MATH-102940	Comparison Geometry (S. 116)	5	Wilderich Tuschmann
M-MATH-102864	Convex Geometry (S. 113)	8	Daniel Hug
M-MATH-101317	Differential Geometry (S. 126)	8	Wilderich Tuschmann
M-MATH-102957	Extremal Graph Theory (S. 125)	8	Maria Aksenovich
M-MATH-103258	Finite group schemes (S. 124)	4	Frank Herrlich,Fabian Januszewski
M-MATH-102867	Geometric Group Theory (S. 117)	8	Roman Sauer
M-MATH-102866	Geometry of Schemes (S. 114)	8	Frank Herrlich
M-MATH-102912	Global Differential Geometry (S. 129)	8	Wilderich Tuschmann
M-MATH-101336	Graph Theory (S. 127)	8	Maria Aksenovich
M-MATH-102954	Group Actions in Riemannian Geometry (S. 133)	5	Wilderich Tuschmann
M-MATH-102959	Homotopy Theory (S. 132)	8	Roman Sauer
M-MATH-102949	Introduction to Geometric Measure Theory (S. 130)	6	Steffen Winter
M-MATH-102952	L2-Invariants (S. 72)	5	Holger Kammeyer
M-MATH-103256	Rational Homotopy Theory (S. 128)	4	Manuel Amann,Roman Sauer
M-MATH-102958	Spin Manifolds, Alpha Invariant and Positive Scalar Curvature (S. 120)	5	Wilderich Tuschmann
M-MATH-102865	Stochastic Geometry (S. 50)	8	Daniel Hug

2.3.2 Analysis

Identifier	Module	ECTS	Responsibility
M-MATH-103259	Bifurcation Theory (S. 82)	5	Rainer Mandel
M-MATH-102871	Boundary and Eigenvalue Problems (S. 75)	8	Wolfgang Reichel
M-MATH-102882	Calculus of Variations (S. 69)	8	Wolfgang Reichel

M-MATH-102870	Classical Methods for Partial Differential Equations (S. 74)	8	Michael Plum
M-MATH-102878	Complex Analysis (S. 79)	8	Christoph Schmoeger
M-MATH-102883	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems (S. 61)	8	Michael Plum
M-MATH-102941	Control Theory (S. 68)	6	Roland Schnaubelt
M-MATH-103080	Dynamical Systems (S. 77)	8	Jens Rottmann-Matthes
M-MATH-102872	Evolution Equations (S. 66)	8	Roland Schnaubelt
M-MATH-102873	Fourier Analysis (S. 78)	8	Lutz Weis
M-MATH-101320	Functional Analysis (S. 80)	8	Roland Schnaubelt
M-MATH-102874	Integral Equations (S. 70)	8	Frank Hettlich
M-MATH-102890	Inverse Problems (S. 62)	8	Andreas Kirsch
M-MATH-102952	L2-Invariants (S. 72)	5	Holger Kammeyer
M-MATH-102885	Maxwell's Equations (S. 76)	8	Andreas Kirsch
M-MATH-103257	Nonlinear Maxwell Equations (S. 71)	3	Roland Schnaubelt
M-MATH-102924	Optimization in Banach Spaces (S. 65)	8	Andreas Kirsch
M-MATH-102879	Potential Theory (S. 64)	8	Andreas Kirsch
M-MATH-102926	Sobolev Spaces (S. 83)	5	Andreas Kirsch
M-MATH-101335	Special Functions and Applications in Potential Theory (S. 81)	5	Andreas Kirsch
M-MATH-101768	Spectral Theory (S. 67)	8	Lutz Weis
M-MATH-102881	Stochastic Differential Equations (S. 73)	8	Lutz Weis
M-MATH-102942	Stochastic Evolution Equations (S. 49)	8	Lutz Weis
M-MATH-102927	Traveling Waves (S. 63)	6	Jens Rottmann-Matthes

2.3.3 Applied and Numerical Mathematics, Optimization

Identifier	Module	ECTS	Responsibility
M-MATH-102900	Adaptive Finite Elemente Methods (S. 98)	6	Willy Dörfler
M-MATH-102955	Advanced Inverse Problems: Nonlinearity and Banach Spaces (S. 95)	5	Andreas Rieder
M-MATH-102935	Compressive Sensing (S. 108)	5	Andreas Rieder
M-MATH-102891	Finite Element Methods (S. 87)	8	Willy Dörfler,Christian Wieners
M-MATH-102937	Functions of Matrices (S. 107)	8	Volker Grimm
M-MATH-102936	Functions of Operators (S. 86)	6	Volker Grimm
M-MATH-102921	Geometric Numerical Integration (S. 96)	6	Tobias Jahnke
M-MATH-102874	Integral Equations (S. 70)	8	Frank Hettlich
M-MATH-102943	Introduction into Particulate Flows (S. 106)	3	Willy Dörfler
M-MATH-102945	Introduction to Matlab and Numerical Algorithms (S. 97)	5	Daniel Weiß
M-MATH-102889	Introduction to Scientific Computing (S. 105)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102890	Inverse Problems (S. 62)	8	Andreas Kirsch
M-MATH-102897	Mathematical Methods in Signal and Image Processing (S. 110)	8	Andreas Rieder
M-MATH-103260	Mathematical Methods of Imaging (S. 85)	5	Andreas Rieder
M-MATH-102929	Mathematical Modelling and Simulation in Practise (S. 109)	4	Gudrun Thäter
M-MATH-102885	Maxwell's Equations (S. 76)	8	Andreas Kirsch
M-MATH-102896	Medical Imaging (S. 102)	8	Andreas Rieder
M-MATH-102944	Numerical Continuation Methods (S. 93)	5	Jens Rottmann-Matthes
M-MATH-102888	Numerical Methods for Differential Equations (S. 88)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102915	Numerical Methods for Hyperbolic Equations (S. 94)	6	Willy Dörfler
M-MATH-102930	Numerical Methods for Integral Equations (S. 91)	8	Tilo Arens
M-MATH-102931	Numerical Methods for Maxwell's Equations (S. 84)	6	Marlis Hochbruck,Tobias Jahnke

M-MATH-102928	Numerical Methods for Time-Dependent Partial Differential Equations (S. 101)	8	Marlis Hochbruck
M-MATH-102894	Numerical Methods in Computational Electrodynamics (S. 89)	6	Willy Dörfler
M-MATH-102932	Numerical Methods in Fluid Mechanics (S. 100)	4	Willy Dörfler,Gudrun Thäter
M-MATH-102901	Numerical Methods in Mathematical Finance (S. 111)	8	Tobias Jahnke
M-MATH-102914	Numerical Methods in Mathematical Finance II (S. 104)	8	Tobias Jahnke
M-MATH-102892	Numerical Optimisation Methods (S. 112)	8	Christian Wieners
M-MATH-102899	Optimisation and Optimal Control for Differential Equations (S. 90)	4	Christian Wieners
M-MATH-102924	Optimization in Banach Spaces (S. 65)	8	Andreas Kirsch
M-MATH-102879	Potential Theory (S. 64)	8	Andreas Kirsch
M-MATH-102938	Project Centered Software-Lab (S. 92)	4	Gudrun Thäter
M-MATH-102926	Sobolev Spaces (S. 83)	5	Andreas Kirsch
M-MATH-101335	Special Functions and Applications in Potential Theory (S. 81)	5	Andreas Kirsch
M-MATH-102920	Special Topics of Numerical Linear Algebra (S. 99)	8	Marlis Hochbruck
M-MATH-102895	Wavelets (S. 103)	8	Andreas Rieder

2.3.4 Stochastics

Identifier	Module	ECTS	Responsibility
M-MATH-102902	Asymptotic Stochastics (S. 56)	8	Norbert Henze
M-MATH-102904	Brownian Motion (S. 41)	4	Nicole Bäuerle
M-MATH-102860	Continuous Time Finance (S. 58)	8	Nicole Bäuerle
M-MATH-102919	Discrete Time Finance (S. 60)	8	Nicole Bäuerle
M-MATH-102939	Extreme Value Theory (S. 52)	4	Vicky Fasen-Hartmann
M-MATH-102956	Forecasting: Theory and Practice (S. 43)	8	Tilmann Gneiting
M-MATH-102906	Generalized Regression Models (S. 47)	4	Bernhard Klar
M-MATH-102907	Markov Decision Processes (S. 54)	5	Nicole Bäuerle
M-MATH-102909	Mathematical Statistics (S. 42)	4	Bernhard Klar
M-MATH-102910	Nonparametric Statistics (S. 46)	4	Norbert Henze
M-MATH-102905	Percolation (S. 48)	6	Günter Last
M-MATH-102922	Poisson Processes (S. 57)	5	Günter Last
M-MATH-102947	Probability Theory and Combinatorial Optimization (S. 44)	8	Daniel Hug
M-MATH-102951	Random Graphs (S. 45)	6	Matthias Schulte
M-MATH-102903	Spatial Stochastics (S. 51)	8	Günter Last
M-MATH-102946	Stein's Method (S. 59)	5	Matthias Schulte
M-MATH-102908	Stochastic Control (S. 53)	4	Nicole Bäuerle
M-MATH-102942	Stochastic Evolution Equations (S. 49)	8	Lutz Weis
M-MATH-102865	Stochastic Geometry (S. 50)	8	Daniel Hug
M-MATH-102911	Time Series Analysis (S. 55)	4	Bernhard Klar

3 Finance - Risk Management - Managerial Economics

Identifier	Module	ECTS	Responsibility
M-WIWI-101637	Analytics and Statistics (S. 139)	9	Oliver Grothe
M-WIWI-101504	Collective Decision Making (S. 146)	9	Clemens Puppe

M-WIWI-102970	Decision and Game Theory (S. 151)	9	Clemens Puppe
M-WIWI-103261	Disruptive FinTech Innovations (S. 157)	9	Maxim Ulrich
M-WIWI-101638	Econometrics and Statistics I (S. 154)	9	Melanie Schienle
M-WIWI-101639	Econometrics and Statistics II (S. 155)	9	Melanie Schienle
M-WIWI-101502	Economic Theory and its Application in Finance (S. 144)	9	Kay Mitusch
M-WIWI-101505	Experimental Economics (S. 152)	9	Johannes Philipp Reiß
M-WIWI-101482	Finance 1 (S. 138)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101483	Finance 2 (S. 148)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101480	Finance 3 (S. 136)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101496	Growth and Agglomeration (S. 147)	9	Ingrid Ott
M-WIWI-101478	Innovation and growth (S. 142)	9	Ingrid Ott
M-WIWI-101469	Insurance Management I (S. 150)	9	Ute Werner
M-WIWI-103247	Intelligent Risk and Investment Advisory (S. 141)	9	Maxim Ulrich
M-WIWI-101500	Microeconomic Theory (S. 135)	9	Clemens Puppe

4 Operations Management - Data Analysis - Informatics

Identifier	Module	ECTS	Responsibility
M-WIWI-101413	Applications of Operations Research (S. 158)	9	Stefan Nickel
M-WIWI-101452	Energy Economics and Technology (S. 168)	9	Wolf Fichtner
M-WIWI-101472	Informatics (S. 176)	9	Andreas Oberweis,Harald Sack,Hartmut Schmeck,York Sure-Vetter,Johann Marius Zöllner
M-WIWI-101490	Marketing Management (S. 172)	9	Martin Klarmann
M-WIWI-101473	Mathematical Programming (S. 162)	9	Oliver Stein
M-WIWI-101414	Methodical Foundations of OR (S. 160)	9	Oliver Stein
M-WIWI-102832	Operations Research in Supply Chain Management (S. 178)	9	Stefan Nickel
M-WIWI-102805	Service Operations (S. 174)	9	Stefan Nickel
M-WIWI-101400	Stochastic Methods and Simulation (S. 164)	9	Karl-Heinz Waldmann
M-WIWI-101454	Stochastic Modelling and Optimization (S. 166)	9	Karl-Heinz Waldmann
M-WIWI-103289	Stochastic Optimization (S. 170)	9	Steffen Rebennack

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Identifier	Module	ECTS	Responsibility
M-WIWI-102971	Seminar (S. 180)	3	Hagen Lindstädt,Oliver Stein
M-WIWI-102973	Seminar (S. 182)	3	Hagen Lindstädt,Oliver Stein

6 Mathematical Seminar

Identifier	Module	ECTS	Responsibility
M-MATH-102730	Seminar (S. 183)	3	Stefan Kühnlein

7 Elective Field

Identifier	Module	ECTS	Responsibility
M-MATH-102960	The Riemann Zeta Function (S. 134)	4	Fabian Januszewski
M-MATH-102900	Adaptive Finite Elemente Methods (S. 98)	6	Willy Dörfler
M-MATH-102955	Advanced Inverse Problems: Nonlinearity and Banach Spaces (S. 95)	5	Andreas Rieder
M-MATH-101315	Algebra (S. 119)	8	Frank Herrlich
M-MATH-101724	Algebraic Geometry (S. 115)	8	Frank Herrlich
M-MATH-101725	Algebraic Number Theory (S. 121)	8	Claus-Günther Schmidt
M-MATH-102948	Algebraic Topology (S. 131)	8	Roman Sauer
M-MATH-102953	Algebraic Topology II (S. 122)	8	Roman Sauer
M-MATH-102902	Asymptotic Stochastics (S. 56)	8	Norbert Henze
M-MATH-103259	Bifurcation Theory (S. 82)	5	Rainer Mandel
M-MATH-102871	Boundary and Eigenvalue Problems (S. 75)	8	Wolfgang Reichel
M-MATH-102904	Brownian Motion (S. 41)	4	Nicole Bäuerle
M-MATH-102882	Calculus of Variations (S. 69)	8	Wolfgang Reichel
M-MATH-102870	Classical Methods for Partial Differential Equations (S. 74)	8	Michael Plum
M-MATH-102950	Combinatorics (S. 123)	8	Maria Aksenovich
M-MATH-102925	Combinatorics in the Plane (S. 118)	7	Maria Aksenovich
M-MATH-102940	Comparison Geometry (S. 116)	5	Wilderich Tuschmann
M-MATH-102878	Complex Analysis (S. 79)	8	Christoph Schmoeger
M-MATH-102935	Compressive Sensing (S. 108)	5	Andreas Rieder
M-MATH-102883	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems (S. 61)	8	Michael Plum
M-MATH-102860	Continuous Time Finance (S. 58)	8	Nicole Bäuerle
M-MATH-102941	Control Theory (S. 68)	6	Roland Schnaubelt
M-MATH-102864	Convex Geometry (S. 113)	8	Daniel Hug
M-MATH-101317	Differential Geometry (S. 126)	8	Wilderich Tuschmann
M-MATH-102919	Discrete Time Finance (S. 60)	8	Nicole Bäuerle
M-MATH-103080	Dynamical Systems (S. 77)	8	Jens Rottmann-Matthes
M-MATH-102872	Evolution Equations (S. 66)	8	Roland Schnaubelt
M-MATH-102957	Extremal Graph Theory (S. 125)	8	Maria Aksenovich
M-MATH-102939	Extreme Value Theory (S. 52)	4	Vicky Fasen-Hartmann
M-MATH-102891	Finite Element Methods (S. 87)	8	Willy Dörfler,Christian Wieners
M-MATH-103258	Finite group schemes (S. 124)	4	Frank Herrlich,Fabian Januszewski
M-MATH-102956	Forecasting: Theory and Practice (S. 43)	8	Tilmann Gneiting
M-MATH-102873	Fourier Analysis (S. 78)	8	Lutz Weis
M-MATH-101320	Functional Analysis (S. 80)	8	Roland Schnaubelt
M-MATH-102937	Functions of Matrices (S. 107)	8	Volker Grimm
M-MATH-102936	Functions of Operators (S. 86)	6	Volker Grimm
M-MATH-102906	Generalized Regression Models (S. 47)	4	Bernhard Klar
M-MATH-102867	Geometric Group Theory (S. 117)	8	Roman Sauer
M-MATH-102921	Geometric Numerical Integration (S. 96)	6	Tobias Jahnke
M-MATH-102866	Geometry of Schemes (S. 114)	8	Frank Herrlich
M-MATH-102912	Global Differential Geometry (S. 129)	8	Wilderich Tuschmann
M-MATH-101336	Graph Theory (S. 127)	8	Maria Aksenovich
M-MATH-102954	Group Actions in Riemannian Geometry (S. 133)	5	Wilderich Tuschmann

M-MATH-102959	Homotopy Theory (S. 132)	8	Roman Sauer
M-MATH-102874	Integral Equations (S. 70)	8	Frank Hettlich
M-MATH-102943	Introduction into Particulate Flows (S. 106)	3	Willy Dörfler
M-MATH-102949	Introduction to Geometric Measure Theory (S. 130)	6	Steffen Winter
M-MATH-102945	Introduction to Matlab and Numerical Algorithms (S. 97)	5	Daniel Weiß
M-MATH-102889	Introduction to Scientific Computing (S. 105)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102890	Inverse Problems (S. 62)	8	Andreas Kirsch
M-MATH-102952	L2-Invariants (S. 72)	5	Holger Kammeyer
M-MATH-102907	Markov Decision Processes (S. 54)	5	Nicole Bäuerle
M-MATH-102897	Mathematical Methods in Signal and Image Processing (S. 110)	8	Andreas Rieder
M-MATH-103260	Mathematical Methods of Imaging (S. 85)	5	Andreas Rieder
M-MATH-102929	Mathematical Modelling and Simulation in Practise (S. 109)	4	Gudrun Thäter
M-MATH-102909	Mathematical Statistics (S. 42)	4	Bernhard Klar
M-MATH-102885	Maxwell's Equations (S. 76)	8	Andreas Kirsch
M-MATH-102896	Medical Imaging (S. 102)	8	Andreas Rieder
M-MATH-103257	Nonlinear Maxwell Equations (S. 71)	3	Roland Schnaubelt
M-MATH-102910	Nonparametric Statistics (S. 46)	4	Norbert Henze
M-MATH-102944	Numerical Continuation Methods (S. 93)	5	Jens Rottmann-Matthes
M-MATH-102888	Numerical Methods for Differential Equations (S. 88)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102915	Numerical Methods for Hyperbolic Equations (S. 94)	6	Willy Dörfler
M-MATH-102930	Numerical Methods for Integral Equations (S. 91)	8	Tilo Arens
M-MATH-102931	Numerical Methods for Maxwell's Equations (S. 84)	6	Marlis Hochbruck,Tobias Jahnke
M-MATH-102928	Numerical Methods for Time-Dependent Partial Differential Equations (S. 101)	8	Marlis Hochbruck
M-MATH-102894	Numerical Methods in Computational Electrodynamics (S. 89)	6	Willy Dörfler
M-MATH-102932	Numerical Methods in Fluid Mechanics (S. 100)	4	Willy Dörfler,Gudrun Thäter
M-MATH-102901	Numerical Methods in Mathematical Finance (S. 111)	8	Tobias Jahnke
M-MATH-102914	Numerical Methods in Mathematical Finance II (S. 104)	8	Tobias Jahnke
M-MATH-102892	Numerical Optimisation Methods (S. 112)	8	Christian Wieners
M-MATH-102899	Optimisation and Optimal Control for Differential Equations (S. 90)	4	Christian Wieners
M-MATH-102924	Optimization in Banach Spaces (S. 65)	8	Andreas Kirsch
M-MATH-102905	Percolation (S. 48)	6	Günter Last
M-MATH-102922	Poisson Processes (S. 57)	5	Günter Last
M-MATH-102879	Potential Theory (S. 64)	8	Andreas Kirsch
M-MATH-102947	Probability Theory and Combinatorial Optimization (S. 44)	8	Daniel Hug
M-MATH-102938	Project Centered Software-Lab (S. 92)	4	Gudrun Thäter
M-MATH-102951	Random Graphs (S. 45)	6	Matthias Schulte
M-MATH-103256	Rational Homotopy Theory (S. 128)	4	Manuel Amann,Roman Sauer
M-MATH-102926	Sobolev Spaces (S. 83)	5	Andreas Kirsch
M-MATH-102903	Spatial Stochastics (S. 51)	8	Günter Last
M-MATH-101335	Special Functions and Applications in Potential Theory (S. 81)	5	Andreas Kirsch
M-MATH-102920	Special Topics of Numerical Linear Algebra (S. 99)	8	Marlis Hochbruck
M-MATH-101768	Spectral Theory (S. 67)	8	Lutz Weis
M-MATH-102958	Spin Manifolds, Alpha Invariant and Positive Scalar Curvature (S. 120)	5	Wilderich Tuschmann
M-MATH-102946	Stein's Method (S. 59)	5	Matthias Schulte
M-MATH-102908	Stochastic Control (S. 53)	4	Nicole Bäuerle
M-MATH-102881	Stochastic Differential Equations (S. 73)	8	Lutz Weis
M-MATH-102942	Stochastic Evolution Equations (S. 49)	8	Lutz Weis
M-MATH-102865	Stochastic Geometry (S. 50)	8	Daniel Hug

M-MATH-102911	Time Series Analysis (S. 55)	4	Bernhard Klar
M-MATH-102927	Traveling Waves (S. 63)	6	Jens Rottmann-Matthes
M-MATH-102895	Wavelets (S. 103)	8	Andreas Rieder
M-WIWI-101637	Analytics and Statistics (S. 139)	9	Oliver Grothe
M-WIWI-101413	Applications of Operations Research (S. 158)	9	Stefan Nickel
M-WIWI-101504	Collective Decision Making (S. 146)	9	Clemens Puppe
M-WIWI-102970	Decision and Game Theory (S. 151)	9	Clemens Puppe
M-WIWI-103261	Disruptive FinTech Innovations (S. 157)	9	Maxim Ulrich
M-WIWI-101638	Econometrics and Statistics I (S. 154)	9	Melanie Schienle
M-WIWI-101639	Econometrics and Statistics II (S. 155)	9	Melanie Schienle
M-WIWI-101502	Economic Theory and its Application in Finance (S. 144)	9	Kay Mitusch
M-WIWI-101452	Energy Economics and Technology (S. 168)	9	Wolf Fichtner
M-WIWI-101505	Experimental Economics (S. 152)	9	Johannes Philipp Reiß
M-WIWI-101482	Finance 1 (S. 138)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101483	Finance 2 (S. 148)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101480	Finance 3 (S. 136)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101496	Growth and Agglomeration (S. 147)	9	Ingrid Ott
M-WIWI-101472	Informatics (S. 176)	9	Andreas Oberweis,Harald Sack,Hartmut Schmeck,York Sure-Vetter,Johann Marius Zöllner
M-WIWI-101478	Innovation and growth (S. 142)	9	Ingrid Ott
M-WIWI-101469	Insurance Management I (S. 150)	9	Ute Werner
M-WIWI-103247	Intelligent Risk and Investment Advisory (S. 141)	9	Maxim Ulrich
M-WIWI-101490	Marketing Management (S. 172)	9	Martin Klarmann
M-WIWI-101473	Mathematical Programming (S. 162)	9	Oliver Stein
M-WIWI-101414	Methodical Foundations of OR (S. 160)	9	Oliver Stein
M-WIWI-101500	Microeconomic Theory (S. 135)	9	Clemens Puppe
M-WIWI-102832	Operations Research in Supply Chain Management (S. 178)	9	Stefan Nickel
M-WIWI-102971	Seminar (S. 180)	3	Hagen Lindstädt,Oliver Stein
M-WIWI-102973	Seminar (S. 182)	3	Hagen Lindstädt,Oliver Stein
M-WIWI-102972	Seminar (S. 184)	3	Hagen Lindstädt,Oliver Stein
M-WIWI-102974	Seminar (S. 186)	3	Hagen Lindstädt,Oliver Stein
M-WIWI-101400	Stochastic Methods and Simulation (S. 164)	9	Karl-Heinz Waldmann
M-WIWI-101454	Stochastic Modelling and Optimization (S. 166)	9	Karl-Heinz Waldmann
M-WIWI-103289	Stochastic Optimization (S. 170)	9	Steffen Rebennack

8 Additional Examinations

Identifier	Module	ECTS	Responsibility
M-MATH-102960	The Riemann Zeta Function (S. 134)	4	Fabian Januszewski
M-MATH-102900	Adaptive Finite Elemente Methods (S. 98)	6	Willy Dörfler
M-MATH-102955	Advanced Inverse Problems: Nonlinearity and Banach Spaces (S. 95)	5	Andreas Rieder
M-MATH-101315	Algebra (S. 119)	8	Frank Herrlich
M-MATH-101724	Algebraic Geometry (S. 115)	8	Frank Herrlich
M-MATH-101725	Algebraic Number Theory (S. 121)	8	Claus-Günther Schmidt
M-MATH-102948	Algebraic Topology (S. 131)	8	Roman Sauer
M-MATH-102953	Algebraic Topology II (S. 122)	8	Roman Sauer

M-MATH-102902	Asymptotic Stochastics (S. 56)	8	Norbert Henze
M-MATH-103259	Bifurcation Theory (S. 82)	5	Rainer Mandel
M-MATH-102871	Boundary and Eigenvalue Problems (S. 75)	8	Wolfgang Reichel
M-MATH-102904	Brownian Motion (S. 41)	4	Nicole Bäuerle
M-MATH-102882	Calculus of Variations (S. 69)	8	Wolfgang Reichel
M-MATH-102870	Classical Methods for Partial Differential Equations (S. 74)	8	Michael Plum
M-MATH-102950	Combinatorics (S. 123)	8	Maria Aksenovich
M-MATH-102925	Combinatorics in the Plane (S. 118)	7	Maria Aksenovich
M-MATH-102940	Comparison Geometry (S. 116)	5	Wilderich Tuschmann
M-MATH-102878	Complex Analysis (S. 79)	8	Christoph Schmoeger
M-MATH-102935	Compressive Sensing (S. 108)	5	Andreas Rieder
M-MATH-102883	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems (S. 61)	8	Michael Plum
M-MATH-102860	Continuous Time Finance (S. 58)	8	Nicole Bäuerle
M-MATH-102941	Control Theory (S. 68)	6	Roland Schnaubelt
M-MATH-102864	Convex Geometry (S. 113)	8	Daniel Hug
M-MATH-101317	Differential Geometry (S. 126)	8	Wilderich Tuschmann
M-MATH-102919	Discrete Time Finance (S. 60)	8	Nicole Bäuerle
M-MATH-103080	Dynamical Systems (S. 77)	8	Jens Rottmann-Matthes
M-MATH-102872	Evolution Equations (S. 66)	8	Roland Schnaubelt
M-MATH-102957	Extremal Graph Theory (S. 125)	8	Maria Aksenovich
M-MATH-102939	Extreme Value Theory (S. 52)	4	Vicky Fasen-Hartmann
M-MATH-102891	Finite Element Methods (S. 87)	8	Willy Dörfler,Christian Wieners
M-MATH-103258	Finite group schemes (S. 124)	4	Frank Herrlich,Fabian Januszewski
M-MATH-102956	Forecasting: Theory and Practice (S. 43)	8	Tilmann Gneiting
M-MATH-102873	Fourier Analysis (S. 78)	8	Lutz Weis
M-MATH-101320	Functional Analysis (S. 80)	8	Roland Schnaubelt
M-MATH-102937	Functions of Matrices (S. 107)	8	Volker Grimm
M-MATH-102936	Functions of Operators (S. 86)	6	Volker Grimm
M-MATH-102906	Generalized Regression Models (S. 47)	4	Bernhard Klar
M-MATH-102867	Geometric Group Theory (S. 117)	8	Roman Sauer
M-MATH-102921	Geometric Numerical Integration (S. 96)	6	Tobias Jahnke
M-MATH-102866	Geometry of Schemes (S. 114)	8	Frank Herrlich
M-MATH-102912	Global Differential Geometry (S. 129)	8	Wilderich Tuschmann
M-MATH-101336	Graph Theory (S. 127)	8	Maria Aksenovich
M-MATH-102954	Group Actions in Riemannian Geometry (S. 133)	5	Wilderich Tuschmann
M-MATH-102959	Homotopy Theory (S. 132)	8	Roman Sauer
M-MATH-102874	Integral Equations (S. 70)	8	Frank Hettlich
M-MATH-102943	Introduction into Particulate Flows (S. 106)	3	Willy Dörfler
M-MATH-102949	Introduction to Geometric Measure Theory (S. 130)	6	Steffen Winter
M-MATH-102945	Introduction to Matlab and Numerical Algorithms (S. 97)	5	Daniel Weiß
M-MATH-102889	Introduction to Scientific Computing (S. 105)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102890	Inverse Problems (S. 62)	8	Andreas Kirsch
M-MATH-102952	L2-Invariants (S. 72)	5	Holger Kammeyer
M-MATH-102907	Markov Decision Processes (S. 54)	5	Nicole Bäuerle
M-MATH-102897	Mathematical Methods in Signal and Image Processing (S. 110)	8	Andreas Rieder
M-MATH-103260	Mathematical Methods of Imaging (S. 85)	5	Andreas Rieder
M-MATH-102929	Mathematical Modelling and Simulation in Practise (S. 109)	4	Gudrun Thäter
M-MATH-102909	Mathematical Statistics (S. 42)	4	Bernhard Klar
M-MATH-102885	Maxwell's Equations (S. 76)	8	Andreas Kirsch
M-MATH-102896	Medical Imaging (S. 102)	8	Andreas Rieder
M-MATH-103257	Nonlinear Maxwell Equations (S. 71)	3	Roland Schnaubelt
M-MATH-102910	Nonparametric Statistics (S. 46)	4	Norbert Henze

M-MATH-102944	Numerical Continuation Methods (S. 93)	5	Jens Rottmann-Matthes
M-MATH-102888	Numerical Methods for Differential Equations (S. 88)	8	Willy Dörfler,Tobias Jahnke
M-MATH-102915	Numerical Methods for Hyperbolic Equations (S. 94)	6	Willy Dörfler
M-MATH-102930	Numerical Methods for Integral Equations (S. 91)	8	Tilo Arens
M-MATH-102931	Numerical Methods for Maxwell's Equations (S. 84)	6	Marlis Hochbruck,Tobias Jahnke
M-MATH-102928	Numerical Methods for Time-Dependent Partial Differential Equations (S. 101)	8	Marlis Hochbruck
M-MATH-102894	Numerical Methods in Computational Electrodynamics (S. 89)	6	Willy Dörfler
M-MATH-102932	Numerical Methods in Fluid Mechanics (S. 100)	4	Willy Dörfler,Gudrun Thäter
M-MATH-102901	Numerical Methods in Mathematical Finance (S. 111)	8	Tobias Jahnke
M-MATH-102914	Numerical Methods in Mathematical Finance II (S. 104)	8	Tobias Jahnke
M-MATH-102892	Numerical Optimisation Methods (S. 112)	8	Christian Wieners
M-MATH-102899	Optimisation and Optimal Control for Differential Equations (S. 90)	4	Christian Wieners
M-MATH-102924	Optimization in Banach Spaces (S. 65)	8	Andreas Kirsch
M-MATH-102905	Percolation (S. 48)	6	Günter Last
M-MATH-102922	Poisson Processes (S. 57)	5	Günter Last
M-MATH-102879	Potential Theory (S. 64)	8	Andreas Kirsch
M-MATH-102947	Probability Theory and Combinatorial Optimization (S. 44)	8	Daniel Hug
M-MATH-102938	Project Centered Software-Lab (S. 92)	4	Gudrun Thäter
M-MATH-102951	Random Graphs (S. 45)	6	Matthias Schulte
M-MATH-103256	Rational Homotopy Theory (S. 128)	4	Manuel Amann,Roman Sauer
M-MATH-102926	Sobolev Spaces (S. 83)	5	Andreas Kirsch
M-MATH-102903	Spatial Stochastics (S. 51)	8	Günter Last
M-MATH-101335	Special Functions and Applications in Potential Theory (S. 81)	5	Andreas Kirsch
M-MATH-102920	Special Topics of Numerical Linear Algebra (S. 99)	8	Marlis Hochbruck
M-MATH-101768	Spectral Theory (S. 67)	8	Lutz Weis
M-MATH-102958	Spin Manifolds, Alpha Invariant and Positive Scalar Curvature (S. 120)	5	Wilderich Tuschmann
M-MATH-102946	Stein's Method (S. 59)	5	Matthias Schulte
M-MATH-102908	Stochastic Control (S. 53)	4	Nicole Bäuerle
M-MATH-102881	Stochastic Differential Equations (S. 73)	8	Lutz Weis
M-MATH-102942	Stochastic Evolution Equations (S. 49)	8	Lutz Weis
M-MATH-102865	Stochastic Geometry (S. 50)	8	Daniel Hug
M-MATH-102911	Time Series Analysis (S. 55)	4	Bernhard Klar
M-MATH-102927	Traveling Waves (S. 63)	6	Jens Rottmann-Matthes
M-MATH-102895	Wavelets (S. 103)	8	Andreas Rieder
M-WIWI-101637	Analytics and Statistics (S. 139)	9	Oliver Grothe
M-WIWI-101413	Applications of Operations Research (S. 158)	9	Stefan Nickel
M-WIWI-101504	Collective Decision Making (S. 146)	9	Clemens Puppe
M-WIWI-102970	Decision and Game Theory (S. 151)	9	Clemens Puppe
M-WIWI-101638	Econometrics and Statistics I (S. 154)	9	Melanie Schienle
M-WIWI-101639	Econometrics and Statistics II (S. 155)	9	Melanie Schienle
M-WIWI-101502	Economic Theory and its Application in Finance (S. 144)	9	Kay Mitusch
M-WIWI-101452	Energy Economics and Technology (S. 168)	9	Wolf Fichtner
M-WIWI-101505	Experimental Economics (S. 152)	9	Johannes Philipp Reiß
M-WIWI-101482	Finance 1 (S. 138)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101483	Finance 2 (S. 148)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101480	Finance 3 (S. 136)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101496	Growth and Agglomeration (S. 147)	9	Ingrid Ott

M-WIWI-101472	Informatics (S. 176)	9	Andreas Oberweis,Harald Sack,Hartmut Schmeck,York Sure-Vetter,Johann Marius Zöllner
M-WIWI-101478	Innovation and growth (S. 142)	9	Ingrid Ott
M-WIWI-101469	Insurance Management I (S. 150)	9	Ute Werner
M-WIWI-101490	Marketing Management (S. 172)	9	Martin Klarmann
M-WIWI-101473	Mathematical Programming (S. 162)	9	Oliver Stein
M-WIWI-101414	Methodical Foundations of OR (S. 160)	9	Oliver Stein
M-WIWI-101500	Microeconomic Theory (S. 135)	9	Clemens Puppe
M-WIWI-102832	Operations Research in Supply Chain Management (S. 178)	9	Stefan Nickel
M-WIWI-102805	Service Operations (S. 174)	9	Stefan Nickel
M-WIWI-101400	Stochastic Methods and Simulation (S. 164)	9	Karl-Heinz Waldmann
M-WIWI-101454	Stochastic Modelling and Optimization (S. 166)	9	Karl-Heinz Waldmann

Part IV
Modules

M Module: Master Thesis [M-MATH-102917]

Responsibility: Sebastian Grensing

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory

Contained in: Master Thesis

ECTS	Recurrence	Duration	Version
30	Jedes Semester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105878	Master Thesis (S. 316)	30	Sebastian Grensing

M Module: Brownian Motion [M-MATH-102904]

Responsibility:	Nicole Bäuerle
Organisation:	KIT-Fakultät für Mathematik
Curricular Anchorage:	Compulsory Elective
Contained in:	Mathematical Methods / Stochastics Mathematical Methods / Elective Field Mathematical Methods / Stochastics Elective Field Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105868	Brownian Motion (S. 211)	4	Nicole Bäuerle, Vicky Fasen-Hartmann, Günter Last

Conditions

none

M Module: Mathematical Statistics [M-MATH-102909]

Responsibility: Bernhard Klar

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105872	Mathematical Statistics (S. 320)	4	Norbert Henze, Bernhard Klar

Module Grade
Die Modulnote ist die Note der mündlichen Prüfung.

Conditions
none

M Module: Forecasting: Theory and Practice [M-MATH-102956]

Responsibility: Tilmann Gneiting

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	2 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105928	Forecasting: Theory and Practice (S. 267)	8	Tilmann Gneiting

Conditions
none

Remarks

- Regular cycle: every 2nd year, starting winter semester 16/17
- Course is held in English

M Module: Probability Theory and Combinatorial Optimization [M-MATH-102947]

Responsibility: Daniel Hug

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105923	Probability Theory and Combinatorial Optimization (S. 373)	8	Daniel Hug, Günter Last

Conditions
none

M Module: Random Graphs [M-MATH-102951]

Responsibility: Matthias Schulte

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105929	Random Graphs (S. 379)	6	Matthias Schulte

Conditions
none

M Module: Nonparametric Statistics [M-MATH-102910]

Responsibility: Norbert Henze

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105873	Nonparametric Statistics (S. 340)	4	Norbert Henze, Bernhard Klar

Conditions
none

M Module: Generalized Regression Models [M-MATH-102906]

Responsibility: Bernhard Klar

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105870	Generalized Regression Models (S. 272)	4	Norbert Henze, Bernhard Klar

Conditions
none

M Module: Percolation [M-MATH-102905]

Responsibility: Günter Last

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105869	Percolation (S. 366)	6	Günter Last

Conditions
none

Qualification Objectives
The students

- are acquainted with basic models of discrete and continuum percolation,
- acquire the skills needed to use specific probabilistic and graph-theoretical methods for the analysis of these models,
- know how to work self-organised and self-reflexive.

M Module: Stochastic Evolution Equations [M-MATH-102942]

Responsibility: Lutz Weis

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105910	Stochastic Evolution Equations (S. 441)	8	Lutz Weis

Conditions
none

M Module: Stochastic Geometry [M-MATH-102865]

Responsibility: Daniel Hug

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105840	Stochastic Geometry (S. 442)	8	Daniel Hug, Günter Last

Qualification Objectives
The students

- know the fundamental geometric models and characteristics in stochastic geometry,
- are familiar with properties of Poisson processes of geometric objects,
- know examples of applications of models of stochastic geometry,
- know how to work self-organised and self-reflexive.

Content

- Random Sets
- Geometric Point Processes
- Stationarity and Isotropy
- Germ Grain Models
- Boolean Models
- Foundations of Integral Geometry
- Geometric densities and characteristics
- Random Tessellations

Recommendations
It is recommended to attend the module 'Spatial Stochastics' previously.

Module: Spatial Stochastics [M-MATH-102903]

Responsibility: Günter Last

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105867	Spatial Stochastics (S. 427)	8	Daniel Hug, Günter Last

Conditions
none

Qualification Objectives
The students are familiar with some basic spatial stochastic processes. They do not only understand how to deal with general properties of distributions, but also know how to describe and apply specific models (Poisson process, Gaussian random fields). They know how to work self-organised and self-reflexive.

Content

- Point processes
- Random measures
- Poisson processes
- Gibbs point processes
- Ralm distributions
- Spatial ergodic theorem
- Spectral Theory of random fields
- Gaussian fields

Recommendations
It is recommended to attend the following modules previously: Probability Theory

M Module: Extreme Value Theory [M-MATH-102939]

Responsibility: Vicky Fasen-Hartmann

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105908	Extreme Value Theory (S. 258)	4	Vicky Fasen-Hartmann, Norbert Henze

Conditions
none

M Module: Stochastic Control [M-MATH-102908]

Responsibility: Nicole Bäuerle

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105871	Stochastic Control (S. 439)	4	Nicole Bäuerle

Conditions
none

M Module: Markov Decision Processes [M-MATH-102907]

Responsibility: Nicole Bäuerle

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105921	Markov Decision Processes (S. 315)	5	Nicole Bäuerle

Conditions
none

M Module: Time Series Analysis [M-MATH-102911]

Responsibility: Bernhard Klar

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105874	Time Series Analysis (S. 456)	4	Norbert Henze, Bernhard Klar

Conditions
none

M Module: Asymptotic Stochastics [M-MATH-102902]

Responsibility: Norbert Henze

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105866	Asymptotic Stochastics (S. 204)	8	Vicky Fasen-Hartmann, Norbert Henze, Bernhard Klar

Conditions
none

M Module: Poisson Processes [M-MATH-102922]

Responsibility: Günter Last

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105922	Poisson Processes (S. 367)	5	Vicky Fasen-Hartmann, Daniel Hug, Günter Last

Learning Control / Examinations
oral exam

Module Grade
Marking: grade of exam

Conditions
none

Qualification Objectives
The students know about important properties of the Poisson process. The focus is on probabilistic methods and results which are independent of the specific phase space. The students understand the central role of the Poisson process as a specific point process and as a random measure.

Content

- Distributional properties of Poisson processes
- The Poisson process as a particular point process
- stationary Poisson and point processes
- Random measures and Cox processes
- Poisson cluster processes and compound Poisson processes
- The spatial Gale-Shapley algorithm

M Module: Continuous Time Finance [M-MATH-102860]

Responsibility: Nicole Bäuerle

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105930	Continuous Time Finance (S. 230)	8	Nicole Bäuerle, Vicky Fasen-Hartmann

Module: Stein's Method [M-MATH-102946]

Responsibility: Matthias Schulte

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105914	Stein's Method (S. 436)	5	Matthias Schulte

Module Grade
Die Modulnote ist die Note der mündlichen Prüfung.

Conditions
none

M Module: Discrete Time Finance [M-MATH-102919]

Responsibility: Nicole Bäuerle

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Stochastics
Mathematical Methods / Elective Field Mathematical Methods / Stochastics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105839	Discrete Time Finance (S. 243)	8	Nicole Bäuerle, Vicky Fasen-Hartmann

Conditions
none

M Module: Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems [M-MATH-102883]

Responsibility: Michael Plum

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105854	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems (S. 228)	8	Michael Plum

M Module: Inverse Problems [M-MATH-102890]

Responsibility: Andreas Kirsch

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105835	Inverse Problems (S. 301)	8	Tilo Arens, Frank Hettlich, Andreas Kirsch, Andreas Rieder

M Module: Traveling Waves [M-MATH-102927]

Responsibility: Jens Rottmann-Matthes

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105897	Traveling Waves (S. 458)	6	Jens Rottmann-Matthes

M Module: Potential Theory [M-MATH-102879]

Responsibility: Andreas Kirsch

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105850	Potential Theory (S. 369)	8	Tilo Arens, Frank Hettlich, Andreas Kirsch, Wolfgang Reichel

M Module: Optimization in Banach Spaces [M-MATH-102924]

Responsibility: Andreas Kirsch

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105893	Optimization in Banach Spaces (S. 359)	8	Andreas Kirsch

Conditions
none

M Module: Evolution Equations [M-MATH-102872]

Responsibility: Roland Schnaubelt

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105844	Evolution Equations (S. 254)	8	Roland Schnaubelt, Lutz Weis

M Module: Spectral Theory [M-MATH-101768]

Responsibility: Lutz Weis

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
8	Jedes Sommersemester	1 Semester	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-103414	Spectral Theory - Exam (S. 434)	8	Gerd Herzog, Peer Kunstmann, Christoph Schmoeger, Roland Schnaubelt, Lutz Weis

Recommendations

It is recommended to attend the following modules previously:

- Linear Algebra 1+2
- Analysis 1-3
- Functional Analysis

M Module: Control Theory [M-MATH-102941]

Responsibility: Roland Schnaubelt

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105909	Control Theory (S. 231)	6	Roland Schnaubelt, Lutz Weis

Conditions
none

M Module: Calculus of Variations [M-MATH-102882]

Responsibility: Wolfgang Reichel

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105853	Calculus of Variations (S. 215)	8	Andreas Kirsch, Tobias Lamm, Michael Plum, Wolfgang Reichel

M Module: Integral Equations [M-MATH-102874]

Responsibility: Frank Hettlich

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105834	Integral Equations (S. 294)	8	Tilo Arens, Frank Hettlich, Andreas Kirsch

Recommendations
It is recommended to attend the following modules previously:
Linear Algebra 1+2
Analysis 1-3

M Module: Nonlinear Maxwell Equations [M-MATH-103257]

Responsibility: Roland Schnaubelt

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
3	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106484	Nonlinear Maxwell Equations (S. 334)	3	Roland Schnaubelt

Conditions
none

Content

- Short introduction to nonlinear contraction semigroups in Hilbert spaces and to the spaces H(curl) and H(div).

- Semilinear case:
Maxwell's equations with linear material laws and nonlinear conductivity. Wellposedness by means of maximal monotone operators. Long-term behavior.

- Quasilinear case:
Maxwell's equations with nonlinear instantaneous material laws. Local wellposedness on the whole space via linearisation, apriori estimates and regularization. Blow-up examples. Outlook to results on domains.

M Module: L2-Invariants [M-MATH-102952]

Responsibility: Holger Kammeyer

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105924	L2-Invariants (S. 303)	5	Holger Kammeyer, Roman Sauer

Conditions

none

M Module: Stochastic Differential Equations [M-MATH-102881]

Responsibility: Lutz Weis

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105852	Stochastic Differential Equations (S. 440)	8	Roland Schnaubelt, Lutz Weis

Content

- Brownian motion
- Martingales and Martingal inequalities
- Stochastic integrals and Ito's formula
- Existence and uniqueness of solutions for systems of stochastic differential equations
- Perturbation and stability results
- Application to equations in financial mathematics, physics and engineering
- Connection with diffusion equations and potential theory

M Module: Classical Methods for Partial Differential Equations [M-MATH-102870]

Responsibility: Michael Plum

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105832	Classical Methods for Partial Differential Equations (S. 218)	8	Dirk Hundertmark, Tobias Lamm, Michael Plum, Wolfgang Reichel, Jens Rottmann-Matthes, Roland Schnaubelt, Lutz Weis

M Module: Boundary and Eigenvalue Problems [M-MATH-102871]

Responsibility: Wolfgang Reichel

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105833	Boundary and Eigenvalue Problems (S. 210)	8	Dirk Hundertmark, Tobias Lamm, Michael Plum, Wolfgang Reichel, Jens Rottmann-Matthes, Roland Schnaubelt, Lutz Weis

M Module: Maxwell's Equations [M-MATH-102885]

Responsibility: Andreas Kirsch

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105856	Maxwell's Equations (S. 322)	8	Tilo Arens, Frank Hettlich, Andreas Kirsch

M Module: Dynamical Systems [M-MATH-103080]

Responsibility: Jens Rottmann-Matthes

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
8	Unregelmäßig	1 Semester	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106114	Dynamical Systems (S. 246)	8	Jens Rottmann-Matthes

Conditions
none

M Module: Fourier Analysis [M-MATH-102873]

Responsibility: Lutz Weis

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105845	Fourier Analysis (S. 268)	8	Roland Schnaubelt, Lutz Weis

Content

- Fourier series
- Fourier transform on L1 and L2
- Tempered distributions and their Fourier transform
- Explizit solutions of the Heat-, Schrödinger- and Wave equation in Rn
- the Hilbert transform
- the interpolation theorem of Marcinkiewicz
- Singular integral operators
- the Fourier multiplier theorem of Mihlin

M Module: Complex Analysis [M-MATH-102878]

Responsibility: Christoph Schmoeger

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105849	Complex Analysis (S. 222)	8	Gerd Herzog, Michael Plum, Wolfgang Reichel, Christoph Schmoeger, Roland Schnaubelt, Lutz Weis

Content

- infinite products
- Mittag-Leffler theorem
- Montel's theorem
- Riemann mapping theorem
- conformal mappings
- univalent (schlicht) functions
- automorphisms of some domains
- harmonic functions
- Schwarz reflection principle
- regular and singular points of power series

M Module: Functional Analysis [M-MATH-101320]

Responsibility: Roland Schnaubelt

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-102255	Functional Analysis (S. 269)	8	Gerd Herzog, Dirk Hundertmark, Tobias Lamm, Michael Plum, Wolfgang Reichel, Christoph Schmoeger, Roland Schnaubelt, Lutz Weis

Conditions
None

M Module: Special Functions and Applications in Potential Theory [M-MATH-101335]

Responsibility: Andreas Kirsch

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-102274	Special Functions and Applications in Potential Theory (S. 428)	5	Andreas Kirsch

Conditions
None

M Module: Bifurcation Theory [M-MATH-103259]

Responsibility: Rainer Mandel

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106487	Bifurcation Theory (S. 209)	5	Rainer Mandel

Conditions
None

Remarks
Course is held in English

M Module: Sobolev Spaces [M-MATH-102926]

Responsibility: Andreas Kirsch

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Analysis
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Analysis
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105896	Sobolev Spaces (S. 422)	5	Andreas Kirsch

M Module: Numerical Methods for Maxwell's Equations [M-MATH-102931]

Responsibility:	Marlis Hochbruck, Tobias Jahnke
Organisation:	KIT-Fakultät für Mathematik
Curricular Anchorage:	Compulsory Elective
Contained in:	Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization Elective Field Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105920	Numerical Methods for Maxwell's Equations (S. 345)	6	Marlis Hochbruck, Tobias Jahnke

M Module: Mathematical Methods of Imaging [M-MATH-103260]

Responsibility: Andreas Rieder

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106488	Mathematical Methods of Imaging (S. 318)	5	Andreas Rieder

Conditions
None

M Module: Functions of Operators [M-MATH-102936]

Responsibility: Volker Grimm

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105905	Functions of Operators (S. 271)	6	

M Module: Finite Element Methods [M-MATH-102891]

Responsibility: Willy Dörfler, Christian Wieners

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105857	Finite Element Methods (S. 264)	8	Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners

M Module: Numerical Methods for Differential Equations [M-MATH-102888]

Responsibility: Willy Dörfler, Tobias Jahnke

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105836	Numerical Methods for Differential Equations (S. 342)	8	Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners

M Module: Numerical Methods in Computational Electrodynamics [M-MATH-102894]

Responsibility: Willy Dörfler

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105860	Numerical Methods in Computational Electrodynamics (S. 347)	6	Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners

Conditions
none

M Module: Optimisation and Optimal Control for Differential Equations [M-MATH-102899]

Responsibility:	Christian Wieners
Organisation:	KIT-Fakultät für Mathematik
Curricular Anchorage:	Compulsory Elective
Contained in:	Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization Elective Field Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105864	Optimisation and Optimal Control for Differential Equations (S. 357)	4	

Conditions

none

M Module: Numerical Methods for Integral Equations [M-MATH-102930]

Responsibility: Tilo Arens

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105901	Numerical Methods for Integral Equations (S. 344)	8	Tilo Arens, Frank Hettlich, Andreas Kirsch

M Module: Project Centered Software-Lab [M-MATH-102938]

Responsibility: Gudrun Thäter

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105907	Project Centered Software-Lab (S. 375)	4	Gudrun Thäter

Conditions
none

M Module: Numerical Continuation Methods [M-MATH-102944]

Responsibility:	Jens Rottmann-Matthes
Organisation:	KIT-Fakultät für Mathematik
Curricular Anchorage:	Compulsory Elective
Contained in:	Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization Elective Field Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105912	Numerical Continuation Methods (S. 341)	5	Jens Rottmann-Matthes

Conditions

none

M Module: Numerical Methods for Hyperbolic Equations [M-MATH-102915]

Responsibility: Willy Dörfler

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105900	Numerical Methods for Hyperbolic Equations (S. 343)	6	Willy Dörfler

Conditions

none

Qualification Objectives

.

M Module: Advanced Inverse Problems: Nonlinearity and Banach Spaces [M-MATH-102955]

Responsibility: Andreas Rieder

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105927	Advanced Inverse Problems: Nonlinearity and Banach Spaces (S. 190)	5	Andreas Rieder

Conditions

none

M Module: Geometric Numerical Integration [M-MATH-102921]

Responsibility: Tobias Jahnke

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in:
Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105919	Geometric Numerical Integration (S. 274)	6	Marlis Hochbruck, Tobias Jahnke

Conditions
none

M Module: Introduction to Matlab and Numerical Algorithms [M-MATH-102945]

Responsibility: Daniel Weiß

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105913	Introduction to Matlab and Numerical Algorithms (S. 298)	5	Daniel Weiß, Christian Wieners

Conditions
none

M Module: Adaptive Finite Elemente Methods [M-MATH-102900]

Responsibility: Willy Dörfler

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105898	Adaptive Finite Element Methods (S. 188)	6	Willy Dörfler

Conditions
none

M Module: Special Topics of Numerical Linear Algebra [M-MATH-102920]

Responsibility: Marlis Hochbruck

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105891	Special Topics of Numerical Linear Algebra (S. 432)	8	Marlis Hochbruck

Conditions
none

M Module: Numerical Methods in Fluid Mechanics [M-MATH-102932]

Responsibility: Willy Dörfler, Gudrun Thäter

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105902	Numerical Methods in Fluid Mechanics (S. 348)	4	Willy Dörfler, Gudrun Thäter

M Module: Numerical Methods for Time-Dependent Partial Differential Equations [M-MATH-102928]

Responsibility: Marlis Hochbruck

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105899	Numerical Methods for Time-Dependent Partial Differential Equations (S. 346)	8	Marlis Hochbruck, Tobias Jahnke

M Module: Medical Imaging [M-MATH-102896]

Responsibility: Andreas Rieder

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105861	Medical Imaging (S. 323)	8	Andreas Rieder

Conditions
None

M Module: Wavelets [M-MATH-102895]

Responsibility: Andreas Rieder

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105838	Wavelets (S. 460)	8	Andreas Rieder

Module Grade
Die Modulnote ist die Note der mündlichen Prüfung.

Conditions
none

M Module: Numerical Methods in Mathematical Finance II [M-MATH-102914]

Responsibility: Tobias Jahnke

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105880	Numerical Methods in Mathematical Finance II (S. 350)	8	Tobias Jahnke

Conditions
none

M Module: Introduction to Scientific Computing [M-MATH-102889]

Responsibility: Willy Dörfler, Tobias Jahnke

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105837	Introduction to Scientific Computing (S. 299)	8	Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners

M Module: Introduction into Particulate Flows [M-MATH-102943]

Responsibility: Willy Dörfler

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
3	Einmalig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105911	Introduction into Particulate Flows (S. 296)	3	Willy Dörfler

Conditions
none

Module: Functions of Matrices [M-MATH-102937]

Responsibility: Volker Grimm

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105906	Functions of Matrices (S. 270)	8	Volker Grimm

Conditions
none

M Module: Compressive Sensing [M-MATH-102935]

Responsibility: Andreas Rieder

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105894	Compressive Sensing (S. 223)	5	Andreas Rieder

M Module: Mathematical Modelling and Simulation in Practise [M-MATH-102929]

Responsibility: Gudrun Thäter

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105889	Mathematical Modelling and Simulation in Practise (S. 319)	4	Gudrun Thäter

M Module: Mathematical Methods in Signal and Image Processing [M-MATH-102897]

Responsibility: Andreas Rieder

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105862	Mathematical Methods in Signal and Image Processing (S. 317)	8	Andreas Rieder

Conditions
none

M Module: Numerical Methods in Mathematical Finance [M-MATH-102901]

Responsibility: Tobias Jahnke

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105865	Numerical Methods in Mathematical Finance (S. 349)	8	Tobias Jahnke

Conditions
none

M Module: Numerical Optimisation Methods [M-MATH-102892]

Responsibility: Christian Wieners

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Analysis or Applied and Numerical Mathematics, Optimization / Applied and Numerical Mathematics, Optimization
Mathematical Methods / Elective Field Mathematical Methods / Applied and Numerical Mathematics, Optimization
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105858	Numerical Optimisation Methods (S. 351)	8	Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners

M Module: Convex Geometry [M-MATH-102864]

Responsibility: Daniel Hug

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105831	Convex Geometry (S. 233)	8	Daniel Hug

Qualification Objectives
The students

- know fundamental combinatorial, geometric and analytic properties of convex sets and convex functions and apply these to related problems,
- are familiar with fundamental geometric and analytic inequalities for functionals of convex sets and their applications to geometric extremal problems and can present central ideas and techniques of proofs,
- know selected integral formulas for convex sets and the required results on invariant measures.
- know how to work self-organized and self-reflexive.

Content
1. Convex Sets
1.1. Combinatorial Properties
1.2. Support and Separation Properties
1.3. Extremal Representations
2. Convex Functions
2.1. Basic Properties
2.2. Regularity
2.3. Support Function
3. Brunn-Minkowski Theory
3.1. Hausdorff Metric
3.2. Volume and Surface Area
3.3. Mixed Volumes
3.4. Geometric Inequalities
3.5. Surface Area Measures
3.6. Projection Functions
4. Integralgeometric Formulas
4.1. Invariant Measures
4.2. Projection and Section Formulas

M Module: Geometry of Schemes [M-MATH-102866]

Responsibility: Frank Herrlich

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105841	Geometry of Schemes (S. 275)	8	Frank Herrlich, Stefan Kühnlein

M Module: Algebraic Geometry [M-MATH-101724]

Responsibility: Frank Herrlich

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-103340	Algebraic Geometry (S. 198)	8	Frank Herrlich, Stefan Kühnlein

M Module: Comparison Geometry [M-MATH-102940]

Responsibility: Wilderich Tuschmann

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105917	Comparison Geometry (S. 221)	5	Wilderich Tuschmann

Conditions
none

M Module: Geometric Group Theory [M-MATH-102867]

Responsibility: Roman Sauer

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105842	Geometric Group Theory (S. 273)	8	Frank Herrlich, Enrico Leuzinger, Gabriele Link, Roman Sauer, Petra Schwer, Wilderich Tuschmann

M Module: Combinatorics in the Plane [M-MATH-102925]

Responsibility: Maria Aksenovich

Organisation: KIT-Fakultät für Mathematik
Curricular Anchorage: Compulsory Elective
Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
7	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105895	Combinatorics in the Plane (S. 220)	7	Maria Aksenovich, Torsten Ueckerdt

Learning Control / Examinations
The final grade is given based on an oral exam (approx. 30 min.).

Qualification Objectives
The students understand, can describe and use fundamental notions and techniques in discrete geometry. They can analyze, structure, and formally describe typical combinatorial geometric questions. The students can use results and methods such as the crossing lemma, the ham sandwich theorem, and Erdös-Szekeres-Theorem, as well as the developed proof ideas, in solving geometric problems. In particular, they can dualize configurations of points and lines and compute Helly numbers. The
students understand and critically use the combinatorial methods in discrete geometry. Moreover, the students can communicate using English technical terminology.

Content
This course is an introduction to a variety of standard and non-standard concepts in plane combinatorics. This contains but is not limited to planar point sets, intersection patterns, order relations, and geometric arrangements. The concepts are presented in a problem-oriented form, i.e., each concept is motivated by a typical problem in the field, such as a coloring problem, an extremal question, a structural question, or a problem of representability.

Recommendations
Basic knowledge of linear algebra, combinatorics and graph theory is recommended.

Remarks
Course is held in English

M Module: Algebra [M-MATH-101315]

Responsibility: Frank Herrlich

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Wintersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-102253	Algebra (S. 197)	8	Frank Herrlich, Stefan Kühnlein, Claus-Günther Schmidt

Conditions
None

M Module: Spin Manifolds, Alpha Invariant and Positive Scalar Curvature [M-MATH-102958]

Responsibility: Wilderich Tuschmann

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
5	Unregelmäßig	1 Semester	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105932	Spin Manifolds, Alpha Invariant and Positive Scalar Curvature (S. 187)	5	Stephan Klaus, Wilderich Tuschmann

M Module: Algebraic Number Theory [M-MATH-101725]

Responsibility: Claus-Günther Schmidt

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-103346	Algebraic Number Theory (S. 199)	8	Stefan Kühnlein, Claus-Günther Schmidt

M Module: Algebraic Topology II [M-MATH-102953]

Responsibility: Roman Sauer

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105926	Algebraic Topology II (S. 201)	8	Roman Sauer

Conditions
none

M Module: Combinatorics [M-MATH-102950]

Responsibility: Maria Aksenovich

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105916	Combinatorics (S. 219)	8	Maria Aksenovich, Torsten Ueckerdt

Learning Control / Examinations
The final grade is given based on the written final exam (3h).
By successfully working on the problem sets, a bonus can be obtained. If the grade in the final written exam is between 4,0 and 1,3, then the bonus improves the grade by one step (0,3 or 0,4).

Conditions
none

Qualification Objectives
The students understand, describe, and use fundamental notions and techniques in combinatorics. They can analyze, structure, and formally describe typical combinatorial questions. The students can use the results and methods such as inclusion-exclusion, generating functions, Young tableaux, as well as the developed proof ideas, in solving combinatorial problems. In particular, they can analyze the existence and the number of ordered and unordered arrangements of a given size. The students understand and critically use the combinatorial methods. Moreover, the students can communicate using English technical terminology.

Content
The course is an introduction into combinatorics. Starting with counting problems and bijections, classical methods such as inclusion-exclusion principle and generating functions are discussed. Further topics include Catalan families, permutations, Young tableaux, partial orders, and combinatorial designs.

Recommendations
Basic knowledge of linear algebra and analysis is recommended.

Remarks

- Regular cycle: every 2nd year, summer semester
- Course is held in English

M Module: Finite group schemes [M-MATH-103258]

Responsibility:	Frank Herrlich, Fabian Januszewski
Organisation:	KIT-Fakultät für Mathematik
Curricular Anchorage:	Compulsory Elective
Contained in:	Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field Additional Examinations

ECTS	Recurrence	Duration	Language	Version
4	Einmalig	1 Semester	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106486	Finite group schemes (S. 265)	4	Fabian Januszewski

M Module: Extremal Graph Theory [M-MATH-102957]

Responsibility: Maria Aksenovich

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
8	Unregelmäßig	1 Semester	Englisch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105931	Extremal Graph Theory (S. 257)	8	Maria Aksenovich, Torsten Ueckerdt

Learning Control / Examinations
The final grade is given based on an oral exam (approx. 30 min.).

Qualification Objectives
The students understand, describe, and use fundamental notions and techniques in extremal graph theory. They can analyze, structure, and formally describe typical combinatorial questions. The students understand and use Szemeredi's regularity lemma and Szemeredi's theorem, can use probabilistic techniques, such as dependent random choice and multistep random colorings, know the best bounds for the extremal numbers of complete graphs, cycles, complete bipartite graphs, and bipartite graphs with bounded maximum degree. They understand and can use the Ramsey theorem for graphs and hypergraphs, as well as stepping-up techniques for bounding Ramsey numbers. Moreover, the students know and understand the behavior of Ramsey numbers for graphs with bounded maximum degree. The students can communicate using English technical terminology.

Content
The course is concerned with advanced topics in graph theory. It focuses on the areas of extremal functions, regularity, and Ramsey theory for graphs and hypergraphs. Further topics include Turán's theorem, Erdös-Stone theorem, Szemerédi's lemma, graph colorings and probabilistic techniques.

Recommendations
Basic knowledge of linear algebra, analysis, and graph theory is recommended.

Remarks
Course is held in English

M Module: Differential Geometry [M-MATH-101317]

Responsibility: Wilderich Tuschmann

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Jedes Sommersemester	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-102275	Differential Geometry (S. 242)	8	Sebastian Grensing, Enrico Leuzinger, Wilderich Tuschmann

Conditions
None

M Module: Graph Theory [M-MATH-101336]

Responsibility:	Maria Aksenovich
Organisation:	KIT-Fakultät für Mathematik
Curricular Anchorage:	Compulsory Elective
Contained in:	Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field Additional Examinations

ECTS	Recurrence	Duration	Language	Version
8	Unregelmäßig	1 Semester	Englisch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-102273	Graph Theory (S. 280)	8	Maria Aksenovich, Torsten Ueckerdt

Learning Control / Examinations

The final grade is given based on the written final exam (3h).
By successfully working on the problem sets, a bonus can be obtained. If the grade in the final written exam is between 4,0 and 1,3, then the bonus improves the grade by one step (0,3 or 0,4).

Conditions

None

Qualification Objectives

The students understand, describe and use fundamental notions and techniques in graph theory. They can represent the appropriate mathematical questions in terms of graphs and use the results such as Menger's theorem, Kuratowski's theorem, Turan's theorem, as well as the developed proof ideas, to solve these problems. The students can analyze graphs in terms of their characteristics such as connectivity, planarity, and chromatic number. They are well positioned to understand graph theoretic methods and use them critically. Moreover, the students can communicate using English technical terminology.

Content

The course Graph Theory treats the fundamental properties of graphs, starting with basic ones introduced by Euler and including the modern results obtained in the last decade. The following topics are covered: structure of trees, paths, cycles and walks in graphs, minors, unavoidable subgraphs in dense graphs, planar graphs, graph coloring, Ramsey theory, and regularity in graphs.

Remarks

- Regular cycle: every 2nd year, winter semester
- Course is held in English

M Module: Rational Homotopy Theory [M-MATH-103256]

Responsibility: Manuel Amann, Roman Sauer

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
4	Einmalig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106483	Rational Homotopy Theory (S. 380)	4	Manuel Amann, Roman Sauer

Conditions

none

M Module: Global Differential Geometry [M-MATH-102912]

Responsibility: Wilderich Tuschmann

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105885	Global Differential Geometry (S. 276)	8	Sebastian Grensing, Wilderich Tuschmann

Conditions

none

M Module: Introduction to Geometric Measure Theory [M-MATH-102949]

Responsibility: Steffen Winter

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
6	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105918	Introduction to Geometric Measure Theory (S. 297)	6	Steffen Winter

Conditions
none

M Module: Algebraic Topology [M-MATH-102948]

Responsibility: Roman Sauer

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
8	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105915	Algebraic Topology (S. 200)	8	Holger Kammeyer, Roman Sauer

Conditions
none

M Module: Homotopy Theory [M-MATH-102959]

Responsibility: Roman Sauer

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
8	Unregelmäßig	1 Semester	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105933	Homotopy Theory (S. 284)	8	Roman Sauer

M Module: Group Actions in Riemannian Geometry [M-MATH-102954]

Responsibility: Wilderich Tuschmann

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
5	Unregelmäßig	1 Semester	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105925	Group Actions in Riemannian Geometry (S. 282)	5	Wilderich Tuschmann

Conditions

none

M Module: The Riemann Zeta Function [M-MATH-102960]

Responsibility: Fabian Januszewski

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory Elective

Contained in: Mathematical Methods / Elective Field Mathematical Methods / Algebra and Geometry
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
4	Unregelmäßig	1 Semester	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105934	The Riemann Zeta Function (S. 453)	4	Fabian Januszewski

M Module: Microeconomic Theory [M-WIWI-101500]

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
9	Jedes Semester	2 Semester	Deutsch	2

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102609	Advanced Topics in Economic Theory (S. 196)	4,5	Kay Mitusch
T-WIWI-102861	Advanced Game Theory (S. 189)	4,5	Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß
T-WIWI-102859	Social Choice Theory (S. 423)	4,5	Clemens Puppe
T-WIWI-102613	Auction Theory (S. 205)	4,5	Karl-Martin Ehrhart
T-WIWI-105781	Incentives in Organizations (S. 285)	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: Finance 3 [M-WIWI-101480]

Responsibility: Martin Ruckes, Marliese Uhrig-Homburg

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	2

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102647	Asset Pricing (S. 203)	4,5	Martin Ruckes, Marliese Uhrig-Homburg
T-WIWI-102621	Valuation (S. 459)	4,5	Martin Ruckes
T-WIWI-102643	Derivatives (S. 241)	4,5	Marliese Uhrig-Homburg
T-WIWI-102644	Fixed Income Securities (S. 266)	4,5	Marliese Uhrig-Homburg
T-WIWI-102645	Credit Risk (S. 235)	4,5	Marliese Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy (S. 234)	4,5	Martin Ruckes
T-WIWI-102623	Financial Intermediation (S. 263)	4,5	Martin Ruckes
T-WIWI-102625	Exchanges (S. 255)	1,5	Jörg Franke
T-WIWI-102626	Business Strategies of Banks (S. 214)	3	Wolfgang Müller
T-WIWI-102646	International Finance (S. 295)	3	Marliese Uhrig-Homburg
T-WIWI-102600	eFinance: Information Engineering and Management for Securities Trading (S. 248)	4,5	Christof Weinhardt
T-WIWI-102900	Financial Analysis (S. 261)	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: Finance 1 [M-WIWI-101482]

Responsibility: Martin Ruckes, Marliese Uhrig-Homburg

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102643	Derivatives (S. 241)	4,5	Marliese Uhrig-Homburg
T-WIWI-102621	Valuation (S. 459)	4,5	Martin Ruckes
T-WIWI-102647	Asset Pricing (S. 203)	4,5	Martin Ruckes, Marliese Uhrig-Homburg

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

Conditions
None

Qualification Objectives
The student

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

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

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

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

Responsibility: Oliver Grothe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Language	Version
9	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-103123	Advanced Statistics (S. 194)	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. 331)	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: Intelligent Risk and Investment Advisory [M-WIWI-103247]

Responsibility: Maxim Ulrich

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field

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. 227)	4,5	Maxim Ulrich
T-WIWI-106494	Bayesian Risk Analytics and Machine Learning (S. 207)	4,5	Maxim Ulrich
T-WIWI-106193	Engineering FinTech Solutions (S. 252)	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 obtain a practical and yet research oriented introduction into the field of quantitative and computational risk and investment management. Students learn how to use concepts from computer science, statistics, OR and economics to build intelligent risk and investment systems. Based on personal preferences, students can specialize within the module on either more practical programming and statistical learning points or more on the economic and mathematical insights and intuition.
After successful completion of the module, students know the industry intuition as well as state-of-the-art academic 'financial engineering' methods necessary to successfully contribute to sustainable and value oriented innovations in the field of intelligent risk and investment advisory.

Content
See respective lecture

Recommendations
None

Remarks
See respective lecture

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

M Module: Innovation and growth [M-WIWI-101478]

Responsibility: Ingrid Ott

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	2

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102840	Innovationtheory and -Policy (S. 289)	4,5	Ingrid Ott
T-WIWI-102785	Theory of Endogenous Growth (S. 454)	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 [M-WIWI-101502]

Responsibility: Kay Mitusch

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
9	Jedes Semester	1 Semester	Deutsch	3

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102622	Corporate Financial Policy (S. 234)	4,5	Martin Ruckes
T-WIWI-102623	Financial Intermediation (S. 263)	4,5	Martin Ruckes
T-WIWI-102647	Asset Pricing (S. 203)	4,5	Martin Ruckes, Marliese Uhrig-Homburg

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102609	Advanced Topics in Economic Theory (S. 196)	4,5	Kay Mitusch
T-WIWI-102861	Advanced Game Theory (S. 189)	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 [M-WIWI-101504]

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	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. 321)	4,5	Andranik Melik-Tangian
T-WIWI-102859	Social Choice Theory (S. 423)	4,5	Clemens Puppe
T-WIWI-102740	Public Management (S. 376)	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.

Remarks
The lecture "Mathematical Theory of Democracy" will not be offered from winter term 2017/2018. The last examination takes place in summer term 2017 (only for repeaters).

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

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

Responsibility: Ingrid Ott

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	2

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102785	Theory of Endogenous Growth (S. 454)	4,5	Ingrid Ott
T-WIWI-103107	Spatial Economics (S. 426)	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: Finance 2 [M-WIWI-101483]

Responsibility: Martin Ruckes, Marliese Uhrig-Homburg

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	2

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102644	Fixed Income Securities (S. 266)	4,5	Marliese Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy (S. 234)	4,5	Martin Ruckes
T-WIWI-102645	Credit Risk (S. 235)	4,5	Marliese Uhrig-Homburg
T-WIWI-102647	Asset Pricing (S. 203)	4,5	Martin Ruckes, Marliese Uhrig-Homburg
T-WIWI-102621	Valuation (S. 459)	4,5	Martin Ruckes
T-WIWI-102643	Derivatives (S. 241)	4,5	Marliese Uhrig-Homburg
T-WIWI-102646	International Finance (S. 295)	3	Marliese Uhrig-Homburg
T-WIWI-102626	Business Strategies of Banks (S. 214)	3	Wolfgang Müller
T-WIWI-102625	Exchanges (S. 255)	1,5	Jörg Franke
T-WIWI-102623	Financial Intermediation (S. 263)	4,5	Martin Ruckes
T-WIWI-102600	eFinance: Information Engineering and Management for Securities Trading (S. 248)	4,5	Christof Weinhardt
T-WIWI-102900	Financial Analysis (S. 261)	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: Insurance Management I [M-WIWI-101469]

Responsibility: Ute Werner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	3

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102603	Principles of Insurance Management (S. 372)	4,5	Ute Werner
T-WIWI-102601	Insurance Marketing (S. 291)	4,5	Edmund Schwake
T-WIWI-102648	Insurance Production (S. 292)	4,5	Ute Werner
T-WIWI-102637	Current Issues in the Insurance Industry (S. 236)	2	Wolf-Rüdiger Heilmann
T-WIWI-102636	Insurance Risk Management (S. 293)	2,5	Harald Maser
T-WIWI-102797	P&C Insurance Simulation Game (S. 362)	3	Ute Werner
T-WIWI-102649	Risk Communication (S. 382)	4,5	Ute Werner
T-WIWI-102841	Modelling, Measuring and Managing of Extreme Risks (S. 329)	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: Decision and Game Theory [M-WIWI-102970]

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Language	Version
9	Deutsch	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102613	Auction Theory (S. 205)	4,5	Karl-Martin Ehrhart
T-WIWI-102614	Experimental Economics (S. 256)	4,5	Timm Teubner, Christof Weinhardt
T-WIWI-102861	Advanced Game Theory (S. 189)	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 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 learns the basics of individual and strategic decisions on an advanced and formal level.
He learns to analyze economic problems through abstract and method-based thinking and to design solution strategies.
In the tutorials, the concepts and results of the lecture will be applied in case studies.

Content
See German version.

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

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

Responsibility: Johannes Philipp Reiß

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

ECTS	Language	Version
9	Deutsch	3

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102862	Predictive Mechanism and Market Design (S. 371)	4,5	Johannes Philipp Reiß
T-WIWI-102863	Topics in Experimental Economics (S. 457)	4,5	Johannes Philipp Reiß
T-WIWI-105781	Incentives in Organizations (S. 285)	4,5	Petra Nieken
T-WIWI-102614	Experimental Economics (S. 256)	4,5	Timm Teubner, Christof Weinhardt

Learning Control / Examinations

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

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

Conditions

None.

Qualification Objectives

Students

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

Content

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

Recommendations

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

Remarks

- The course *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: Econometrics and Statistics I [M-WIWI-101638]

Responsibility: Melanie Schienle

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-103066	Data Mining and Applications (S. 237)	4,5	Rheza Nakhaeizadeh
T-WIWI-103064	Financial Econometrics (S. 262)	4,5	Melanie Schienle
T-WIWI-103126	Non- and Semiparametrics (S. 333)	4,5	Melanie Schienle
T-WIWI-103127	Panel Data (S. 363)	4,5	Wolf-Dieter Heller
T-WIWI-103065	Statistical Modeling of generalized regression models (S. 435)	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
Starting winter term 2017/18, the course "*Advanced Statistics*" [2520020] is compulsory and must be examined.
The course Financial Econometrics [2520022] can only be passed if the course Time Series Analysis in the module Time Series Analysis and the course Generalized Regression Models in the module Generalized Regression Models have not be passed.

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: Finance - Risk Management - Managerial Economics
Elective Field
Additional Examinations

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-103066	Data Mining and Applications (S. 237)	4,5	Rheza Nakhaeizadeh
T-WIWI-103064	Financial Econometrics (S. 262)	4,5	Melanie Schienle
T-WIWI-103124	Multivariate Statistical Methods (S. 331)	4,5	Oliver Grothe
T-WIWI-103126	Non- and Semiparametrics (S. 333)	4,5	Melanie Schienle
T-WIWI-103127	Panel Data (S. 363)	4,5	Wolf-Dieter Heller
T-WIWI-103128	Portfolio and Asset Liability Management (S. 368)	4,5	Mher Safarian
T-WIWI-103065	Statistical Modeling of generalized regression models (S. 435)	4,5	Wolf-Dieter Heller
T-WIWI-103129	Stochastic Calculus and Finance (S. 437)	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.
The course Financial Econometrics [2520022] can only be passed if the course Time Series Analysis in the module Time Series Analysis and the course Generalized Regression Models in the module Generalized Regression Models have not be passed.

Modeled Conditions
The following conditions must be met:

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

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

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

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

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

Responsibility: Maxim Ulrich

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Finance - Risk Management - Managerial Economics
Elective Field

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-106193	Engineering FinTech Solutions (S. 252)	4,5	Maxim Ulrich
T-WIWI-106496	Computational FinTech with Python and C++ (S. 226)	1,5	
T-WIWI-106495	Automated Financial Advisory (S. 206)	3	Maxim Ulrich

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

Conditions
None.

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

Content
See respective lecture

Recommendations
None

Remarks
See respective lecture

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

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

Responsibility: Stefan Nickel

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	6

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102704	Facility Location and Strategic Supply Chain Management (S. 259)	4,5	Stefan Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management (S. 450)	4,5	Stefan Nickel

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102726	Global optimization I (S. 277)	4,5	Oliver Stein
T-WIWI-106199	Modeling and OR-Software: Introduction (S. 328)	4,5	Stefan Nickel
T-WIWI-106545	Optimization under uncertainty (S. 360)	5	Steffen Rebennack

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

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

Qualification Objectives
The student

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

Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics

service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.
This module considers several areas of Supply Chain Management. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities like production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of Supply Chain Management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints.
Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Management, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

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

Remarks
The examination Simulation I will be offered latest until winter term 2016/2017 (for beginners).
The planned lectures and courses for the next three years are announced online.

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

Responsibility: Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	7

Wahlpflichtangebot
Non-Compulsory Block; You must choose at least 1 courses and between 4,5 and 9 credits.

Identifier	Course	ECTS	Responsibility
T-WIWI-102726	Global optimization I (S. 277)	4,5	Oliver Stein
T-WIWI-103638	Global optimization I and II (S. 278)	9	Oliver Stein
T-WIWI-102724	Nonlinear Optimization I (S. 335)	4,5	Oliver Stein
T-WIWI-103637	Nonlinear Optimization I und II (S. 337)	9	Oliver Stein

Ergänzungsangebot
Non-Compulsory Block;

Identifier	Course	ECTS	Responsibility
T-WIWI-106546	Introduction to Stochastic Optimization (S. 300)	4,5	Steffen Rebennack
T-WIWI-102727	Global optimization II (S. 279)	4,5	Oliver Stein
T-WIWI-102725	Nonlinear Optimization II (S. 339)	4,5	Oliver Stein
T-WIWI-102704	Facility Location and Strategic Supply Chain Management (S. 259)	4,5	Stefan Nickel

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

Conditions
At least one of the courses *Nonlinear Optimization I* and *Global Optimization I* has to be examined.

Qualification Objectives
The student

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

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous

decision variables. The lectures on nonlinear programming deal with local solution concepts, whereas the lectures on global optimization treat approaches for global solutions.

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

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

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

M Module: Mathematical Programming [M-WIWI-101473]

Responsibility: Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	2

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102719	Mixed Integer Programming I (S. 324)	4,5	Oliver Stein
T-WIWI-102733	Mixed Integer Programming I and II (S. 325)	9	Oliver Stein
T-WIWI-102856	Convex Analysis (S. 232)	4,5	Oliver Stein
T-WIWI-102855	Parametric Optimization (S. 364)	4,5	Oliver Stein

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106548	Advanced Stochastic Optimization (S. 195)	4,5	Steffen Rebennack
T-WIWI-102720	Mixed Integer Programming II (S. 326)	4,5	Oliver Stein
T-WIWI-102726	Global optimization I (S. 277)	4,5	Oliver Stein
T-WIWI-102727	Global optimization II (S. 279)	4,5	Oliver Stein
T-WIWI-103638	Global optimization I and II (S. 278)	9	Oliver Stein
T-WIWI-102723	Graph Theory and Advanced Location Models (S. 281)	4,5	Stefan Nickel
T-WIWI-106549	Large-scale Optimization (S. 304)	4,5	Steffen Rebennack
T-WIWI-102724	Nonlinear Optimization I (S. 335)	4,5	Oliver Stein
T-WIWI-102725	Nonlinear Optimization II (S. 339)	4,5	Oliver Stein
T-WIWI-103637	Nonlinear Optimization I und II (S. 337)	9	Oliver Stein
T-WIWI-102715	Operations Research in Supply Chain Management (S. 355)	4,5	Stefan Nickel

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

Conditions
At least one of the courses “Mixed Integer Programming I”, “Parametric Optimization” and “Convex Analysis” has to be taken.

Qualification Objectives
The student

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content

The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous and mixed integer decision variables.

Remarks

The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).
For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload

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

M Module: Stochastic Methods and Simulation [M-WIWI-101400]

Responsibility: Karl-Heinz Waldmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	5

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102710	Markov Decision Models I (S. 313)	5	Karl-Heinz Waldmann
T-WIWI-102627	Simulation I (S. 419)	4,5	Karl-Heinz Waldmann

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102711	Markov Decision Models II (S. 314)	4,5	Karl-Heinz Waldmann
T-WIWI-102703	Simulation II (S. 420)	4,5	Karl-Heinz Waldmann
T-WIWI-102724	Nonlinear Optimization I (S. 335)	4,5	Oliver Stein
T-WIWI-102714	Tactical and Operational Supply Chain Management (S. 450)	4,5	Stefan Nickel

Learning Control / Examinations
The module is not offered from summer term 2017.
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
At least one of the courses Markov Decision Models [2550679] or Simulation I [2550662] has to be attended.

Qualification Objectives
The student posses profound 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.

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

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).
- T-WIWI-102710 Markov Decision Models I will be offered latest until summer term 2017 (for beginners).

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

M Module: Stochastic Modelling and Optimization [M-WIWI-101454]

Responsibility: Karl-Heinz Waldmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106546	Introduction to Stochastic Optimization (S. 300)	4,5	Steffen Rebennack
T-WIWI-102628	Optimization in a Random Environment (S. 358)	4,5	Karl-Heinz Waldmann
T-WIWI-102730	OR-Oriented Modeling and Analysis of Real Problems (Project) (S. 361)	4,5	Karl-Heinz Waldmann
T-WIWI-102728	Quality Control I (S. 377)	4,5	Karl-Heinz Waldmann
T-WIWI-102729	Quality Control II (S. 378)	4,5	Karl-Heinz Waldmann
T-WIWI-102627	Simulation I (S. 419)	4,5	Karl-Heinz Waldmann
T-WIWI-102703	Simulation II (S. 420)	4,5	Karl-Heinz Waldmann
T-WIWI-102710	Markov Decision Models I (S. 313)	5	Karl-Heinz Waldmann
T-WIWI-102711	Markov Decision Models II (S. 314)	4,5	Karl-Heinz Waldmann

Learning Control / Examinations
The module is not offered from summer term 2017.
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: Energy Economics and Technology [M-WIWI-101452]

Responsibility: Wolf Fichtner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
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-102650	Energy and Environment (S. 250)	4,5	Ute Karl
T-WIWI-102633	Strategical Aspects of Energy Economy (S. 446)	3,5	Armin Ardone
T-WIWI-102694	Technological Change in Energy Economics (S. 451)	3	Martin Wietschel
T-WIWI-102695	Heat Economy (S. 283)	3	Wolf Fichtner
T-WIWI-102830	Energy Systems Analysis (S. 251)	3	Valentin Bertsch
T-WIWI-102793	Efficient Energy Systems and Electric Mobility (S. 247)	3,5	Patrick Jochem, Russell McKenna

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
To integrate the module "Energy Economics and Technology" in the degree programme "Wirtschaftsmathematik" it is compulsory to choose the course „Energy Systems Analysis".

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: Stochastic Optimization [M-WIWI-103289]

Responsibility: Steffen Rebennack

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106546	Introduction to Stochastic Optimization (S. 300)	4,5	Steffen Rebennack
T-WIWI-106548	Advanced Stochastic Optimization (S. 195)	4,5	Steffen Rebennack
T-WIWI-106549	Large-scale Optimization (S. 304)	4,5	Steffen Rebennack

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102723	Graph Theory and Advanced Location Models (S. 281)	4,5	Stefan Nickel
T-WIWI-102719	Mixed Integer Programming I (S. 324)	4,5	Oliver Stein
T-WIWI-102720	Mixed Integer Programming II (S. 326)	4,5	Oliver Stein
T-WIWI-103124	Multivariate Statistical Methods (S. 331)	4,5	Oliver Grothe
T-WIWI-102715	Operations Research in Supply Chain Management (S. 355)	4,5	Stefan Nickel
T-WIWI-106552	Simulation of Stochastic Systems (S. 421)	4,5	Oliver Grothe, Steffen Rebennack

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

Conditions
At least one of the courses "Advanced Stochastic Optimization" and "Large-scale Optimization"has to be taken.

Qualification Objectives
The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,

- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Recommendations
It is recommended to listen to the lecture “Introduction to Stochastic Optimization” before the lecture “Advanced Stochastic Optimization” is visited.

M Module: Marketing Management [M-WIWI-101490]

Responsibility: Martin Klarmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Sommersemester	1 Semester	4

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106569	Consumer Behavior (S. 229)	3	Sven Feurer
T-WIWI-102902	Marketing Communication (S. 311)	4,5	Ju-Young Kim
T-WIWI-102835	Marketing Strategy Business Game (S. 312)	1,5	Martin Klarmann
T-WIWI-102811	Market Research (S. 310)	4,5	Martin Klarmann
T-WIWI-102901	Open Innovation - Concepts, Methods and Best Practices (S. 352)	1,5	Alexander Hahn
T-WIWI-102812	Product and Innovation Management (S. 374)	3	Martin Klarmann
T-WIWI-102842	Strategic Brand Management (S. 444)	1,5	Joachim Blickhäuser, Martin Klarmann
T-WIWI-102618	Strategic and Innovative Decision Making in Marketing (S. 443)	4,5	Bruno Neibecker
T-WIWI-102619	Behavioral Approaches in Marketing (S. 208)	4,5	Bruno Neibecker

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
The course "Market Research" is obligatory.

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 “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: Service Operations [M-WIWI-102805]

Responsibility: Stefan Nickel

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
9	Jedes Semester	1 Semester	Deutsch	4

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102715	Operations Research in Supply Chain Management (S. 355)	4,5	Stefan Nickel
T-WIWI-102884	Operations Research in Health Care Management (S. 354)	4,5	Stefan Nickel
T-WIWI-102716	Practical Seminar: Health Care Management (with Case Studies) (S. 370)	4,5	Stefan Nickel

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics (S. 244)	4,5	Stefan Nickel
T-WIWI-102860	Supply Chain Management in the Process Industry (S. 448)	4,5	Stefan Nickel
T-WIWI-102872	Challenges in Supply Chain Management (S. 216)	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: Informatics [M-WIWI-101472]

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

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Jedes Semester	1 Semester	5

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102759	Requirements Analysis and Requirements Management (S. 381)	4	Ralf Kneuper
T-WIWI-102651	Applied Informatics II - IT Systems for eCommerce (S. 202)	5	York Sure-Vetter
T-WIWI-102680	Computational Economics (S. 224)	5	Pradyumn Kumar Shukla
T-WIWI-102661	Database Systems and XML (S. 239)	5	Andreas Oberweis
T-WIWI-102663	Document Management and Groupware Systems (S. 245)	4	Stefan Klink
T-WIWI-102668	Enterprise Architecture Management (S. 253)	5	Thomas Wolf
T-WIWI-106423	Information Service Engineering (S. 287)	5	Harald Sack
T-WIWI-102666	Knowledge Discovery (S. 302)	5	York Sure-Vetter
T-WIWI-102667	Management of IT-Projects (S. 308)	5	Roland Schätzle
T-WIWI-106340	Machine Learning 1 - Basic Methods (S. 305)	5	Johann Marius Zöllner
T-WIWI-106341	Machine Learning 2 – Advanced Methods (S. 306)	5	Johann Marius Zöllner
T-WIWI-102697	Business Process Modelling (S. 212)	5	Andreas Oberweis
T-WIWI-102679	Nature-Inspired Optimisation Methods (S. 332)	5	Pradyumn Kumar Shukla
T-WIWI-102874	Semantic Web Technologies (S. 383)	5	Andreas Harth, York Sure-Vetter
T-WIWI-105801	Service Oriented Computing (S. 418)	5	York Sure-Vetter
T-WIWI-102895	Software Quality Management (S. 424)	5	Andreas Oberweis
T-WIWI-102676	Special Topics of Enterprise Information Systems (S. 430)	5	Andreas Oberweis
T-WIWI-102657	Special Topics of Efficient Algorithms (S. 429)	5	Hartmut Schmeck
T-WIWI-102678	Special Topics of Software- and Systemsengineering (S. 433)	5	Andreas Oberweis
T-WIWI-102671	Special Topics of Knowledge Management (S. 431)	5	York Sure-Vetter
T-WIWI-102669	Strategic Management of Information Technology (S. 445)	5	Thomas Wolf
T-WIWI-103112	Web Science (S. 461)	5	York Sure-Vetter
T-WIWI-102662	Workflow-Management (S. 462)	5	Andreas Oberweis
T-WIWI-103523	Advanced Lab Informatics (S. 191)	4	Andreas Oberweis, Harald Sack, Hartmut Schmeck, 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.

Remarks

The course "Document Management and Groupware Systems" expires after summer term 2017. Last examination date is winter term 2017/2018 (only for repeaters).

Workload

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

M Module: Operations Research in Supply Chain Management [M-WIWI-102832]

Responsibility: Stefan Nickel

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Management - Data Analysis - Informatics
Elective Field
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
9	Jedes Semester	2 Semester	Deutsch	4

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102723	Graph Theory and Advanced Location Models (S. 281)	4,5	Stefan Nickel
T-WIWI-106200	Modeling and OR-Software: Advanced Topics (S. 327)	4,5	Stefan Nickel
T-WIWI-102715	Operations Research in Supply Chain Management (S. 355)	4,5	Stefan Nickel

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics (S. 244)	4,5	Stefan Nickel
T-WIWI-106548	Advanced Stochastic Optimization (S. 195)	4,5	Steffen Rebennack
T-WIWI-102719	Mixed Integer Programming I (S. 324)	4,5	Oliver Stein
T-WIWI-102720	Mixed Integer Programming II (S. 326)	4,5	Oliver Stein
T-WIWI-106549	Large-scale Optimization (S. 304)	4,5	Steffen Rebennack
T-WIWI-102704	Facility Location and Strategic Supply Chain Management (S. 259)	4,5	Stefan Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management (S. 450)	4,5	Stefan Nickel

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

Conditions
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.

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: Seminar [M-WIWI-102971]

Responsibility: Hagen Lindstädt, Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Elective Field

ECTS	Language	Version
3	Deutsch	1

Wahlpflichtangebot
Non-Compulsory Block; You must choose 3 credits.

Identifier	Course	ECTS	Responsibility
T-WIWI-103474	Seminar in Business Administration A (Master) (S. 385)	3	Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters
T-WIWI-103478	Seminar in Economics A (Master) (S. 399)	3	Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger
T-WIWI-103483	Seminar in Statistics A (Master) (S. 415)	3	Oliver Grothe, Melanie Schienle

Learning Control / Examinations
The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.
The final mark for the module is the mark of the seminar.

Conditions
None.

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.

Recommendations

None.

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.

M Module: Seminar [M-WIWI-102973]

Responsibility: Hagen Lindstädt, Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Elective Field

ECTS	Language	Version
3	Deutsch	1

Wahlpflichtangebot

Non-Compulsory Block; You must choose 3 credits.

Identifier	Course	ECTS	Responsibility
T-WIWI-103479	Seminar in Informatics A (Master) (S. 401)	3	Andreas Oberweis, Harald Sack, Hartmut Schmeck, York Sure-Vetter, Johann Marius Zöllner
T-WIWI-103481	Seminar in Operations Research A (Master) (S. 411)	3	Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann

Learning Control / Examinations

The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.
The final mark for the module is the mark of the seminar.

Conditions

None.

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.

Recommendations

None.

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.

M Module: Seminar [M-MATH-102730]

Responsibility: Stefan Kühnlein

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory

Contained in: Mathematical Seminar

ECTS	Recurrence	Duration	Language	Version
3	Jedes Semester	1 Semester	Deutsch	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-105686	Seminar Mathematics (S. 417)	3	

M Module: Seminar [M-WIWI-102972]

Responsibility: Hagen Lindstädt, Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Elective Field

ECTS	Recurrence	Duration	Language	Version
3	Jedes Semester	1 Semester	Deutsch/Englisch	1

Wahlplfichtangebot

Non-Compulsory Block; You must choose 1 courses.

Identifier	Course	ECTS	Responsibility
T-WIWI-103476	Seminar in Business Administration B (Master) (S. 392)	3	Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters
T-WIWI-103477	Seminar in Economics B (Master) (S. 400)	3	Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger
T-WIWI-103484	Seminar in Statistics B (Master) (S. 416)	3	Oliver Grothe, Melanie Schienle

Learning Control / Examinations

The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.
The final mark for the module is the mark of the seminar

Conditions

None.

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.

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 90 hours.

M Module: Seminar [M-WIWI-102974]

Responsibility: Hagen Lindstädt, Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Elective Field

ECTS	Recurrence	Duration	Language	Version
3	Jedes Semester	1 Semester	Deutsch/Englisch	1

Wahlplfichtangebot

Non-Compulsory Block; You must choose 1 courses.

Identifier	Course	ECTS	Responsibility
T-WIWI-103480	Seminar in Informatics B (Master) (S. 406)	3	Andreas Oberweis, Harald Sack, Hartmut Schmeck, York Sure-Vetter, Johann Marius Zöllner
T-WIWI-103482	Seminar in Operations Research B (Master) (S. 413)	3	Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann

Learning Control / Examinations

The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.
The final mark for the module is the mark of the seminar

Conditions

None.

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.

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 90 hours.

Part V

Courses

T Course: Spin Manifolds, Alpha Invariant and Positive Scalar Curvature [T-MATH-105932]

Responsibility: Stephan Klaus, Wilderich Tuschmann
Contained in: [M-MATH-102958] Spin Manifolds, Alpha Invariant and Positive Scalar Curvature

ECTS	Version
5	1

T Course: Adaptive Finite Element Methods [T-MATH-105898]

Responsibility: Willy Dörfler
Contained in: [M-MATH-102900] Adaptive Finite Elemente Methods

ECTS	Version
6	1

Conditions
none

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-102970] Decision and Game Theory

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	Johannes Brumm, Karl-Martin Ehrhart, Nora Szech
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.

V Event excerpt: 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 Inverse Problems: Nonlinearity and Banach Spaces [T-MATH-105927]

Responsibility: Andreas Rieder
Contained in: [M-MATH-102955] Advanced Inverse Problems: Nonlinearity and Banach Spaces

ECTS	Version
5	1

Conditions
none

T Course: Advanced Lab Informatics [T-WIWI-103523]

Responsibility: Andreas Oberweis, Harald Sack, Hartmut Schmeck, York Sure-Vetter, Johann Marius Zöllner
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
4	deutsch/englisch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2512200		Praktikum (P)	3	Murat Citak, Andreas Fritsch, Andreas Oberweis, Andreas Schoknecht, Meike Ullrich
WS 16/17	2512100	Security	Praktikum (P)	4	Kaibin Bao, Hartmut Schmeck
WS 16/17	2512310	Smart Services and the IoT	Seminar / Praktikum (S/P)		Johannes Kunze von Bischhoffshausen, Maria Maleshkova, York Sure-Vetter, Tobias Weller
WS 16/17	2512307	Applications of Semantic MediaWiki	Seminar / Praktikum (S/P)	3	Matthias Frank, Maria Maleshkova, Achim Rettinger, Rudi Studer, York Sure-Vetter, Tobias Weller
WS 16/17	2512101		Praktikum (P)	3	Andreas Drescher, Andreas Oberweis, Frederic Toussaint
WS 16/17	2512301		Seminar / Praktikum (S/P)	3	Maribel Acosta Deibe, Andreas Harth, Tobias Christof Käfer, Rudi Studer, York Sure-Vetter
SS 2017	2512101		Praktikum (P)	3	Andreas Drescher, Andreas Oberweis, Frederic Toussaint
SS 2017	2512500		Praktikum (P)	3	Johann Marius Zöllner
SS 2017	2512300		Seminar / Praktikum (S/P)	3	Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma
SS 2017	2512200		Praktikum (P)	3	Andreas Drescher, Andreas Oberweis

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.

V Event excerpt: Smart Services and the IoT (WS 16/17)

Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

V Event excerpt: 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

V Event excerpt: (SS 2017)

Aim
Die Studierenden können Kenntnisse aus der Vorlesung Maschinelles Lernen auf einem ausgewählten Gebiet der aktuellen Forschung im Bereich Robotik oder kognitive Automobile praktisch anwenden.
Die Studierenden beherrschen die Analyse und Lösung entsprechender Problemstellungen im Team.
Die Studierenden können ihre Konzepte und Ergebnisse evaluieren, dokumentieren und präsentieren.

Content
Umsetzung einzelner, durch die Studenten ausgewählter Verfahren des Maschinellen Lernens an einer konkreten Aufgabenstellung entweder aus dem Bereich Robotik oder kognitive Automobile.

Die einzelnen Projekte erfordern die Analyse der gestellten Aufgabe, Auswahl geeigneter Lernverfahren, Spezifikation und Implementierung und Evaluierung eines Lösungsansatzes. Schließlich ist die gewählte Lösung zu dokumentieren und in einem Kurzvortrag vorzustellen.

Workload
Der Arbeitsaufwand von 4 SWS setzt sich zusammen aus Präsenzzeit am Versuchsort zur praktischen Umsetzung der gewählten Lösung, sowie der Zeit für Literaturrecherchen und Planung/Spezifikation der geplanten Lösung. Zusätzlich

wird ein kurzer Bericht und eine Präsentation der durchgeführten Arbeit erstellt.

V Event excerpt: (SS 2017)

Content

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature

Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Event excerpt: (WS 16/17)

Workload

Topicsof interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

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	Oliver Grothe, Laura Hersing

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 Stochastic Optimization [T-WIWI-106548]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Recurrence	Version
4,5	Unregelmäßig	1

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Conditions
None.

T Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsibility: Kay Mitusch
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101502] Economic Theory and its Application in Finance

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: Algebra [T-MATH-102253]

Responsibility: Frank Herrlich, Stefan Kühnlein, Claus-Günther Schmidt
Contained in: [M-MATH-101315] Algebra

ECTS	Version
8	1

T Course: Algebraic Geometry [T-MATH-103340]

Responsibility: Frank Herrlich, Stefan Kühnlein
Contained in: [M-MATH-101724] Algebraic Geometry

ECTS	Version
8	1

T Course: Algebraic Number Theory [T-MATH-103346]

Responsibility: Stefan Kühnlein, Claus-Günther Schmidt
Contained in: [M-MATH-101725] Algebraic Number Theory

ECTS	Version
8	1

T Course: Algebraic Topology [T-MATH-105915]

Responsibility: Holger Kammeyer, Roman Sauer
Contained in: [M-MATH-102948] Algebraic Topology

ECTS	Recurrence	Version
8	Unregelmäßig	1

Conditions
none

T Course: Algebraic Topology II [T-MATH-105926]

Responsibility: Roman Sauer
Contained in: [M-MATH-102953] Algebraic Topology II

ECTS	Recurrence	Version
8	Unregelmäßig	1

Conditions
none

T Course: Applied Informatics II - IT Systems for eCommerce [T-WIWI-102651]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	deutsch	Jedes Sommersemester	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511033		Übung (Ü)	1	Agnes Koschmider
SS 2017	2511032	Applied Informatics II: IT Systems for e-Commerce	Vorlesung (V)	2	Agnes Koschmider

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.

V Event excerpt: Applied Informatics II: IT Systems for e-Commerce (SS 2017)

Aim
The student learns about concepts and technologies for designing big, distributed application architectures. Students apply industryrelevant technology to solve application-oriented problems in lab classes.

Content
The course Applied Informatics II [2511032] covers various facets of electronic commerce which have to be supported by adequate and efficient distributed information systems. Key topics are middleware technologies and distributed application architectures. Document description and exchange (incl. XML), Java EE, Web technologies, and Web services are additional topics.

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

Literature
Tba in the lecture.

T Course: Asset Pricing [T-WIWI-102647]

Responsibility: Martin Ruckes, Marliese Uhrig-Homburg
Contained in: [M-WIWI-101480] Finance 3
[M-WIWI-101482] Finance 1
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101483] Finance 2

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2530556		Übung (Ü)	1	Marcel Müller, Martin Ruckes, Marliese Uhrig-Homburg
SS 2017	2530555	Asset Pricing	Vorlesung (V)	2	Martin Ruckes, Marliese Uhrig-Homburg

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

V Event excerpt: Asset Pricing (SS 2017)

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: Asymptotic Stochastics [T-MATH-105866]

Responsibility: Vicky Fasen-Hartmann, Norbert Henze, Bernhard Klar
Contained in: [M-MATH-102902] Asymptotic Stochastics

ECTS	Version
8	1

Conditions
none

T Course: Auction Theory [T-WIWI-102613]

Responsibility: Karl-Martin Ehrhart
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-102970] Decision and Game Theory

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

V Event excerpt: (WS 16/17)

Aim
The student

- learns the game-theoretic modeling and analysis of auctions,
- learns about various auction formats and their specific characteristics,
- understands the challenge for participating in auctions as bidder,
- understands the challenge of designing auctions as auctioneer,
- gains insight into practice by case studies,
- participates in and analyzes demonstration experiments.

Content
This course deals with the analysis and modeling of auction which are based on game theory. This also includes aspects of applying and designing auctions as well as experiences with auctions. Main topics are:

- Single- and multi-unit auctions
- Selling and procurement auctions
- Electronic auctions (e.g. eBay, C2C, B2B)
- Multi-attributive auctions.

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

Literature

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

T Course: Automated Financial Advisory [T-WIWI-106495]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103261] Disruptive FinTech Innovations

ECTS	Recurrence	Version
3	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2530372	Automated Financial Advisory (Master)	Seminar (S)	2	Maxim Ulrich

Learning Control / Examinations
The grade consists of a written thesis and an oral presentation.

Conditions
There are two conditions for taking this course:

1. This course is only open for registered students of the module "Disruptive FinTech Innovations".
2. Registered students do also attend in the same semester the lecture "Engineering FinTech Solutions" and the programming internship "Computational FinTech with Python and C++".

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-106193] *Engineering FinTech Solutions* must have been started.
2. The course [T-WIWI-106496] *Computational FinTech with Python and C++* must have been started.

V Event excerpt: Automated Financial Advisory (Master) (SS 2017)

Aim
In this seminar students work on issues related to the automatization of risk and investment management applications.

Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

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

Literature
Literature will be distributed during the first lecture.

T Course: Bayesian Risk Analytics and Machine Learning [T-WIWI-106494]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103247] Intelligent Risk and Investment Advisory

ECTS	Recurrence	Version
4,5	Jedes Wintersemester	1

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 period. Students who fail the exam are allowed to retake the exam.

Conditions

None.

Recommendations

It is recommend that students have studied the material of „Computational Risk and Asset Management“.

Remarks

New course starting winter term 2017/2018.

T Course: Behavioral Approaches in Marketing [T-WIWI-102619]

Responsibility: Bruno Neibecker
Contained in: [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

V Event excerpt: 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: Bifurcation Theory [T-MATH-106487]

Responsibility: Rainer Mandel
Contained in: [M-MATH-103259] Bifurcation Theory

ECTS	Recurrence	Version
5	Unregelmäßig	1

Conditions
None

T Course: Boundary and Eigenvalue Problems [T-MATH-105833]

Responsibility: Dirk Hundertmark, Tobias Lamm, Michael Plum, Wolfgang Reichel, Jens Rottmann-Matthes, Roland Schnaubelt, Lutz Weis

Contained in: [M-MATH-102871] Boundary and Eigenvalue Problems

ECTS	Version
8	1

T Course: Brownian Motion [T-MATH-105868]

Responsibility: Nicole Bäuerle, Vicky Fasen-Hartmann, Günter Last
Contained in: [M-MATH-102904] Brownian Motion

ECTS	Version
4	1

Conditions
none

T Course: Business Process Modelling [T-WIWI-102697]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101472] 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

V Event excerpt: 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

V Event excerpt: 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: Calculus of Variations [T-MATH-105853]

Responsibility: Andreas Kirsch, Tobias Lamm, Michael Plum, Wolfgang Reichel
Contained in: [M-MATH-102882] Calculus of Variations

ECTS	Version
8	1

T Course: Challenges in Supply Chain Management [T-WIWI-102872]

Responsibility: Robert Blackburn
Contained in: [M-WIWI-102805] Service Operations

ECTS	Language	Recurrence	Version
4,5	englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550494	Challenges in Supply Chain Management	Vorlesung (V)	3	Robert Blackburn, Jan Buchmann

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.

V Event excerpt: Challenges in Supply Chain Management (SS 2017)

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: Classical Methods for Partial Differential Equations [T-MATH-105832]

Responsibility: Dirk Hundertmark, Tobias Lamm, Michael Plum, Wolfgang Reichel, Jens Rottmann-Matthes, Roland Schnaubelt, Lutz Weis

Contained in: [M-MATH-102870] Classical Methods for Partial Differential Equations

ECTS	Version
8	1

T Course: Combinatorics [T-MATH-105916]

Responsibility: Maria Aksenovich, Torsten Ueckerdt
Contained in: [M-MATH-102950] Combinatorics

ECTS	Recurrence	Version
8	Unregelmäßig	1

Conditions
none

T Course: Combinatorics in the Plane [T-MATH-105895]

Responsibility: Maria Aksenovich, Torsten Ueckerdt
Contained in: [M-MATH-102925] Combinatorics in the Plane

ECTS	Version
7	1

Conditions
none

T Course: Comparison Geometry [T-MATH-105917]

Responsibility: Wilderich Tuschmann
Contained in: [M-MATH-102940] Comparison Geometry

ECTS	Recurrence	Version
5	Unregelmäßig	1

Conditions
Keine

T Course: Complex Analysis [T-MATH-105849]

Responsibility: Gerd Herzog, Michael Plum, Wolfgang Reichel, Christoph Schmoeger, Roland Schnaubelt, Lutz Weis

Contained in: [M-MATH-102878] Complex Analysis

ECTS	Version
8	1

T Course: Compressive Sensing [T-MATH-105894]

Responsibility: Andreas Rieder
Contained in: [M-MATH-102935] Compressive Sensing

ECTS	Version
5	1

T Course: Computational Economics [T-WIWI-102680]

Responsibility: Pradyumn Kumar Shukla
Contained in: [M-WIWI-101472] 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.

V Event excerpt: 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 FinTech with Python and C++ [T-WIWI-106496]

Responsibility:
Contained in: [M-WIWI-103261] Disruptive FinTech Innovations

ECTS	Recurrence	Version
1,5	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2530373		Praktikum (P)	2	Maxim Ulrich

Learning Control / Examinations
The grade is based on a larger or several smaller programming exercises.

Conditions
There are two conditions for taking this course:

1. This course is only open for registered students of the module “Disruptive FinTech Innovations”.
2. Registered students do also attend in the same semester the lecture “Engineering FinTech Solutions” and the seminar “Automated Financial Advisory”.

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-106193] *Engineering FinTech Solutions* must have been started.
2. The course [T-WIWI-106495] *Automated Financial Advisory* must have been started.

V Event excerpt: (SS 2017)

Aim
Implementation of different programming specific concepts and skills.

Content
At the beginning of the semester, each student receives a personalized set of programming tasks .

Workload
Roughly 45 hours.

T Course: Computational Risk and Asset Management [T-WIWI-102878]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103247] Intelligent Risk and Investment Advisory

ECTS	Recurrence	Version
4,5	Jedes Wintersemester	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2530360	Computational Risk and Asset Management	Vorlesung (V)		Maxim Ulrich
WS 16/17	2530361		Übung (Ü)	2	Elmar Jakobs

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 period. Students who fail the exam are allowed to retake the exam.

Conditions
None.

Recommendations
None

T Course: Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems [T-MATH-105854]

Responsibility: Michael Plum
Contained in: [M-MATH-102883] Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems

ECTS	Version
8	1

T Course: Consumer Behavior [T-WIWI-106569]

Responsibility: Sven Feurer
Contained in: [M-WIWI-101490] Marketing Management

ECTS	Recurrence	Version
3	Einmalig	1

Learning Control / Examinations

Please note: This course is offered only once in winter term 2017/18.
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). Since the course is only offered in winter term 2017/18, students are required to take the exam in winter term 2017/18 at the first exam date offered. Exclusively for students who need to retake the exam, a re-examination will be offered in the following semester if required.

Conditions

None.

Remarks

For further information, please contact the research group Marketing and Sales (http://marketing.iism.kit.edu/).

T Course: Continuous Time Finance [T-MATH-105930]

Responsibility: Nicole Bäuerle, Vicky Fasen-Hartmann
Contained in: [M-MATH-102860] Continuous Time Finance

ECTS	Version
8	1

T Course: Control Theory [T-MATH-105909]

Responsibility: Roland Schnaubelt, Lutz Weis
Contained in: [M-MATH-102941] Control Theory

ECTS	Version
6	1

Conditions
none

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

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550120		Vorlesung (V)		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.

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: Convex Geometry [T-MATH-105831]

Responsibility: Daniel Hug
Contained in: [M-MATH-102864] Convex Geometry

ECTS	Version
8	1

T Course: Corporate Financial Policy [T-WIWI-102622]

Responsibility: Martin Ruckes
Contained in: [M-WIWI-101480] Finance 3
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101483] Finance 2

ECTS	Language	Recurrence	Version
4,5	englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	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

V Event excerpt: (SS 2017)

Aim
Students

- are in a position to explain the importance of informational frictions for the financing of firms,
- are able to evaluate financing contracts with respect to their incentive effects,
- are able to analyse financing contracts with respect to their information they provide to outsiders,
- are in a position to derive optimal financing contracts in prototypical situations,
- are able to discuss the financial determinants of corporate distribution policy.

Content
Students are told profound knowledge about appropriate financing of firms.
The course is concerned with the theory of corporate financing:

- Financing contracts
- Financing capacity
- Issuance of securities
- Capital structure
- Payout policy

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

Literature
Elective Literature
Tirole, J. (2006): The Theory of Corporate Finance. Princeton University Press.

T Course: 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.

V Event excerpt: 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 the Insurance Industry [T-WIWI-102637]

Responsibility: Wolf-Rüdiger Heilmann
Contained in: [M-WIWI-101469] Insurance Management I

ECTS	Recurrence	Version
2	Jedes Sommersemester	1

Learning Control / Examinations
The exam is offered latest in summer term 2016.
The assessment consists of a written exam (according to Section 4 (2), 1 of the examination regulation) .
The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None

Recommendations
For the understanding of this course knowledge of *Private and Social Insurance* [2530050] is required.

Remarks
Block course. For organizational reasons, please register with the secretay of the chair: thomas.mueller3@kit.edu.

T Course: 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 2017	2520375		Vorlesung (V)	2/4	Rheza Nakhaeizadeh

Learning Control / Examinations

- Oral examination 70%
- Conduction of a small empirical study 30%

Conditions
None

V Event excerpt: (SS 2017)

Aim
After completing of the course the students:

- know the definition of Data Mining
- are familiar with the CRISP-DM
- are Familiar with at least six important Data Mining Tasks
- can recognize whether a given problem can be formulated as a data mining problem
- are familiar with the most important Data Mining Algorithms like Decision Tree, K-Means, Artificial Neural Networks, Association Rules, Regression Analysis
- are familiar with evaluation of DM-algorithms
- will be able to use a DM-Tool

Content
Part one: Data Mining
Why Data Mining?

- What is Data Mining?
- History of Data Mining
- Conferences and Journals on Data Mining
- Potential Applications
- Data Mining Process:
- Business Understanding
- Data Understanding
- Data Preparation
- Modeling
- Evaluation
- Deployment
- Interdisciplinary aspects of Data Mining
- Data Mining tasks
- Data Mining Algorithms (Decision Trees, Association Rules,

- Regression, Clustering, Neural Networks)
- Fuzzy Mining
- OLAP and Data Warehouse
- Data Mining Tools
- Trends in Data Mining

Part two: Examples of application of Data Mining

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

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

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

- Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
- David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000
- Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.
- Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367
- Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.
- Ian witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070, 2005.

T Course: Database Systems and XML [T-WIWI-102661]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101472] 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	Timm Caporale, Andreas Fritsch, Andreas Oberweis

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Conditions
None

V Event excerpt: 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 2017	2530550	Derivatives	Vorlesung (V)	2	Marliese Uhrig-Homburg
SS 2017	2530551		Übung (Ü)	1	Stefan Fiesel, Marliese Uhrig-Homburg

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

V Event excerpt: Derivatives (SS 2017)

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: Differential Geometry [T-MATH-102275]

Responsibility: Sebastian Grensing, Enrico Leuzinger, Wilderich Tuschmann
Contained in: [M-MATH-101317] Differential Geometry

ECTS	Recurrence	Version
8	Jedes Sommersemester	1

T Course: Discrete Time Finance [T-MATH-105839]

Responsibility: Nicole Bäuerle, Vicky Fasen-Hartmann
Contained in: [M-MATH-102919] Discrete Time Finance

ECTS	Version
8	1

Conditions
none

T Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102805] Service Operations
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550488		Vorlesung (V)	3	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.

V Event excerpt: (SS 2017)

Aim
The student

- knows basic concepts of discrete event simulation models,
- applies computer-based simulation systems,
- structures and implements simulation studies according to specific process models,
- has an in-depthr knowledge for logistics issues and discovers the importance of statistical methods in modeling and evaluation of simulation models,
- explains coupled systems of simulation and meta-heuristics, and characterizes simulation programs.

Content
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

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

T Course: Document Management and Groupware Systems [T-WIWI-102663]

Responsibility: Stefan Klink
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
4	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511212	Document Management and Groupware Systems	Vorlesung (V)	2	Stefan Klink

Learning Control / Examinations
The course expires after summer term 2017. Last examination date is winter term 2017/2018 (only for repeaters).
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

V Event excerpt: Document Management and Groupware Systems (SS 2017)

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: Dynamical Systems [T-MATH-106114]

Responsibility: Jens Rottmann-Matthes
Contained in: [M-MATH-103080] Dynamical Systems

ECTS	Recurrence	Version
8	Unregelmäßig	1

Conditions
none

T Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Responsibility: Patrick Jochem, Russell McKenna
Contained in: [M-WIWI-101452] Energy Economics and Technology

ECTS	Language	Recurrence	Version
3,5	englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2581006	Efficient Energy Systems and Electric Mobility	Vorlesung (V)	2	Patrick Jochem, Russell McKenna

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

V Event excerpt: Efficient Energy Systems and Electric Mobility (SS 2017)

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

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	Benedikt Notheisen, Christof Weinhardt
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

V Event excerpt: 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: Energy and Environment [T-WIWI-102650]

Responsibility: Ute Karl
Contained in: [M-WIWI-101452] Energy Economics and Technology

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2581003	Energy and Environment	Vorlesung (V)	2	Ute Karl
SS 2017	2581004		Übung (Ü)	1	Katrin Seddig

V Event excerpt: Energy and Environment (SS 2017)

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 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.

V Event excerpt: 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: Engineering FinTech Solutions [T-WIWI-106193]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103247] Intelligent Risk and Investment Advisory
[M-WIWI-103261] Disruptive FinTech Innovations

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2530357		Vorlesung (V)		Maxim Ulrich

Learning Control / Examinations
The grade consists of a written part and an oral exam. In the written part, students solve an academic problem from the field of risk and asset management. This part counts for 30% of the grade. An oral exam at the end of the semester accounts for 70% of the final grade and gives the student a chance to present and defend his solution.

Conditions
There are two conditions for taking this course:

1. This course is only open for registered students of the module "Intelligent Risk and Investment Advisory" and "Disruptive FinTech Solutions".
2. Registered students have completed a Bachelor thesis with a grade of 1.3 or better on a topic that has had a significant exposure to IT- or software engineering content. Alternatively, students who completed at least one of the following lectures with a grade of 1.7 or better are also eligible to participate: Computational Risk and Asset Management, Bayesian Risk Analytics and Machine Learning.

Recommendations
None

Remarks
New course starting summer term 2017.

V Event excerpt: (SS 2017)

Aim
Students develop modern IT-technologies to solve financial problems.

Content
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature will be distributed during the first lecture.

T Course: Enterprise Architecture Management [T-WIWI-102668]

Responsibility: Thomas Wolf
Contained in: [M-WIWI-101472] 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

V Event excerpt: 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: Evolution Equations [T-MATH-105844]

Responsibility: Roland Schnaubelt, Lutz Weis
Contained in: [M-MATH-102872] Evolution Equations

ECTS	Version
8	1

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 2017	2530296	Exchanges	Vorlesung (V)	1	Jörg Franke

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

V Event excerpt: Exchanges (SS 2017)

Aim
Students are in a position to discuss and evaluate current developments regarding the organisation of exchanges and securities trading.

Content

- Organisation of exchanges: Changing Zeitgeist - Corporates instead of cooparative structures
- Market models: order driven vs. market maker - Liquidity provision for less frequently traded securities
- Trading systems: The end of an era? - No more need for running traders?
- Clearing: Diversity instead of uniformity - Safety for all?
- Settlement: Increasing importance - Does efficient settlement assure the "value added" of exchanges in the long run?

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
Elective literature:
Educational material will be offered within the lecture.

T Course: Experimental Economics [T-WIWI-102614]

Responsibility: Timm Teubner, Christof Weinhardt
Contained in: [M-WIWI-102970] Decision and Game Theory
[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	Verena Dorner, Jella Pfeiffer, Timm Teubner
WS 16/17	2540493		Übung (Ü)	1	Verena Dorner, Jella Pfeiffer, 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

V Event excerpt: 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: Extremal Graph Theory [T-MATH-105931]

Responsibility: Maria Aksenovich, Torsten Ueckerdt
Contained in: [M-MATH-102957] Extremal Graph Theory

ECTS	Version
8	1

T Course: Extreme Value Theory [T-MATH-105908]

Responsibility: Vicky Fasen-Hartmann, Norbert Henze
Contained in: [M-MATH-102939] Extreme Value Theory

ECTS	Version
4	1

Conditions
none

T Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-101413] Applications of Operations Research
[M-WIWI-101414] Methodical Foundations of OR
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Wintersemester	2

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.

Recommendations
None

Remarks
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

V Event excerpt: Facility Location and Strategic Supply Chain Management (WS 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: 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 2017	2530206		Übung (Ü)	2	Torsten Luedecke
SS 2017	2530205		Vorlesung (V)	2	Torsten Luedecke

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
Basic knowledge in corporate finance, accounting, and valuation is required.

V Event excerpt: (SS 2017)

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

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-MATH-105874] *Time Series Analysis* must not have been started.

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-101502] Economic Theory and its Application in Finance
[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	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

V Event excerpt: 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: Finite Element Methods [T-MATH-105857]

Responsibility: Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners
Contained in: [M-MATH-102891] Finite Element Methods

ECTS	Version
8	1

T Course: Finite group schemes [T-MATH-106486]

Responsibility: Fabian Januszewski
Contained in: [M-MATH-103258] Finite group schemes

ECTS	Recurrence	Version
4	Einmalig	1

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.

V Event excerpt: 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: Forecasting: Theory and Practice [T-MATH-105928]

Responsibility: Tilmann Gneiting
Contained in: [M-MATH-102956] Forecasting: Theory and Practice

ECTS	Version
8	1

Conditions
none

T Course: Fourier Analysis [T-MATH-105845]

Responsibility: Roland Schnaubelt, Lutz Weis
Contained in: [M-MATH-102873] Fourier Analysis

ECTS	Version
8	1

T Course: Functional Analysis [T-MATH-102255]

Responsibility: Gerd Herzog, Dirk Hundertmark, Tobias Lamm, Michael Plum, Wolfgang Reichel, Christoph Schmoeger, Roland Schnaubelt, Lutz Weis

Contained in: [M-MATH-101320] Functional Analysis

ECTS	Recurrence	Version
8	Jedes Wintersemester	1

T Course: Functions of Matrices [T-MATH-105906]

Responsibility: Volker Grimm
Contained in: [M-MATH-102937] Functions of Matrices

ECTS	Version
8	1

Conditions
none

T Course: Functions of Operators [T-MATH-105905]

Responsibility:
Contained in: [M-MATH-102936] Functions of Operators

ECTS	Version
6	1

T Course: Generalized Regression Models [T-MATH-105870]

Responsibility: Norbert Henze, Bernhard Klar
Contained in: [M-MATH-102906] Generalized Regression Models

ECTS	Version
4	1

Conditions
none

T Course: Geometric Group Theory [T-MATH-105842]

Responsibility: Frank Herrlich, Enrico Leuzinger, Gabriele Link, Roman Sauer, Petra Schwer, Wilderich Tuschmann

Contained in: [M-MATH-102867] Geometric Group Theory

ECTS	Recurrence	Version
8	Unregelmäßig	1

T Course: Geometric Numerical Integration [T-MATH-105919]

Responsibility: Marlis Hochbruck, Tobias Jahnke
Contained in: [M-MATH-102921] Geometric Numerical Integration

ECTS	Version
6	1

Conditions
none

T Course: Geometry of Schemes [T-MATH-105841]

Responsibility: Frank Herrlich, Stefan Kühnlein
Contained in: [M-MATH-102866] Geometry of Schemes

ECTS	Version
8	1

T Course: Global Differential Geometry [T-MATH-105885]

Responsibility: Sebastian Grensing, Wilderich Tuschmann
Contained in: [M-MATH-102912] Global Differential Geometry

ECTS	Version
8	1

Conditions
none

T Course: Global optimization I [T-WIWI-102726]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101413] Applications of Operations Research
[M-WIWI-101414] Methodical Foundations of OR
[M-WIWI-101473] Mathematical Programming

ECTS	Recurrence	Version
4,5	Jedes Wintersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550144		Übung (Ü)		Oliver Stein
SS 2017	2550135		Übung (Ü)	1	Oliver Stein
SS 2017	2550134		Vorlesung (V)	2	Oliver Stein

Learning Control / Examinations
Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO) and possibly of a compulsory prerequisite.
The exam is offered in the lecture of semester and the following semester.
The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-103638] *Global optimization I and II* must not have been started.

Recommendations
None

Remarks
Part I and II of the lecture are held consecutively in the *same*semester.

T Course: Global optimization I and II [T-WIWI-103638]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101414] Methodical Foundations of OR
[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 and possibly of a compulsory prerequisite.
The examination is held in the semester of the lecture and in the following semester.

Conditions
None

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-102726] *Global optimization I* must not have been started.
2. The course [T-WIWI-102727] *Global optimization II* must not have been started.

Recommendations
None

Remarks
Part I and II of the lecture are held consecutively in the *same* semester.

T Course: Global optimization II [T-WIWI-102727]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101414] Methodical Foundations of OR
[M-WIWI-101473] Mathematical Programming

ECTS	Recurrence	Version
4,5	Jedes Wintersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550144		Übung (Ü)		Oliver Stein
SS 2017	2550136		Vorlesung (V)	2	Oliver Stein
SS 2017	2550135		Übung (Ü)	1	Oliver Stein

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The examination is held in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-103638] *Global optimization I and II* must not have been started.

Remarks
Part I and II of the lecture are held consecutively in the *same*semester.

T Course: Graph Theory [T-MATH-102273]

Responsibility: Maria Aksenovich, Torsten Ueckerdt
Contained in: [M-MATH-101336] Graph Theory

ECTS	Version
8	1

Conditions
None

T Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Recurrence	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.

Course: Group Actions in Riemannian Geometry [T-MATH-105925]

Responsibility: Wilderich Tuschmann
Contained in: [M-MATH-102954] Group Actions in Riemannian Geometry

ECTS	Version
5	1

Conditions
none

T 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 2017	2581001	Heat Economy	Vorlesung (V)	2	Wolf Fichtner

Recommendations
None

Remarks
See German version.

V Event excerpt: Heat Economy (SS 2017)

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: Homotopy Theory [T-MATH-105933]

Responsibility: Roman Sauer
Contained in: [M-MATH-102959] Homotopy Theory

ECTS	Version
8	1

T Course: Incentives in Organizations [T-WIWI-105781]

Responsibility: Petra Nieken
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101505] Experimental Economics

ECTS	Language	Recurrence	Version
4,5	englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2573004		Übung (Ü)	1	Mitarbeiter, Petra Nieken
SS 2017	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.

V Event excerpt: Incentives in Organizations (SS 2017)

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 datafor companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Content
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Workload
The total workload for this course is approximately 135 hours.
Lecture 32h
Preparation of lecture 52h
Exam preparation 51h

Literature
Slides

Additional case studies and research papers will be announced in the lecture.

T Course: Information Service Engineering [T-WIWI-106423]

Responsibility: Harald Sack
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511606		Vorlesung (V)	2	Harald Sack
SS 2017	2511607		Übung (Ü)	1	Harald Sack

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None

Remarks
New course starting summer term 2017.

V Event excerpt: (SS 2017)

Aim

- The students know the fundamentals and measures of information theory and are able to apply those in the context of Information Service Engineering.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students have fundamental skills of information retrieval and are enabled to conduct and to evaluate simple information retrieval tasks.
- The students apply their skills of natural language processing, Linked Data engineering, and Information Retrieval to conduct and evaluate simple knowledge mining tasks.
- The students know the fundamentals of recommender systems as well as of semantic and exploratory search.

Content
- Information, Natural Language and the Web
- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques & Challenges
- Evaluation, Precision and Recall
- Regular Expressions and Automata
- Tokenization
- Language Model and N-Grams
- Part-of-Speech Tagging

- Linked Data Engineering

- Knowledge Representations and Ontologies

- What's in an URI?
- Resource Description Framework (RDF)
- Creating new Models with RDFS
- Querying RDF(S) with SPARQL
- More Expressivity with Web Ontology Language (OWL)
- The Web of Data
- Vocabularies and Ontologies in the Web of Data
- Wikipedia, DBpedia, and Wikidata

- Information Retrieval

- Information Retrieval Models
- Retrieval Evaluation
- Web Information Retrieval
- Document Crawling, Text Processing, and Indexing
- Query Processing and Result Representation
- Question Answering

- Knowledge Mining

- From Data to Knowledge
- Data Mining
- Machine Learning Basics for Knowledge Mining
- Mining Knowledge from Wikipedia
- Named Entity Resolution

- Exploratory Search and Recommender Systems

- Semantic Search and Entity Centric Search
- Collaborative Filtering and Content Based Recommendations
- From Search to Intelligent Browsing
- Linked Data Based Exploratory Search
- Fact Ranking

Literature

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- S. Hitzler, S. Rudolph, Foundations of Semantic Web Technologies, Chapman / Hall, 2009.
- R. Baeza-Yates, B. Ribeiro-Neto, Modern Information Retrieval, 2nd ed., Addison Wesley, 2010.#

T Course: Innovationtheory and -Policy [T-WIWI-102840]

Responsibility: Ingrid Ott
Contained in: [M-WIWI-101478] Innovation and growth

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2560237		Übung (Ü)		Levent Eraydin, Ingrid Ott
SS 2017	2560236	Innovationtheory and -policy	Vorlesung (V)		Ingrid Ott

Learning Control / Examinations

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Conditions

None

Recommendations

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

V Event excerpt: Innovationtheory and -policy (SS 2017)

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-101469] Insurance Management I

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

Conditions
None

Recommendations
None

T Course: Insurance Production [T-WIWI-102648]

Responsibility: Ute Werner
Contained in: [M-WIWI-101469] Insurance Management I

ECTS	Language	Recurrence	Version
4,5	deutsch	Unregelmäßig	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2530324	Insurance Production	Vorlesung (V)	3	Klaus Besserer, 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

V Event excerpt: Insurance Production (SS 2017)

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-101469] Insurance Management I

ECTS	Recurrence	Version
2,5	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2530335	Insurance Risk Management	Vorlesung (V)	2	Harald Maser

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.

V Event excerpt: Insurance Risk Management (SS 2017)

Aim
Getting to know basic principles of risk management in insurance companies and credit institutions.

Content
Einführend wird zunächst die Position von Risk Management in Kreditinstituten und Versicherungsunternehmen in Abgrenzung zu anderen Steuerungs- und Überwachungssystemen dargestellt. Erster Schwerpunkt der Vorlesung ist die Identifikation und Messung von Risiken (Methoden und Modelle), gefolgt von einer Darstellung ausgewählter Risk Management-Instrumente. Hierauf baut die Thematisierung von Kapitalbedarf (Soll-Kapital) und risikotragendem Kapital (Ist-Kapital) anhand verschiedener Modelle (Aufsicht nach Basel II und Solvency II, Rating sowie ökonomischer Modelle). Ferner werden Fragen und Standpunkte zur Basel II- und Solvency II-Diskussion und Reaktionen der deutschen Finanzdienstleistungsaufsicht dargestellt und diskutiert.
Die sog. Subprime-Krise (US-amerikanische Immobilienfinanzierung) bzw. die jetzt allgemeine Finanzmarktkrise und deren Auswirkungen aud deutsche Kreditinstitute und Versicherungen (Kapitalanlagen, D&O-Versciherung, Kreditausfallversicherung, Kreditvergabe, Refinanzierung) bilden den praxisbezogenen Schwerpunkt der diesjährigen Vorlesung.

Workload
The total workload for this course is approximately 75.0 hours. For further information see German version.

Literature
Elective literature:

- "Mindestanforderungen an ein (Bank-)Risikomanagement", www.bafin.de
- V. Bieta, W. Siebe. Strategisches Risikomanagement in Versicherungen. in: ZVersWiss 2002 S. 203-221.
- A. Schäfer. Subprime-Krise, in: VW2008, S. 167-169.
- B. Rudolph. Lehren aus den Ursachen und dem Verlauf der internationalen Finanzkrise, in: zfbf 2008, S. 713-741.

T Course: Integral Equations [T-MATH-105834]

Responsibility: Tilo Arens, Frank Hettlich, Andreas Kirsch
Contained in: [M-MATH-102874] Integral Equations

ECTS	Version
8	1

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 2017	2530570	International Finance	Vorlesung (V)	2	Marliese Uhrig-Homburg, Ulrich Walter

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

Remarks
See German version.

V Event excerpt: International Finance (SS 2017)

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: Introduction into Particulate Flows [T-MATH-105911]

Responsibility: Willy Dörfler
Contained in: [M-MATH-102943] Introduction into Particulate Flows

ECTS	Version
3	1

Conditions
none

T Course: Introduction to Geometric Measure Theory [T-MATH-105918]

Responsibility: Steffen Winter
Contained in: [M-MATH-102949] Introduction to Geometric Measure Theory

ECTS	Version
6	1

Conditions
none

T Course: Introduction to Matlab and Numerical Algorithms [T-MATH-105913]

Responsibility: Daniel Weiß, Christian Wieners
Contained in: [M-MATH-102945] Introduction to Matlab and Numerical Algorithms

ECTS	Version
5	1

Conditions
none

T Course: Introduction to Scientific Computing [T-MATH-105837]

Responsibility: Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners
Contained in: [M-MATH-102889] Introduction to Scientific Computing

ECTS	Version
8	1

T Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-101414] Methodical Foundations of OR
[M-WIWI-101454] Stochastic Modelling and Optimization
[M-WIWI-103289] Stochastic Optimization

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550471		Übung (Ü)		Steffen Rebennack
SS 2017	2550470		Vorlesung (V)		Steffen Rebennack

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Conditions
None.

T Course: Inverse Problems [T-MATH-105835]

Responsibility: Tilo Arens, Frank Hettlich, Andreas Kirsch, Andreas Rieder
Contained in: [M-MATH-102890] Inverse Problems

ECTS	Version
8	1

T Course: Knowledge Discovery [T-WIWI-102666]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-101472] 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	Achim Rettinger, Rudi Studer, Tobias Weller

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation.
Students can be awarded a bonus on their final grade if they successfully complete special assignments.

Conditions
None

V Event excerpt: Knowledge Discovery (WS 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: L2-Invariants [T-MATH-105924]

Responsibility: Holger Kammeyer, Roman Sauer
Contained in: [M-MATH-102952] L2-Invariants

ECTS	Version
5	1

Conditions
none

Course: Large-scale Optimization [T-WIWI-106549]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Recurrence	Version
4,5	Unregelmäßig	1

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Conditions
None.

T Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

Responsibility: Johann Marius Zöllner
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	deutsch	Jedes Wintersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	24150	Machine Learning 1 - Basic methods	Vorlesung (V)	2	Rüdiger Dillmann, Johann Marius Zöllner

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None.

Remarks
New course starting winter term 2017/2018.

V Event excerpt: Machine Learning 1 - Basic methods (WS 16/17)

Aim

- Studierende erlangen Kenntnis der grundlegenden Methoden im Bereich des Maschinellen Lernens.
- Studierende können Methoden des Maschinellen Lernens einordnen, formal beschreiben und bewerten.
- Die Studierenden können ihr Wissen für die Auswahl geeigneter Modelle und Methoden für ausgewählte Probleme im Bereich des Maschinellen Lernens einsetzen.

Content
Das Themenfeld Wissensakquisition und Maschinelles Lernen ist ein stark expandierendes Wissensgebiet und Gegenstand zahlreicher Forschungs- und Entwicklungsvorhaben. Der Wissenserwerb kann dabei auf unterschiedliche Weise erfolgen. So kann ein System Nutzen aus bereits gemachten Erfahrungen ziehen, es kann trainiert werden, oder es zieht Schlüsse aus umfangreichem Hintergrundwissen.
Die Vorlesung behandelt sowohl symbolische Lernverfahren, wie induktives Lernen (Lernen aus Beispielen, Lernen durch Beobachtung), deduktives Lernen (Erklärungsbasiertes Lernen) und Lernen aus Analogien, als auch subsymbolische Techniken wie Neuronale Netze, Support Vektor-Maschinen, Genetische Algorithmen und Reinforcement Lernen. Die Vorlesung führt in die Grundprinzipien sowie Grundstrukturen lernender Systeme und der Lerntheorie ein und untersucht die bisher entwickelten Algorithmen. Der Aufbau sowie die Arbeitsweise lernender Systeme wird an einigen Beispielen, insbesondere aus den Gebieten Robotik, autonome mobile Systeme und Bildverarbeitung vorgestellt und erläutert.

Workload
Vorlesung mit 2 SWS, plus Nachbereitung durch die Studierenden.

T Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

Responsibility: Johann Marius Zöllner
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511503		Übung (Ü)	1	Johann Marius Zöllner
SS 2017	2511502	Machine Learning 2 - Advanced methods	Vorlesung (V)	2	Johann Marius Zöllner

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None.

Remarks
New course starting summer term 2017.

V Event excerpt: Machine Learning 2 - Advanced methods (SS 2017)

Aim

- Students gain knowledge of the basic methods in the field of machine learning.
- Students understand advanced concepts of machine learning and their application.
- Students can classify, formally describe and evaluate methods of machine learning.
- Students can use their knowledge to select suitable models and methods for selected problems in the field of machine learning.

Content
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.
The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.
The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

Workload
Vorlesung mit 2 SWS, plus Nachbereitung durch die Studierenden.

Literature
Die Foliensätze sind als PDF verfügbar.
Weiterführende Literatur

- Stuart J. Russell, Peter Norvig: *'Künstliche Intelligenz: Ein moderner Ansatz'*, Pearson Studium, 2004

- Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T Course: Management of IT-Projects [T-WIWI-102667]

Responsibility: Roland Schätzle
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511215		Übung (Ü)	1	Roland Schätzle
SS 2017	2511214	Management of IT-Projects	Vorlesung (V)	2	Roland Schätzle

Learning Control / Examinations
The assessment of this course is a written examination (60 min) in the first week after lecture period according to Section 4(2), 1 of the examination regulation.

Conditions
None

V Event excerpt: Management of IT-Projects (SS 2017)

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: Market Research [T-WIWI-102811]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101490] Marketing Management

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2571150	Market Research	Vorlesung (V)	2	Martin Klarmann
SS 2017	2571151		Übung (Ü)	1	Maximilian Lüders

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
None

Remarks
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

V Event excerpt: Market Research (SS 2017)

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 Communication [T-WIWI-102902]

Responsibility: Ju-Young Kim
Contained in: [M-WIWI-101490] Marketing Management

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2540440	Marketing Communication	Vorlesung (V)	2	Ju-Young Kim
SS 2017	2540441		Übung (Ü)	1	Ju-Young Kim, Wiebke Klingemann

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

V Event excerpt: Marketing Communication (SS 2017)

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.

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

ECTS	Language	Recurrence	Version
1,5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2571183	Marketing Strategy Business Game	Block (B)	1	Assistenten, Martin Klarmann

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

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.

V Event excerpt: Marketing Strategy Business Game (SS 2017)

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.

T Course: Markov Decision Models I [T-WIWI-102710]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101400] Stochastic Methods and Simulation
[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	André Lust, Ellen Platt, Karl-Heinz Waldmann
WS 16/17	2550681		Übung (Ü)	2	André Lust, Ellen Platt, Karl-Heinz Waldmann
WS 16/17	2550680		Übung (Ü)	2	André Lust, Ellen Platt, Karl-Heinz Waldmann

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

V Event excerpt: 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-101400] Stochastic Methods and Simulation
[M-WIWI-101454] Stochastic Modelling and Optimization

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

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.

T Course: Markov Decision Processes [T-MATH-105921]

Responsibility: Nicole Bäuerle
Contained in: [M-MATH-102907] Markov Decision Processes

ECTS	Version
5	1

Conditions
none

T Course: Master Thesis [T-MATH-105878]

Responsibility: Sebastian Grensing
Contained in: [M-MATH-102917] Master Thesis

ECTS	Version
30	1

T Course: Mathematical Methods in Signal and Image Processing [T-MATH-105862]

Responsibility: Andreas Rieder
Contained in: [M-MATH-102897] Mathematical Methods in Signal and Image Processing

ECTS	Version
8	1

Conditions
none

T Course: Mathematical Methods of Imaging [T-MATH-106488]

Responsibility: Andreas Rieder
Contained in: [M-MATH-103260] Mathematical Methods of Imaging

ECTS	Recurrence	Version
5	Unregelmäßig	1

Conditions
None

T Course: Mathematical Modelling and Simulation in Practise [T-MATH-105889]

Responsibility: Gudrun Thäter
Contained in: [M-MATH-102929] Mathematical Modelling and Simulation in Practise

ECTS	Version
4	1

T Course: Mathematical Statistics [T-MATH-105872]

Responsibility: Norbert Henze, Bernhard Klar
Contained in: [M-MATH-102909] Mathematical Statistics

ECTS	Version
4	1

Conditions
none

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 lecture will not be offered from winter term 2017/2018. The last examination takes place in summer term 2017 (only for repeaters).
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

V Event excerpt: 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: Maxwell's Equations [T-MATH-105856]

Responsibility: Tilo Arens, Frank Hettlich, Andreas Kirsch
Contained in: [M-MATH-102885] Maxwell's Equations

ECTS	Version
8	1

Course: Medical Imaging [T-MATH-105861]

Responsibility: Andreas Rieder
Contained in: [M-MATH-102896] Medical Imaging

ECTS	Version
8	1

Conditions
none

T Course: Mixed Integer Programming I [T-WIWI-102719]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Recurrence	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: Oliver Stein
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
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	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 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: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Recurrence	Version
4,5	Jedes Semester	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2550489		Praktikum (P)	2/1	Tanya Gonser, Stefan Nickel, Melanie Reuter-Oppermann

Learning Control / Examinations
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the software laboratory and the following term.

Conditions
None.

Recommendations
Basic knowledge as conveyed in the module*Introduction toOperations Research*is assumed.
Successful completion of the courseModeling and OR-Software: Introduction.

Remarks
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

T Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-101413] Applications of Operations Research

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2550490		Praktikum (P)	3	Tanya Gonser, Stefan Nickel, Melanie Reuter-Oppermann

Learning Control / Examinations
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the software laboratory and the following term.

Conditions
None

Recommendations
Firm knowledge of the contents from the lecture*Introduction to Operations Research I*[2550040] of the module*Operations Research*[WW1OR].

Remarks
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The lecture is offered in every term. The planned lectures and courses for the next three years are announced online.

V Event excerpt: (WS 16/17)

Aim
The student

- evaluates the possibilities of computer usage in practical applications of Operations Research,
- is capable of classifying and utilizing the general possibilities and fields of usage of modeling and implementation software for solving OR models in practice,
- models and solves problems arising in industry applications with the aid of computer-supported optimization methods.

Content
After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, . . .), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis.
Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

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

T Course: Modelling, Measuring and Managing of Extreme Risks [T-WIWI-102841]

Responsibility: Ute Werner
Contained in: [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 2017	2530355	Modelling, Measuring and Managing of Extreme Risks	Vorlesung (V)		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

V Event excerpt: Modelling, Measuring and Managing of Extreme Risks (SS 2017)

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.

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
[M-WIWI-103289] Stochastic Optimization

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550554		Vorlesung (V)	2	Oliver Grothe
SS 2017	2550555		Übung (Ü)	2	Maximilian Coblenz, Oliver Grothe

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).
The exam is offered every semester. Re-examinations are offered only for repeaters.

Conditions
None

Recommendations
The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course ''Advanced Statistics''. Without this, participation in the course is not advised.
Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

T Course: Nature-Inspired Optimisation Methods [T-WIWI-102679]

Responsibility: Pradyumn Kumar Shukla
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511106		Vorlesung (V)	2	Pradyumn Kumar Shukla

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called "bonus exam", 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exersices . The bonus exam may be split into several shorter written tests.
The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

V Event excerpt: (SS 2017)

Aim
To learn:

1. Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization
2. Different aspects and limitation of the methods
3. Applications of such methods
4. Multi-objective optimization methods
5. Constraint handling methods
6. Different aspects in parallelization and computing platforms

Content
Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

Literature
* E. L. Aarts and J. K. Lenstra: 'Local Search in Combinatorial Optimization'. Wiley, 1997 * D. Corne and M. Dorigo and F. Glover: 'New Ideas in Optimization'. McGraw-Hill, 1999 * C. Reeves: 'Modern Heuristic Techniques for Combinatorial Optimization'. McGraw-Hill, 1995 * Z. Michalewicz, D. B. Fogel: How to solve it: Modern Heuristics. Springer, 1999 * E. Bonabeau, M. Dorigo, G. Theraulaz: 'Swarm Intelligence'. Oxford University Press, 1999 * A. E. Eiben, J. E. Smith: 'Introduction to Evolutionary Computation'. * M. Dorigo, T. Stützle: 'Ant Colony Optimization'. Bradford Book, 2004 Springer, 2003

T Course: Non- and Semiparametrics [T-WIWI-103126]

Responsibility: Melanie Schienle

Contained in: [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II

ECTS	Recurrence	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 Maxwell Equations [T-MATH-106484]

Responsibility: Roland Schnaubelt
Contained in: [M-MATH-103257] Nonlinear Maxwell Equations

ECTS	Recurrence	Version
3	Unregelmäßig	1

Conditions
Keine

T Course: Nonlinear Optimization I [T-WIWI-102724]

Responsibility: Oliver Stein

Contained in: [M-WIWI-101414] Methodical Foundations of OR
[M-WIWI-101473] Mathematical Programming
[M-WIWI-101400] Stochastic Methods and Simulation

ECTS	Recurrence	Version
4,5	Jedes Semester	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2550111		Vorlesung (V)	2	Oliver Stein
WS 16/17	2550142		Übung (Ü)		Robert Mohr, Oliver Stein
WS 16/17	2550112		Übung (Ü)		Robert Mohr, Oliver Stein

Learning Control / Examinations

The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of*Nonlinear OptimizationII*[2550113]. In this case, the duration of the written examination takes 120 minutes.

Conditions

The module component exam T-WIWI-103637 “Nonlinear Optimization I and II” may not be selected.

Remarks

Part I and II of the lecture are held consecutively in the *same*semester.

V Event excerpt: (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: Oliver Stein
Contained in: [M-WIWI-101414] Methodical Foundations of OR
[M-WIWI-101473] Mathematical Programming

ECTS	Recurrence	Version
9	Jedes Semester	2

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)		Robert Mohr, Oliver Stein
WS 16/17	2550112		Übung (Ü)		Robert Mohr, Oliver Stein

Learning Control / Examinations
The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.

Conditions
None.

Remarks
Part I and II of the lecture are held consecutively in the **same** semester.

V Event excerpt: (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

V Event excerpt: (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-101414] Methodical Foundations of OR
[M-WIWI-101473] Mathematical Programming

ECTS	Recurrence	Version
4,5	Jedes Wintersemester	2

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
None.

Remarks
Part I and II of the lecture are held consecutively in the same semester.

V Event excerpt: (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: Nonparametric Statistics [T-MATH-105873]

Responsibility: Norbert Henze, Bernhard Klar
Contained in: [M-MATH-102910] Nonparametric Statistics

ECTS	Version
4	1

Conditions
none

T Course: Numerical Continuation Methods [T-MATH-105912]

Responsibility: Jens Rottmann-Matthes
Contained in: [M-MATH-102944] Numerical Continuation Methods

ECTS	Version
5	1

Conditions
none

T Course: Numerical Methods for Differential Equations [T-MATH-105836]

Responsibility: Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners
Contained in: [M-MATH-102888] Numerical Methods for Differential Equations

ECTS	Version
8	1

T Course: Numerical Methods for Hyperbolic Equations [T-MATH-105900]

Responsibility: Willy Dörfler
Contained in: [M-MATH-102915] Numerical Methods for Hyperbolic Equations

ECTS	Version
6	1

Conditions
none

T Course: Numerical Methods for Integral Equations [T-MATH-105901]

Responsibility: Tilo Arens, Frank Hettlich, Andreas Kirsch
Contained in: [M-MATH-102930] Numerical Methods for Integral Equations

ECTS	Version
8	1

T Course: Numerical Methods for Maxwell's Equations [T-MATH-105920]

Responsibility: Marlis Hochbruck, Tobias Jahnke
Contained in: [M-MATH-102931] Numerical Methods for Maxwell's Equations

ECTS	Version
6	1

T Course: Numerical Methods for Time-Dependent Partial Differential Equations [T-MATH-105899]

Responsibility: Marlis Hochbruck, Tobias Jahnke
Contained in: [M-MATH-102928] Numerical Methods for Time-Dependent Partial Differential Equations

ECTS	Version
8	1

T Course: Numerical Methods in Computational Electrodynamics [T-MATH-105860]

Responsibility: Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners
Contained in: [M-MATH-102894] Numerical Methods in Computational Electrodynamics

ECTS	Version
6	1

Conditions
none

T Course: Numerical Methods in Fluid Mechanics [T-MATH-105902]

Responsibility: Willy Dörfler, Gudrun Thäter
Contained in: [M-MATH-102932] Numerical Methods in Fluid Mechanics

ECTS	Version
4	1

T Course: Numerical Methods in Mathematical Finance [T-MATH-105865]

Responsibility: Tobias Jahnke
Contained in: [M-MATH-102901] Numerical Methods in Mathematical Finance

ECTS	Version
8	1

Conditions
none

T Course: Numerical Methods in Mathematical Finance II [T-MATH-105880]

Responsibility: Tobias Jahnke
Contained in: [M-MATH-102914] Numerical Methods in Mathematical Finance II

ECTS	Version
8	1

Learning Control / Examinations
Mündliche Prüfung im Umfang von ca. 30 Minuten

Conditions
none

T Course: Numerical Optimisation Methods [T-MATH-105858]

Responsibility: Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners
Contained in: [M-MATH-102892] Numerical Optimisation Methods

ECTS	Version
8	1

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 2017	2571199	Open Innovation – Concepts, Methods and Best Practices	Block (B)		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.

V Event excerpt: Open Innovation – Concepts, Methods and Best Practices (SS 2017)

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: Operations Research in Health Care Management [T-WIWI-102884]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102805] Service Operations

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 planned to be held in the summer term 2016. The planned lectures and courses for the next three years are announced online.

T Course: Operations Research in Supply Chain Management [T-WIWI-102715]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102805] Service Operations
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	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.

V Event excerpt: 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: Optimisation and Optimal Control for Differential Equations [T-MATH-105864]

Responsibility:
Contained in: [M-MATH-102899] Optimisation and Optimal Control for Differential Equations

ECTS	Version
4	1

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

ECTS	Recurrence	Version
4,5	Unregelmäßig	1

Learning Control / Examinations
There are no further examination dates for this course
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: Optimization in Banach Spaces [T-MATH-105893]

Responsibility: Andreas Kirsch
Contained in: [M-MATH-102924] Optimization in Banach Spaces

ECTS	Version
8	1

Conditions
none

T Course: Optimization under uncertainty [T-WIWI-106545]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-101413] Applications of Operations Research

ECTS	Recurrence	Version
5	Unregelmäßig	1

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Conditions
None.

T Course: 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

ECTS	Recurrence	Version
4,5	Unregelmäßig	1

Learning Control / Examinations
There are no further examination dates for this course.
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-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 2017	2520320		Vorlesung (V)	2	Wolf-Dieter Heller
SS 2017	2520321		Übung (Ü)	2	Wolf-Dieter Heller, Carlo Siebenschuh

Conditions
None

T Course: Parametric Optimization [T-WIWI-102855]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming

ECTS	Recurrence	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).

V Event excerpt: (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: Percolation [T-MATH-105869]

Responsibility: Günter Last
Contained in: [M-MATH-102905] Percolation

ECTS	Version
6	1

Conditions
none

T Course: Poisson Processes [T-MATH-105922]

Responsibility: Vicky Fasen-Hartmann, Daniel Hug, Günter Last
Contained in: [M-MATH-102922] Poisson Processes

ECTS	Version
5	1

Conditions
none

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 2017	2520357	Portfolio and Asset Liability Management	Vorlesung (V)	2	Mher Safarian
SS 2017	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

V Event excerpt: Portfolio and Asset Liability Management (SS 2017)

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: Potential Theory [T-MATH-105850]

Responsibility: Tilo Arens, Frank Hettlich, Andreas Kirsch, Wolfgang Reichel
Contained in: [M-MATH-102879] Potential Theory

ECTS	Version
8	1

T Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102805] Service Operations

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Semester	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550498	Practical seminar: Health Care Management (with Case Studies)	Veranstaltung (Veranst.)	5	Stefan Nickel, Melanie Reuter-Oppermann, Anne Zander

Learning Control / Examinations
The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

Conditions
None.

Recommendations
Basic knowledge as conveyed in the module*Introduction toOperations Research*is assumed.

Remarks
The credits have been reduced to 4,5 starting summer term 2016.
The lecture is offered every term.
The planned lectures and courses for the next three years are announced online.

T Course: Predictive Mechanism and Market Design [T-WIWI-102862]

Responsibility: Johannes Philipp Reiß
Contained in: [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: Principles of Insurance Management [T-WIWI-102603]

Responsibility: Ute Werner
Contained in: [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 2017	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

V Event excerpt: Principles of Insurance Management (SS 2017)

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: Probability Theory and Combinatorial Optimization [T-MATH-105923]

Responsibility: Daniel Hug, Günter Last
Contained in: [M-MATH-102947] Probability Theory and Combinatorial Optimization

ECTS	Version
8	1

Conditions
none

T Course: Product and Innovation Management [T-WIWI-102812]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101490] Marketing Management

ECTS	Language	Recurrence	Version
3	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2571154	Product and Innovation Marketing	Vorlesung (V)	2	Sven Feurer

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Remarks
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

V Event excerpt: Product and Innovation Marketing (SS 2017)

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: Project Centered Software-Lab [T-MATH-105907]

Responsibility: Gudrun Thäter
Contained in: [M-MATH-102938] Project Centered Software-Lab

ECTS	Version
4	1

Conditions
none

T Course: Public Management [T-WIWI-102740]

Responsibility: Berthold Wigger
Contained in: [M-WIWI-101504] Collective Decision Making

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.

V Event excerpt: 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: Quality Control I [T-WIWI-102728]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101454] Stochastic Modelling and Optimization

ECTS	Recurrence	Version
4,5	Unregelmäßig	1

Learning Control / Examinations
There are no further examination dates for this course
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: Quality Control II [T-WIWI-102729]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101454] Stochastic Modelling and Optimization

ECTS	Recurrence	Version
4,5	Unregelmäßig	1

Learning Control / Examinations

There are no further examination dates for this course.
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: Random Graphs [T-MATH-105929]

Responsibility: Matthias Schulte
Contained in: [M-MATH-102951] Random Graphs

ECTS	Version
6	1

Conditions
none

T Course: Rational Homotopy Theory [T-MATH-106483]

Responsibility: Manuel Amann, Roman Sauer
Contained in: [M-MATH-103256] Rational Homotopy Theory

ECTS	Recurrence	Version
4	Einmalig	1

Conditions
Keine

T Course: Requirements Analysis and Requirements Management [T-WIWI-102759]

Responsibility: Ralf Kneuper
Contained in: [M-WIWI-101472] 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

V Event excerpt: 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-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: Semantic Web Technologies [T-WIWI-102874]

Responsibility: Andreas Harth, York Sure-Vetter
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511311	Exercises to Semantic Web Technologies	Übung (Ü)	1	Maribel Acosta Deibe, Andreas Harth, York Sure-Vetter
SS 2017	2511310	Semantic Web Technologies	Vorlesung (V)	2	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.

V Event excerpt: Semantic Web Technologies (SS 2017)

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: Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters

Contained in: [M-WIWI-102971] Seminar

ECTS	Language	Recurrence	Version
3	deutsch/englisch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
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	Mitarbeiter, Petra Nieken
WS 16/17	2573010		Seminar (S)	2	Mitarbeiter, Petra Nieken
WS 16/17	2581030		Seminar (S)	2	Russell McKenna, Marcus Wiens
WS 16/17	2581990		Seminar (S)	2	Frank Schultmann, Rebekka Volk
WS 16/17	2530580		Seminar (S)	2	Mitarbeiter , Marliese Uhrig-Homburg
WS 16/17	2530395		Vorlesung (V)	3	Ute Werner
WS 16/17	2581977		Seminar (S)	2	Jérémy Rimbon, Frank Schultmann
WS 16/17	2581978		Seminar (S)	2	Frank Schultmann, Marcus Wiens
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	Guido Brückner, Veit Hagenmeyer, Christian Hirsch, Patrick Jochem, Hartmut Schmeck, Dorothea Wagner, Franziska Wegner
SS 2017	2581977		Seminar (S)	2	Jérémy Rimbon, Frank Schultmann
SS 2017	2540510		Seminar (S)	2	Andreas Sonnenbichler
SS 2017	2550493	Hospital Management	Block (B)	2	Martin Ludwig Hansis
SS 2017	252579908	Seminar Management Accounting and Costing Practices	Seminar (S)	2	Michael Pelz, Marcus Wouters
SS 2017	2579904	Seminar Management Accounting	Seminar (S)	2	Michael Pelz, Marcus Wouters

SS 2017	2530580	Seminar in Finance	Seminar (S)	2	Stefan Fiesel, Martin Hain, Michael Hofmann, Marcel Müller, Michael Reichenbacher, Jelena Ristic, Philipp Schuster, Marliese Uhrig-Homburg
SS 2017	252579909	Seminar Management Accounting and Innovation	Seminar (S)	2	Michael Pelz, Marcus Wouters
SS 2017	2579905	Special Topics in Management Accounting	Seminar (S)	2	Ana Mickovic
SS 2017	2573011	Seminar Human Resource Management	Seminar (S)	2	Mitarbeiter, Petra Nieken

Learning Control / Examinations
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Hospital Management (SS 2017)

Aim
The student

- knows the scope of duties and decisions of a hospital manager and
- is able to give profound guidance.

Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.
Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

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

V Event excerpt: Seminar Management Accounting and Costing Practices (SS 2017)

Aim
Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,

- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload

The total workload for this course is approximately 90 hours. For further information see German version.

Literature

Will be announced in the course.

V Event excerpt: Seminar Management Accounting (SS 2017)

Aim

Students

- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content

The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload

The total workload for this course is approximately 90 hours. For further information see German version.

Literature

Will be announced in the course.

V Event excerpt: Seminar in Finance (SS 2017)

Aim

The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.
Through the presentations in this seminar the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

Content

Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.
The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

V Event excerpt: (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.

V Event excerpt: 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.

V Event excerpt: (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.

V Event excerpt: 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.

V Event excerpt: Seminar Management Accounting and Innovation (SS 2017)

Aim
Students

▪ are largely independently able to identify a distinct topic in Management Accounting,
▪ are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
▪ can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: Special Topics in Management Accounting (SS 2017)

Aim
Students
▪ are largely independently able to identify a distinct topic in Management Accounting,
▪ are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
▪ can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: Seminar Human Resource Management (SS 2017)

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: Wolf Fichtner, Hansjörg Fromm, Andreas Geyer-Schulz, Ju-Young Kim, Martin Klarmann, Peter Knauth, Hagen Lindstädt, David Lorenz, Torsten Luedecke, Thomas Lützkendorf, Alexander Mädche, Bruno Neibecker, Stefan Nickel, Petra Nieken, Martin Ruckes, Gerhard Satzger, Frank Schultmann, Thomas Setzer, Orestis Terzidis, Marliese Uhrig-Homburg, Maxim Ulrich, Christof Weinhardt, Marion Weissenberger-Eibl, Ute Werner, Marcus Wouters

Contained in: [M-WIWI-102972] Seminar

ECTS	Language	Recurrence	Version
3	deutsch/englisch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
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	Mitarbeiter, Petra Nieken
WS 16/17	2573010		Seminar (S)	2	Mitarbeiter, Petra Nieken
WS 16/17	2581030		Seminar (S)	2	Russell McKenna, Marcus Wiens
WS 16/17	2581990		Seminar (S)	2	Frank Schultmann, Rebekka Volk
WS 16/17	2530580		Seminar (S)	2	Mitarbeiter , Marliese Uhrig-Homburg
WS 16/17	2530395		Vorlesung (V)	3	Ute Werner
WS 16/17	2581977		Seminar (S)	2	Jérémy Rimbon, Frank Schultmann
WS 16/17	2581978		Seminar (S)	2	Frank Schultmann, Marcus Wiens
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	Guido Brückner, Veit Hagenmeyer, Christian Hirsch, Patrick Jochem, Hartmut Schmeck, Dorothea Wagner, Franziska Wegner
SS 2017	2581977		Seminar (S)	2	Jérémy Rimbon, Frank Schultmann
SS 2017	2540510		Seminar (S)	2	Andreas Sonnenbichler
SS 2017	2550493	Hospital Management	Block (B)	2	Martin Ludwig Hansis
SS 2017	252579908	Seminar Management Accounting and Costing Practices	Seminar (S)	2	Michael Pelz, Marcus Wouters
SS 2017	2579904	Seminar Management Accounting	Seminar (S)	2	Michael Pelz, Marcus Wouters

SS 2017	2530580	Seminar in Finance	Seminar (S)	2	Stefan Fiesel, Martin Hain, Michael Hofmann, Marcel Müller, Michael Reichenbacher, Jelena Ristic, Philipp Schuster, Marliese Uhrig-Homburg
SS 2017	252579909	Seminar Management Accounting and Innovation	Seminar (S)	2	Michael Pelz, Marcus Wouters
SS 2017	2579905	Special Topics in Management Accounting	Seminar (S)	2	Ana Mickovic
SS 2017	2573011	Seminar Human Resource Management	Seminar (S)	2	Mitarbeiter, Petra Nieken

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Hospital Management (SS 2017)

Aim
The student

- knows the scope of duties and decisions of a hospital manager and
- is able to give profound guidance.

Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.
Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

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

V Event excerpt: Seminar Management Accounting and Costing Practices (SS 2017)

Aim
Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,

- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: Seminar Management Accounting (SS 2017)

Aim
Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: Seminar in Finance (SS 2017)

Aim
The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.
Through the presentations in this seminar the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.
The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

V Event excerpt: (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.

V Event excerpt: 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.

V Event excerpt: (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.

V Event excerpt: 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.

V Event excerpt: Seminar Management Accounting and Innovation (SS 2017)

Aim

Students

▪ are largely independently able to identify a distinct topic in Management Accounting,
▪ are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
▪ can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: Special Topics in Management Accounting (SS 2017)

Aim
Students
▪ are largely independently able to identify a distinct topic in Management Accounting,
▪ are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
▪ can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: Seminar Human Resource Management (SS 2017)

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 Economics A (Master) [T-WIWI-103478]

Responsibility: Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger
Contained in: [M-WIWI-102971] Seminar

ECTS	Language	Recurrence	Version
3	deutsch/englisch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2560140		Seminar (S)	2	Jeroen Jannis Engel, Nora Szech
WS 16/17	2560141		Seminar (S)	2	Leonie Fütterer, Nora Szech
SS 2017	2560282		Seminar (S)	2	Assistenten, Ingrid Ott

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: (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: Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger

Contained in: [M-WIWI-102972] Seminar

ECTS	Language	Recurrence	Version
3	deutsch/englisch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2560140		Seminar (S)	2	Jeroen Jannis Engel, Nora Szech
WS 16/17	2560141		Seminar (S)	2	Leonie Fütterer, Nora Szech
SS 2017	2560282		Seminar (S)	2	Assistenten, Ingrid Ott

Learning Control / Examinations

The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions

None.

Recommendations

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks

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

V Event excerpt: (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 Informatics A (Master) [T-WIWI-103479]

Responsibility: Andreas Oberweis, Harald Sack, Hartmut Schmeck, York Sure-Vetter, Johann Marius Zöllner
Contained in: [M-WIWI-102973] Seminar

ECTS	Language	Recurrence	Version
3	deutsch/englisch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2513305	Developing IT-based Business Models	Seminar (S)	2	Felix Leif Keppmann, Maria Maleshkova, Rudi Studer, York Sure-Vetter
WS 16/17	2512310	Smart Services and the IoT	Seminar / Praktikum (S/P)		Johannes Kunze von Bischhoffshausen, Maria Maleshkova, York Sure-Vetter, Tobias Weller
WS 16/17	2512307	Applications of Semantic MediaWiki	Seminar / Praktikum (S/P)	3	Matthias Frank, Maria Maleshkova, Achim Rettinger, Rudi Studer, York Sure-Vetter, Tobias Weller
WS 16/17	2513104		Seminar (S)	2	Marlon Braun, Christian Hirsch, Fabian Rigoll, Hartmut Schmeck
WS 16/17	2595470	Seminar Service Science, Management & Engineering	Seminar (S)	2	Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Rudi Studer, Christof Weinhardt
WS 16/17	2400013	Seminar: Energy Informatics	Seminar (S)	2	Guido Brückner, Veit Hagenmeyer, Christian Hirsch, Patrick Jochem, Hartmut Schmeck, Dorothea Wagner, Franziska Wegner
WS 16/17	2512301		Seminar / Praktikum (S/P)	3	Maribel Acosta Deibe, Andreas Harth, Tobias Christof Käfer, Rudi Studer, York Sure-Vetter
SS 2017	2513200		Seminar (S)	2	Stefanie Betz, Andreas Fritsch, Andreas Oberweis

SS 2017	2513300	Technology-enhanced Learning	Seminar (S)	2	Jürgen Beyerer, Klemens Böhm, Matthias Frank, Gerd Gidion, Martin Mandausch, Wolfgang Roller, Alexander Streicher, York Sure-Vetter, Daniel Szentes
SS 2017	2513306	Data Science & Real-time Big Data Analytics	Seminar (S)	2	Dominik Riemer, Suad Sejdovic, York Sure-Vetter, Ignacio Traverso Ribón
SS 2017	2512300		Seminar / Praktikum (S/P)	3	Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma
SS 2017	2513103		Seminar (S)	2	Marlon Braun, Fabian Rigoll, Hartmut Schmeck

Learning Control / Examinations
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Developing IT-based Business Models (WS 16/17)

Aim
The Student

- analyzes and develops in small teams a business model from an idea to a complete business plan or
- treats a special topic from the area of Semantic Web in businesses and entrepreneurships.
- learns about basic concepts and problem areas and considers these while building the business plan for a particular business idea.
- understands and considers the viewpoints of different stakeholders in the area of entrepreneurships and their influences on an own business idea.

Content
Semantic technologies such as RDF, SPARQL, OWL, and RIF are still standardised only in their first versions. Still, the multitude of integrated technologies provides the basis for development of new applications and creates, with the help of the initial standardisations, a foundation for attracting investors. The potential and future developments in the field are exemplified by the growing popularity and importance of data, being published as Linked Data, as well as by the increase

in applications developed outside the scope of research. The seminar "Developing Business Models for the Semantic Web" aims to explore these opportunities for new business models und business ventures.
The seminar takes place on a weekly basis and consists of two main parts. The first part is a series of presentations, held by external experts who share their experience in the area of entrepreneurship. The aim is to engage a wide variety of presenters, including applicants to programs for supporting young business ventures, startup founders, and people in leadership positions in established companies. Further guest lecturers include experts in the field of business and startup development, tax and enterprise law, as well as entrepreneurs, who have sold their startups or had to give up their ideas. The second part consists of the contributions of seminar participants. They are required to develop a business model, starting with the initial idea and building it up to a complete business plan. This development process is accompanied by feedback sessions, pitches, mid-term presentations and a final presentation. The student presentations alternate with presentations given by external experts. Furthermore, besides on the development of a business plan, student can work on a specific topic such as "Analysing Existing Business Models on the Web" or "Using Open Source in Startups".
The seminar pass can be obtained by submitting a completed seminar thesis (i.e. the business plan or the specific topic) and by regularly attending the seminar presentations.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

V Event excerpt: Smart Services and the IoT (WS 16/17)

Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

V Event excerpt: 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

V Event excerpt: (SS 2017)

Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Event excerpt: 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.

V Event excerpt: 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.

V Event excerpt: (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: Andreas Oberweis, Harald Sack, Hartmut Schmeck, York Sure-Vetter, Johann Marius Zöllner
Contained in: [M-WIWI-102974] Seminar

ECTS	Language	Recurrence	Version
3	deutsch/englisch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2513305	Developing IT-based Business Models	Seminar (S)	2	Felix Leif Keppmann, Maria Maleshkova, Rudi Studer, York Sure-Vetter
WS 16/17	2512310	Smart Services and the IoT	Seminar / Praktikum (S/P)		Johannes Kunze von Bischhoffshausen, Maria Maleshkova, York Sure-Vetter, Tobias Weller
WS 16/17	2512307	Applications of Semantic MediaWiki	Seminar / Praktikum (S/P)	3	Matthias Frank, Maria Maleshkova, Achim Rettinger, Rudi Studer, York Sure-Vetter, Tobias Weller
WS 16/17	2513104		Seminar (S)	2	Marlon Braun, Christian Hirsch, Fabian Rigoll, Hartmut Schmeck
WS 16/17	2595470	Seminar Service Science, Management & Engineering	Seminar (S)	2	Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Rudi Studer, Christof Weinhardt
WS 16/17	2400013	Seminar: Energy Informatics	Seminar (S)	2	Guido Brückner, Veit Hagenmeyer, Christian Hirsch, Patrick Jochem, Hartmut Schmeck, Dorothea Wagner, Franziska Wegner
WS 16/17	2512301		Seminar / Praktikum (S/P)	3	Maribel Acosta Deibe, Andreas Harth, Tobias Christof Käfer, Rudi Studer, York Sure-Vetter
SS 2017	2513200		Seminar (S)	2	Stefanie Betz, Andreas Fritsch, Andreas Oberweis

SS 2017	2513300	Technology-enhanced Learning	Seminar (S)	2	Jürgen Beyerer, Klemens Böhm, Matthias Frank, Gerd Gidion, Martin Mandausch, Wolfgang Roller, Alexander Streicher, York Sure-Vetter, Daniel Szentes
SS 2017	2513306	Data Science & Real-time Big Data Analytics	Seminar (S)	2	Dominik Riemer, Suad Sejdovic, York Sure-Vetter, Ignacio Traverso Ribón
SS 2017	2512300		Seminar / Praktikum (S/P)	3	Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma
SS 2017	2513103		Seminar (S)	2	Marlon Braun, Fabian Rigoll, Hartmut Schmeck

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Developing IT-based Business Models (WS 16/17)

Aim
The Student

- analyzes and develops in small teams a business model from an idea to a complete business plan or
- treats a special topic from the area of Semantic Web in businesses and entrepreneurships.
- learns about basic concepts and problem areas and considers these while building the business plan for a particular business idea.
- understands and considers the viewpoints of different stakeholders in the area of entrepreneurships and their influences on an own business idea.

Content
Semantic technologies such as RDF, SPARQL, OWL, and RIF are still standardised only in their first versions. Still, the multitude of integrated technologies provides the basis for development of new applications and creates, with the help of the initial standardisations, a foundation for attracting investors. The potential and future developments in the field are exemplified by the growing popularity and importance of data, being published as Linked Data, as well as by the increase

in applications developed outside the scope of research. The seminar “Developing Business Models for the Semantic Web” aims to explore these opportunities for new business models und business ventures.
The seminar takes place on a weekly basis and consists of two main parts. The first part is a series of presentations, held by external experts who share their experience in the area of entrepreneurship. The aim is to engage a wide variety of presenters, including applicants to programs for supporting young business ventures, startup founders, and people in leadership positions in established companies. Further guest lecturers include experts in the field of business and startup development, tax and enterprise law, as well as entrepreneurs, who have sold their startups or had to give up their ideas. The second part consists of the contributions of seminar participants. They are required to develop a business model, starting with the initial idea and building it up to a complete business plan. This development process is accompanied by feedback sessions, pitches, mid-term presentations and a final presentation. The student presentations alternate with presentations given by external experts. Furthermore, besides on the development of a business plan, student can work on a specific topic such as “Analysing Existing Business Models on the Web” or “Using Open Source in Startups”.
The seminar pass can be obtained by submitting a completed seminar thesis (i.e. the business plan or the specific topic) and by regularly attending the seminar presentations.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

V Event excerpt: Smart Services and the IoT (WS 16/17)

Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

V Event excerpt: 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

V Event excerpt: (SS 2017)

Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Event excerpt: 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.

V Event excerpt: 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.

V Event excerpt: (WS 16/17)

Workload

Topicsof interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

T Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

Responsibility: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Contained in: [M-WIWI-102973] Seminar

ECTS	Language	Recurrence	Version
3	deutsch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2550462		Seminar (S)		Steffen Rebennack, Oliver Stein
WS 16/17	2550491	Seminar: Recent Topics in OR	Seminar (S)		Mitarbeiter , Stefan Nickel, Anne Zander
SS 2017	2550473		Seminar (S)		Steffen Rebennack, Bismark Singh
SS 2017	2550132		Seminar (S)	2	Peter Kirst, Robert Mohr, Christoph Neumann, Oliver Stein
SS 2017	2500003	Seminar: Recent Topics in OR	Seminar (S)		Mitarbeiter , Stefan Nickel, Anne Zander
SS 2017	2550491	Seminar: Recent Topics in OR	Block (B)		Mitarbeiter , Stefan Nickel

Learning Control / Examinations
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Seminar: Recent Topics in OR (SS 2017)

Aim
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,

- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

V Event excerpt: Seminar: Recent Topics in OR (SS 2017)

Aim
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

T Course: Seminar in Operations Research B (Master) [T-WIWI-103482]

Responsibility: Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann
Contained in: [M-WIWI-102974] Seminar

ECTS	Language	Recurrence	Version
3	deutsch	Jedes Semester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2550462		Seminar (S)		Steffen Rebennack, Oliver Stein
WS 16/17	2550491	Seminar: Recent Topics in OR	Seminar (S)		Mitarbeiter , Stefan Nickel, Anne Zander
SS 2017	2550473		Seminar (S)		Steffen Rebennack, Bismark Singh
SS 2017	2550132		Seminar (S)	2	Peter Kirst, Robert Mohr, Christoph Neumann, Oliver Stein
SS 2017	2500003	Seminar: Recent Topics in OR	Seminar (S)		Mitarbeiter , Stefan Nickel, Anne Zander
SS 2017	2550491	Seminar: Recent Topics in OR	Block (B)		Mitarbeiter , Stefan Nickel

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Seminar: Recent Topics in OR (SS 2017)

Aim
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,

- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

V Event excerpt: Seminar: Recent Topics in OR (SS 2017)

Aim
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

Course: Seminar in Statistics A (Master) [T-WIWI-103483]

Responsibility: Oliver Grothe, Melanie Schienle
Contained in: [M-WIWI-102971] Seminar

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: Oliver Grothe, Melanie Schienle
Contained in: [M-WIWI-102972] Seminar

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 Mathematics [T-MATH-105686]

Responsibility:
Contained in: [M-MATH-102730] Seminar

ECTS	Version
3	1

T Course: Service Oriented Computing [T-WIWI-105801]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	deutsch/englisch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511309	Exercises to Service Oriented Computing	Übung (Ü)	1	Felix Leif Keppmann, Maria Maleshkova, York Sure-Vetter
SS 2017	2511308	Service Oriented Computing	Vorlesung (V)	2	Maria Maleshkova, 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.

Conditions
None

V Event excerpt: Service Oriented Computing (SS 2017)

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: Simulation I [T-WIWI-102627]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101400] Stochastic Methods and Simulation
[M-WIWI-101454] Stochastic Modelling and Optimization

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

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.

T Course: Simulation II [T-WIWI-102703]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101400] Stochastic Methods and Simulation
[M-WIWI-101454] 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	André Lust, Ellen Platt, Karl-Heinz Waldmann
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.

V Event excerpt: (WS 16/17)

Aim
The participants will be enabled to model and analyze discrete event systems that underlie stochastic influences with efficient simulation techniques. The discussion of practice-oriented case studies illustrates the limits of standard simulation techniques for stochastic discrete event systems regarding the simulation effort to obtain statistical significant results. Variance reducing techniques will be introduced in theory as modern and efficient techniques and will be exemplified by examples from quality management, financial engineering and insurance. The main scope of the applications discussed in the course is the efficient simulation of stochastic processes. The facultative computer exercise course under utilization of the programming language Java comprises a practice-oriented case study, in which the participants implement certain variance reducing techniques in order to analyze the reduction in computer effort in comparison to standard techniques.

Content
Variance reducing techniques, simulation of sochastic processes, case studies.

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

T Course: Simulation of Stochastic Systems [T-WIWI-106552]

Responsibility: Oliver Grothe, Steffen Rebennack
Contained in: [M-WIWI-103289] Stochastic Optimization

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Conditions
None.

T Course: Sobolev Spaces [T-MATH-105896]

Responsibility: Andreas Kirsch
Contained in: [M-MATH-102926] Sobolev Spaces

ECTS	Version
5	1

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 2017	2520537	Social Choice Theory	Vorlesung (V)	2	Clemens Puppe
SS 2017	2520539		Übung (Ü)	1	Michael Müller, Clemens Puppe

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

Conditions
None

V Event excerpt: Social Choice Theory (SS 2017)

Aim
The student should acquire knowledge of formal theories of collective decision making and learn to apply them to real life situations.

Content
The course provides a comprehensive treatment of preference and judgement aggregation, including proofs of general results that have Arrow's famous impossibility theorem and Gibbard's oligarchy theorem as corollaries. The second part of the course is devoted to voting theory. Among other things, we prove the Gibbard-Satterthwaite theorem.

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

Literature
Main texts:

- Hervé Moulin: Axioms of Cooperative Decision Making, Cambridge University Press, 1988
- Christian List and Clemens Puppe: Judgement Aggregation. A survey, in: Handbook of rational & social choice, P.Anand, P.Pattanaik, C.Puppe (Eds.), Oxford University Press 2009.

Secondary texts:

- Amartya Sen: Collective Choice and Social Welfare, Holden-Day, 1970
- Wulf Gaertner: A Primer in Social Choice Theory, revised edition, Oxford University Press, 2009
- Wulf Gaertner: Domain Conditions in Social Choice Theory, Oxford University Press, 2001

T Course: Software Quality Management [T-WIWI-102895]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511208	Software Quality Management	Vorlesung (V)	2	Andreas Oberweis
SS 2017	2511209		Übung (Ü)	1	Andreas Oberweis

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Conditions
None

Remarks
This course was formely named "Software Technology: Quality Management".

V Event excerpt: Software Quality Management (SS 2017)

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

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	David Bälz, Ingrid Ott
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.

V Event excerpt: 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: Spatial Stochastics [T-MATH-105867]

Responsibility: Daniel Hug, Günter Last
Contained in: [M-MATH-102903] Spatial Stochastics

ECTS	Version
8	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	0105600		Vorlesung (V)	4	Daniel Hug

Conditions
none

T Course: Special Functions and Applications in Potential Theory [T-MATH-102274]

Responsibility: Andreas Kirsch
Contained in: [M-MATH-101335] Special Functions and Applications in Potential Theory

ECTS	Version
5	1

Conditions
None

T Course: Special Topics of Efficient Algorithms [T-WIWI-102657]

Responsibility: Hartmut Schmeck
Contained in: [M-WIWI-101472] 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

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: York Sure-Vetter
Contained in: [M-WIWI-101472] 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 Numerical Linear Algebra [T-MATH-105891]

Responsibility: Marlis Hochbruck
Contained in: [M-MATH-102920] Special Topics of Numerical Linear Algebra

ECTS	Version
8	1

Conditions
none

T Course: Special Topics of Software- and Systemsengineering [T-WIWI-102678]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101472] 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: Spectral Theory - Exam [T-MATH-103414]

Responsibility: Gerd Herzog, Peer Kunstmann, Christoph Schmoeger, Roland Schnaubelt, Lutz Weis
Contained in: [M-MATH-101768] Spectral Theory

ECTS	Version
8	1

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

Modeled Conditions
The following conditions must be met:

- The course [T-MATH-105870] *Generalized Regression Models* must not have been started.

Recommendations
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

V Event excerpt: (WS 16/17)

Aim
The student

- shows comprehensive knowledge of regression techniques

Workload
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours

T Course: Stein's Method [T-MATH-105914]

Responsibility: Matthias Schulte
Contained in: [M-MATH-102946] Stein's Method

ECTS	Version
5	1

Conditions
none

T 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/

V Event excerpt: (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: Stochastic Control [T-MATH-105871]

Responsibility: Nicole Bäuerle
Contained in: [M-MATH-102908] Stochastic Control

ECTS	Version
4	1

Conditions
none

T Course: Stochastic Differential Equations [T-MATH-105852]

Responsibility: Roland Schnaubelt, Lutz Weis
Contained in: [M-MATH-102881] Stochastic Differential Equations

ECTS	Version
8	1

T Course: Stochastic Evolution Equations [T-MATH-105910]

Responsibility: Lutz Weis
Contained in: [M-MATH-102942] Stochastic Evolution Equations

ECTS	Version
8	1

Conditions
none

T Course: Stochastic Geometry [T-MATH-105840]

Responsibility: Daniel Hug, Günter Last
Contained in: [M-MATH-102865] Stochastic Geometry

ECTS	Version
8	1

T Course: Strategic and Innovative Decision Making in Marketing [T-WIWI-102618]

Responsibility: Bruno Neibecker
Contained in: [M-WIWI-101490] Marketing Management

ECTS	Recurrence	Version
4,5	Jedes Sommersemester	1

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

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 2017	2571185	Strategic Brand Management	Block (B)		Joachim Blickhäuser, Martin Klarmann

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

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.

V Event excerpt: Strategic Brand Management (SS 2017)

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

ECTS	Language	Recurrence	Version
5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511602	Strategic Management of Information Technology	Vorlesung (V)	2	Thomas Wolf
SS 2017	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

V Event excerpt: Strategic Management of Information Technology (SS 2017)

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: 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

V Event excerpt: 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: Supply Chain Management in the Process Industry [T-WIWI-102860]

Responsibility: Stefan Nickel
Contained in: [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.

V Event excerpt: 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: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-101413] Applications of Operations Research
[M-WIWI-101400] Stochastic Methods and Simulation
[M-WIWI-102832] Operations Research in Supply Chain Management

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Sommersemester	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2550487		Übung (Ü)	1	Stefan Nickel, Brita Rohrbeck
SS 2017	2550486		Vorlesung (V)	2	Stefan Nickel

Learning Control / Examinations
The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.
Prerequisite for admission to examination is the succesful completion of the online assessments.

Conditions
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendations
None

Remarks
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

V Event excerpt: (SS 2017)

Aim
The student

- gathers expertise in fundamental techniques from procurement and distribution logistics, methods from inventory management and lot sizing,
- acquires the ability to efficiently utilize quantitative models from transportation planning (long-distance and distribution planning), inventory management and lot sizing in production,
- applies the introduced methods in more detail and in industry-relevant case-studies.

Content
The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models).The exercisesaccompanying the lecture offer the possibility to apply the considered models to practical problems.

Literature
Elective Literature

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T Course: 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 (60 min) (according to Section 4(2), 1 of the examination regulation).

Recommendations
None

V Event excerpt: 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: The Riemann Zeta Function [T-MATH-105934]

Responsibility: Fabian Januszewski
Contained in: [M-MATH-102960] The Riemann Zeta Function

ECTS	Version
4	1

T Course: Theory of Endogenous Growth [T-WIWI-102785]

Responsibility: Ingrid Ott
Contained in: [M-WIWI-101478] Innovation and growth
[M-WIWI-101496] Growth and Agglomeration

ECTS	Language	Recurrence	Version
4,5	deutsch	Jedes Wintersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 16/17	2561504		Übung (Ü)	1	Levent Eraydin, Ingrid Ott
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.

V Event excerpt: 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: Time Series Analysis [T-MATH-105874]

Responsibility: Norbert Henze, Bernhard Klar
Contained in: [M-MATH-102911] Time Series Analysis

ECTS	Version
4	1

Conditions
none

T Course: Topics in Experimental Economics [T-WIWI-102863]

Responsibility: Johannes Philipp Reiß
Contained in: [M-WIWI-101505] Experimental Economics

ECTS	Recurrence	Version
4,5	Unregelmäßig	1

Learning Control / Examinations
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

Remarks
The course is offered in summer 2016 for the first time. The course is not offered in every academic year.

T Course: Traveling Waves [T-MATH-105897]

Responsibility: Jens Rottmann-Matthes
Contained in: [M-MATH-102927] Traveling Waves

ECTS	Version
6	1

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

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

V Event excerpt: (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: Wavelets [T-MATH-105838]

Responsibility: Andreas Rieder
Contained in: [M-MATH-102895] Wavelets

ECTS	Recurrence	Version
8	Unregelmäßig	1

Learning Control / Examinations
Mündliche Prüfung im Umfang von ca. 30 Minuten.

Conditions
none

T Course: Web Science [T-WIWI-103112]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-101472] 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	York Sure-Vetter, Tobias Weller

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None

Remarks
New course starting winter term 2015/2016.

V Event excerpt: Web Science (WS 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: Workflow-Management [T-WIWI-102662]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101472] Informatics

ECTS	Language	Recurrence	Version
5	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	2511204	Workflow-Management	Vorlesung (V)	2	Andreas Oberweis
SS 2017	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

V Event excerpt: Workflow-Management (SS 2017)

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.

Studien- und Prüfungsordnung der Universität Karlsruhe (TH) für den Masterstudiengang Wirtschaftsmathematik

Aufgrund von § 34 Abs. 1, Satz 1 des Landeshochschulgesetzes (LHG) vom 1. Januar 2005 hat die beschließende Senatskommission für Prüfungsordnungen der Universität Karlsruhe (TH) am 13. Februar 2009 die folgende Studien- und Prüfungsordnung für den Masterstudiengang Wirtschaftsmathematik beschlossen.

Der Rektor hat seine Zustimmung am 28. August 2009 erteilt.

Inhaltsverzeichnis

Die Universität Karlsruhe (TH) hat sich im Rahmen der Umsetzung des Bolognaprozesses zum Aufbau eines Europäischen Hochschulraumes zum Ziel gesetzt, dass am Abschluss der Studierendenausbildung an der Universität Karlsruhe (TH) der Mastergrad stehen soll. Die Universität Karlsruhe (TH) sieht daher die an der Universität Karlsruhe (TH) angebotenen konsekutiven Bachelor- und Masterstudiengänge als Gesamtkonzept mit konsekutivem Curriculum.

In dieser Satzung ist nur die weibliche Sprachform gewählt worden. Alle personenbezogenen Aussagen gelten jedoch stets für Frauen und Männer gleichermaßen.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich, Zweck der Prüfung

(1) Diese Masterprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Masterstudiengang Wirtschaftsmathematik an der Universität Karlsruhe (TH).

(2) Im Masterstudium sollen die im Bachelorstudium erworbenen wissenschaftlichen Qualifikationen weiter vertieft oder ergänzt werden. Die Studentin 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.“) verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Die Regelstudienzeit beträgt vier Semester. Sie umfasst neben den Lehrveranstaltungen Prüfungen und die Masterarbeit.

(2) Die im Studium zu absolvierenden Lehrinhalte sind in Module gegliedert, die jeweils aus einer Lehrveranstaltung oder mehreren, thematisch und zeitlich aufeinander bezogenen Lehrveranstaltungen bestehen. Art, Umfang und Zuordnung der Module zu einem Fach sowie die Möglichkeiten, Module untereinander zu kombinieren, beschreibt der Studienplan. Die Fächer und deren Umfang werden in § 17 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 Verteilung der Leistungspunkte im Studienplan auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(6) Lehrveranstaltungen können auch in englischer Sprache angeboten werden.

§ 4 Aufbau der Prüfungen

(1) Die Masterprüfung besteht aus einer Masterarbeit und Modulprüfungen, jede Modulprüfung aus einer oder mehreren Modulteilprüfungen. Eine Modulteilprüfung besteht aus mindestens einer Erfolgskontrolle.

(2) Erfolgskontrollen sind:

1. schriftliche Prüfungen,
2. mündliche Prüfungen oder
3. Erfolgskontrollen anderer Art.

Erfolgskontrollen anderer Art sind z.B. Vorträge, Übungsscheine, Projekte, schriftliche Arbeiten, Berichte, Seminararbeiten und Klausuren, sofern sie nicht als schriftliche oder mündliche Prüfung in der Modul- oder Lehrveranstaltungsbeschreibung im Studienplan ausgewiesen sind.

(3) In der Regel sind mindestens 50 % einer Modulprüfung in Form von schriftlichen oder mündlichen Prüfungen (Absatz 2, Nr. 1 und 2) abzulegen, die restlichen Prüfungen erfolgen durch Erfolgskontrollen anderer Art (Absatz 2, Nr. 3). Hiervon ausgenommen sind Seminarmodule.

§ 5 Anmeldung und Zulassung zu den Prüfungen

(1) Um an den Modulprüfungen teilnehmen zu können, muss sich die Studentin schriftlich oder per Online-Anmeldung beim Studienbüro anmelden. Hierbei sind die gemäß dem Studienplan für die jeweilige Modulprüfung notwendigen Studienleistungen nachzuweisen. Darüber hinaus muss sich die Studentin für jede einzelne Modulteilprüfung, die in Form einer schriftlichen oder mündlichen Prüfung (§ 4 Abs. 2, Nr. 1 und 2) durchgeführt wird, beim Studienbüro anmelden. Dies gilt auch für die Anmeldung zur Masterarbeit.

(2) Um zu schriftlichen und/oder mündlichen Prüfungen (§ 4 Abs. 2, Nr. 1 und 2) in einem bestimmten Modul zugelassen zu werden, muss die Studentin vor der ersten schriftlichen oder mündlichen Prüfung in diesem Modul beim Studienbüro eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach, wenn diese Wahlmöglichkeit besteht, abgeben.

(3) Die Zulassung darf nur abgelehnt werden, wenn die Studentin in einem mit der Wirtschaftsmathematik oder den Wirtschaftswissenschaften 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 Erfolgskontrolle (§ 4 Abs. 2, Nr. 1 bis 3) der einzelnen Lehrveranstaltungen wird von der Prüferin der betreffenden Lehrveranstaltung in Bezug auf die Lehrinhalte der Lehrveranstaltung und die Lehrziele des Moduls festgelegt. Die Prüferin, die Art der Erfolgskontrollen, deren Häufigkeit, Reihenfolge und Gewichtung und die Bildung der Lehrveranstaltungsnote müssen mindestens sechs Wochen vor Semesterbeginn bekannt gegeben werden. Im Einvernehmen zwischen Prüferin und Studentin kann die Art der Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch § 4 Abs. 3 zu berücksichtigen.

(3) Eine schriftlich durchzuführende Prüfung kann auch mündlich, eine mündlich durchzuführende Prüfung kann auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfung bekannt gegeben werden.

(4) Weist eine Studentin nach, dass sie wegen länger andauernder oder ständiger körperlicher Behinderung nicht in der Lage ist, die Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen

Form abzulegen, kann der zuständige Prüfungsausschuss – in dringenden Angelegenheiten, deren Erledigung nicht bis zu einer Sitzung des Ausschusses aufgeschoben werden kann, dessen Vorsitzende – gestatten, Erfolgskontrollen in einer anderen Form zu erbringen. Auf begründeten Antrag kann der Prüfungsausschuss auch in anderen Ausnahmefällen gestatten, Erfolgskontrollen in einer anderen Form zu erbringen.

(5) Bei Lehrveranstaltungen in englischer Sprache können mit Zustimmung der Studentin die entsprechenden Erfolgskontrollen in englischer Sprache abgenommen werden.

(6) Schriftliche Prüfungen (§ 4 Abs. 2, Nr. 1) sind in der Regel von einer Prüferin nach § 15 Abs. 2 oder § 15 Abs. 3 zu bewerten. Die Note ergibt sich 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 zu runden. Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Einzelprüfungen dauern mindestens 60 und höchstens 240 Minuten.

(7) Mündliche Prüfungen (§ 4 Abs. 2, Nr. 2) sind von mehreren Prüferinnen (Kollegialprüfung) oder von einer Prüferin in Gegenwart einer Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört die Prüferin die anderen an der Kollegialprüfung mitwirkenden Prüferinnen an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 45 Minuten pro Studentin.

(8) Die wesentlichen Gegenstände und Ergebnisse der mündlichen Prüfung in den einzelnen Fächern sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist der Studentin im Anschluss an die mündliche Prüfung bekannt zu geben.

(9) Studentinnen, die sich in einem späteren Prüfungszeitraum der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen als Zuhörerinnen bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse. Aus wichtigen Gründen oder auf Antrag der zu prüfenden Studentin 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 der Studentin zurechenbar ist. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

(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. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

(12) Bei mündlich durchgeführten Erfolgskontrollen anderer Art muss in der Regel neben der Prüferin eine Beisitzende anwesend sein, die zusätzlich zur Prüferin die Protokolle zeichnet.

§ 7 Bewertung von Prüfungen und Erfolgskontrollen

(1) Das Ergebnis einer Erfolgskontrolle wird von den jeweiligen Prüferinnen in Form einer Note festgesetzt.

(2) Im Masterzeugnis dürfen nur folgende Noten verwendet werden:

1	=	sehr gut (very good)	=	eine 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 im Studienplan die Benotung mit „bestanden“ (passed) oder „nicht bestanden“ (failed) vorgesehen werden.

(4) Bei der Bildung der gewichteten Durchschnitte der 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 in demselben Studiengang nur einmal angerechnet werden. Die Anrechnung eines Moduls, einer Lehrveranstaltung oder einer Erfolgskontrolle ist darüber hinaus ausgeschlossen, wenn das betreffende Modul, die Lehrveranstaltung oder die Erfolgskontrolle bereits in einem grundständigen Bachelorstudiengang angerechnet wurde, auf dem dieser Masterstudiengang konsekutiv aufbaut.

(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 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 geregelt. Die differenzierten Lehrveranstaltungsnoten (Absatz 2) sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden. Enthält der Studienplan keine Regelung darüber, wann eine Modulprüfung bestanden ist, so ist diese Modulprüfung dann endgültig nicht bestanden, wenn eine dem Modul zugeordnete Modulteilprüfung endgültig nicht bestanden wurde.

(9) Die Ergebnisse der Masterarbeit, der Modulprüfungen bzw. der Modulteilprüfungen, der Erfolgskontrollen anderer Art sowie die erworbenen Leistungspunkte werden durch das Studienbüro der Universität erfasst.

(10) Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein. Eine Fachprüfung ist bestanden, wenn die für das Fach erforderliche Anzahl von Leistungspunkten nachgewiesen wird.

(11) Die Gesamtnote der Masterprüfung und die Modulnoten lauten:

		bis	1.5	=	sehr gut
von	1.6	bis	2.5	=	gut
von	2.6	bis	3.5	=	befriedigend
von	3.6	bis	4.0	=	ausreichend

(12) 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	gehört zu den besten 10 % der Studierenden, die die Erfolgskontrolle bestanden haben,
B	gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben,
C	gehört zu den nächsten 30 % der Studierenden, die die Erfolgskontrolle bestanden haben,
D	gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben,
E	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. Bis zum Aufbau einer entsprechenden Datenbasis wird als Übergangsregel die Verteilung der Diplomsnoten des Diplomstudiengangs Wirtschaftsmathematik per 30. September 2009 zur Bildung dieser Skala für alle Module des Masterstudiengangs Wirtschaftsmathematik herangezogen. Diese Verteilung wird jährlich gleitend über mindestens fünf Semester mit mindestens 30 Studierenden jeweils zu Beginn des Semesters für jedes Modul, die Fachnoten und die Gesamtnote angepasst und in diesem Studienjahr für die Festsetzung der ECTS-Note verwendet.

§ 8 Erlöschen des Prüfungsanspruchs, Wiederholung von Prüfungen und Erfolgskontrollen

(1) Studentinnen können eine nicht bestandene schriftliche Prüfung (§ 4 Abs. 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 „ausreichend“ (4.0) sein.

(2) Studentinnen können eine nicht bestandene mündliche Prüfung (§ 4 Abs. 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. Fehlversuche an anderen Hochschulen sind anzurechnen.

(4) Die Wiederholung einer Erfolgskontrolle anderer Art (§ 4 Abs. 2, Nr. 3) wird im Studienplan geregelt.

(5) Eine zweite Wiederholung derselben schriftlichen oder mündlichen Prüfung ist nur in Ausnahmefällen zulässig. Einen Antrag auf Zweitwiederholung hat die Studentin schriftlich beim Prüfungsausschuss zu stellen. Über den ersten Antrag einer Studentin auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet die Rektorin. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses die Rektorin. Absatz 1, Satz 2 und 3 gelten entsprechend.

(6) Die Wiederholung einer bestandenen Erfolgskontrolle ist nicht zulässig.

(7) Eine Fachprüfung ist endgültig nicht bestanden, wenn mindestens ein Modul des Faches endgültig 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 Abs. 2, Satz 3 LHG die Masterprüfung bis zum Ende des siebten Fachsemesters dieses Studiengangs einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang, es sei denn, dass die Studentin die Fristüberschreitung nicht zu vertreten hat. Die Entscheidung darüber trifft der Prüfungsausschuss. Die Entscheidung über eine Fristverlängerung und über Ausnahmen von der Fristregelung trifft der Prüfungsausschuss.

§ 9 Versäumnis, Rücktritt, Täuschung, Ordnungsverstoß

(1) Die Studentin kann bei schriftlichen Modulprüfungen ohne Angabe von Gründen bis einen Tag (24 Uhr) vor dem Prüfungstermin zurücktreten (Abmeldung). Bei mündlichen Modulprüfungen muss der Rücktritt spätestens drei Werktage vor dem betreffenden Prüfungstermin erklärt werden (Abmeldung). Ein Rücktritt von einer mündlichen Prüfung weniger als drei Werktage vor dem betreffenden Prüfungstermin ist nur unter den Voraussetzungen des Absatzes 3 möglich. Die Abmeldung kann schriftlich bei der Prüferin oder per Online-Abmeldung beim Studienbüro erfolgen. Eine durch Widerruf abgemeldete Prüfung gilt als nicht angemeldet. Der Rücktritt von mündlichen Nachprüfungen im Sinne von § 8 Abs. 2 ist grundsätzlich nur unter den Voraussetzungen von Absatz 3 möglich.

(2) Eine Modulprüfung gilt als mit „nicht ausreichend“ bewertet, wenn die Studentin einen Prüfungstermin ohne triftigen Grund versäumt oder wenn sie 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, die Studentin 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 der Studentin bzw. eines von ihr allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes und in Zweifelsfällen 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 die Studentin das Ergebnis seiner Modulprüfung durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Modulprüfung als mit „nicht ausreichend“ (5.0) bewertet.

(5) Eine Studentin, die den ordnungsgemäßen Ablauf der Prüfung stört, kann von der jeweiligen Prüferin oder Aufsicht Führenden von der Fortsetzung der Modulprüfung ausgeschlossen werden. In diesem Fall gilt die betreffende Prüfungsleistung als mit „nicht ausreichend“ (5.0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss die Studentin von der Erbringung weiterer Prüfungsleistungen ausschließen.

(6) Die Studentin kann innerhalb einer Frist von einem Monat verlangen, dass Entscheidungen gemäß Absatz 4 und 5 vom Prüfungsausschuss überprüft werden. Belastende Entscheidungen des Prüfungsausschusses sind der Studentin unverzüglich schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Der Studentin ist vor einer Entscheidung Gelegenheit zur Äußerung zu geben.

(7) Näheres regelt die Allgemeine Satzung der Universität Karlsruhe (TH) zur Redlichkeit bei Prüfungen und Praktika (‚Verhaltensordnung').

§ 10 Mutterschutz, Elternzeit, Wahrnehmung von Familienpflichten

(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. Die Studentin muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem an sie die Elternzeit antreten will, dem Prüfungsausschuss unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum sie Elternzeit in Anspruch nehmen will. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einer Arbeitnehmerin den Anspruch auf Elternzeit auslösen würden, und teilt der Studentin 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 die Studentin ein neues Thema.

(3) Der Prüfungsausschuss entscheidet auf Antrag über die flexible Handhabung von Prüfungsfristen entsprechend den Bestimmungen des Landeshochschulgesetzes, wenn Studierende Familienpflichten wahrzunehmen haben. Die Bearbeitungszeit der Masterarbeit kann nicht durch die Wahrnehmung von Familienpflichten unterbrochen oder verlängert werden. Die gestellte Arbeit gilt als nicht vergeben. Die Studentin erhält ein neues Thema, das innerhalb der in § 11 festgelegten Bearbeitungszeit zu bearbeiten ist.

§ 11 Masterarbeit

(1) Die Masterarbeit soll zeigen, dass die Studentin in der Lage ist, ein Problem aus ihrem Fach selbstständig und in begrenzter Zeit nach wissenschaftlichen Methoden, die dem Stand der Forschung entsprechen, zu bearbeiten. Die Masterarbeit kann auf Deutsch oder Englisch geschrieben werden.

(2) Zum Modul Masterarbeit wird zugelassen, wer mindestens 70 Leistungspunkte gesammelt hat.

(3) Die Masterarbeit kann von jeder Prüferin nach § 15 Abs. 2 aus den Fakultäten für Mathematik oder Wirtschaftswissenschaften vergeben werden. Soll die Masterarbeit außerhalb der Fakultäten für Mathematik oder Wirtschaftswissenschaften angefertigt werden, so bedarf dies der Genehmigung des Prüfungsausschusses. Der Studentin ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. Auf Antrag der Studentin sorgt ausnahmsweise die Vorsitzende des Prüfungsausschusses dafür, dass die Studentin innerhalb von vier Wochen nach Antragstellung von einer Betreuerin ein Thema für die Masterarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über die Vorsitzende des Prüfungsausschusses.

(4) Der Masterarbeit werden 30 Leistungspunkte zugeordnet. Die Bearbeitungsdauer beträgt sechs Monate. Thema, Aufgabenstellung und Umfang der Masterarbeit sind von der Betreuerin so zu begrenzen, dass sie mit dem in Satz 1 festgelegten Arbeitsaufwand bearbeitet werden kann. Auf begründeten Antrag der Studentin kann der Prüfungsausschuss diesen Zeitraum um höchstens drei Monate verlängern.

(5) Bei der Abgabe der Masterarbeit hat die Studentin schriftlich zu versichern, dass sie die Arbeit selbstständig verfasst hat und keine anderen als die von ihr 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 aktenkundig zu machen. Die Studentin kann das Thema der Masterarbeit nur einmal und nur innerhalb der ersten zwei Monate der Bearbeitungszeit zurückgeben. Wird die Masterarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend" bewertet, es sei denn, dass die Studentin dieses Versäumnis nicht zu vertreten hat. Die Möglichkeit der Wiederholung wird in § 8 geregelt.

(7) Die Masterarbeit wird von einer Betreuerin sowie in der Regel von einer weiteren Prüferin aus den beteiligten Fakultäten begutachtet und bewertet. Eine der beiden muss Hochschullehrerin sein. Bei nicht übereinstimmender Beurteilung der beiden Prüferinnen setzt der Prüfungsausschuss im Rahmen der Bewertung der beiden Prüferinnen die Note der Masterarbeit fest. Der Bewertungszeitraum soll acht Wochen nicht überschreiten.

§ 12 Berufspraktikum

(1) Die Studentin kann während des Masterstudiums ein Berufspraktikum ableisten, welches geeignet ist, der Studentin eine Anschauung von der Verzahnung mathematischer und wirtschaftswissenschaftlicher Sichtweisen zu vermitteln. Dem Berufspraktikum sind 8 Leistungspunkte zugeordnet.

(2) Die Studentin setzt sich in eigener Verantwortung mit geeigneten privaten bzw. öffentlichen Einrichtungen in Verbindung, an denen das Praktikum abgeleistet werden kann. Die Studentin wird dabei von einer Prüferin nach § 15 Abs. 2 und einer Ansprechpartnerin der betroffenen Einrichtung betreut.

(3) Am Ende des Berufspraktikums ist der Prüferin ein kurzer Bericht abzugeben und eine Kurzpräsentation über die Erfahrungen im Berufspraktikum zu halten.

(4) Das Berufspraktikum ist abgeschlossen, wenn eine mindestens sechswöchige Tätigkeit nachgewiesen wird, der Bericht abgegeben und die Kurzpräsentation gehalten wurde. Das Berufspraktikum geht nicht in die Gesamtnote ein. Ein Berufspraktikum kann als Zusatzleistung im Sinne von § 13 Abs. 1 oder im Rahmen des Wahlpflichtfachs gemäß § 17 Abs. 4 erbracht werden.

§ 13 Zusatzleistungen, Zusatzmodule, Schlüsselqualifikationen

(1) Innerhalb der Regelstudienzeit, einschließlich der Urlaubssemester für das Studium an einer ausländischen Hochschule (Regelprüfungszeit), können in einem Modul bzw. Fach auch weitere Leistungspunkte (Zusatzleistungen) im Umfang von höchstens 20 Leistungspunkten pro Studiengang erworben werden. § 3 und § 4 der Prüfungsordnung bleiben davon unberührt. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein. Die bei der Festlegung der Modul- bzw. Fachnote nicht berücksichtigten Leistungspunkte werden als Zusatzleistungen automatisch im Transcript of Records aufgeführt und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet.

(2) Die Studentin hat bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

(3) Die Ergebnisse maximal zweier Module, die jeweils mindestens 9 Leistungspunkte umfassen müssen, werden auf Antrag der Studentin in das Bachelorzeugnis als Zusatzmodule aufgenommen und als Zusatzmodule gekennzeichnet. Zusatzmodule werden bei der Festsetzung der Gesamtnote nicht mit einbezogen. Nicht in das Zeugnis aufgenommene Zusatzmodule werden im Transcript of Records automatisch aufgenommen und als Zusatzmodule gekennzeichnet. Zusatzmodule werden mit den nach § 7 vorgesehenen Noten gelistet.

(4) Neben den verpflichtenden fachwissenschaftlichen Modulen sind Module zu den überfachlichen Schlüsselqualifikationen im Umfang von 3 bis 4 Leistungspunkten Bestandteil eines Masterstudiums. Im Studienplan werden Empfehlungen ausgesprochen, welche Module im Rahmen des Angebots zur Vermittlung der additiven Schlüsselqualifikationen belegt werden sollen.

§ 14 Prüfungsausschuss

(1) Für den Masterstudiengang Wirtschaftsmathematik wird ein Prüfungsausschuss gebildet. Er besteht aus sechs stimmberechtigten Mitgliedern, die jeweils zur Hälfte von der Fakultät für Mathematik und der Fakultät für Wirtschaftswissenschaften bestellt werden: vier Hochschullehrerinnen oder Privatdozentinnen, zwei Vertreterinnen der Gruppe der akademischen Mitarbeiterinnen nach § 10 Abs. 1, Satz 2, Nr. 2 LHG und einer Vertreterin der Studentinnen der Fakultät für Mathematik mit beratender Stimme. Weitere Mitglieder mit beratender Stimme können von den jeweiligen Fakultätsräten bestellt werden. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Die Vorsitzende, ihre Stellvertreterin, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreterinnen werden von den jeweiligen Fakultätsräten bestellt, die Mitglieder der Gruppe der akademischen Mitarbeiterinnen nach § 10 Abs. 1, Satz 2, Nr. 2 LHG und die Vertreterin der Studentinnen auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Die Vorsitzende und deren Stellvertreterin müssen Hochschullehrerin sein. Die Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr.

(3) Der Prüfungsausschuss ist zuständig für die Organisation der Modulprüfungen und die Durchführung der ihm durch diese Studien- und Prüfungsordnung zugewiesenen Aufgaben. Er achtet auf die Einhaltung der Bestimmungen dieser Studien- und Prüfungsordnung und fällt die Entscheidung in Prüfungsangelegenheiten. Er entscheidet über die Anrechnung von Studienzeiten, Studienleistungen und Modulprüfungen und übernimmt die Gleichwertigkeitsfeststellung. Er berichtet der jeweiligen Fakultät regelmäßig über die Entwicklung der Prüfungs- und Studienzeiten, einschließlich der Bearbeitungszeiten für die Masterarbeiten und die Verteilung der Gesamtnoten. Er gibt Anregungen zur Reform der Studien- und Prüfungsordnung und der Modulbeschreibungen.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben für alle Regelfälle auf die Vorsitzende des Prüfungsausschusses übertragen.

(5) Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. Die Mitglieder des Prüfungsausschusses, die Prüferinnen und die Beisitzenden unterliegen der Amtsverschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch die Vorsitzende 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 eine fachlich zuständige und von der betroffenen Fakultät zu nennende Hochschullehrerin oder Privatdozentin hinzuzuziehen. Sie hat in diesem Punkt Stimmrecht.

(7) Belastende Entscheidungen des Prüfungsausschusses sind der Studentin 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 beim Rektorat der Universität Karlsruhe (TH) einzulegen.

§ 15 Prüferinnen und Beisitzende

(1) Der Prüfungsausschuss bestellt die Prüferinnen und die Beisitzenden. Er kann die Bestellung der Vorsitzenden übertragen.

(2) Prüferinnen sind Hochschullehrerinnen und habilitierte Mitglieder sowie akademischen Mitarbeiterinnen, denen die Prüfungsbefugnis übertragen wurde. Zur Prüferin und Beisitzenden darf nur bestellt werden, 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 Prüferinnen bestellt werden, wenn die jeweilige Fakultät ihnen eine diesbezügliche Prüfungsbefugnis erteilt hat.

(4) Zur Beisitzenden darf nur bestellt werden, wer einen Masterabschluss in einem Studiengang der Wirtschaftsmathematik oder einen gleichwertigen akademischen Abschluss erworben hat.

§ 16 Anrechnung von Studienzeiten, Anerkennung von Studienleistungen und Modulprüfungen

(1) Studienzeiten und Studienleistungen und Modulprüfungen, die in gleichen oder anderen Studiengängen an der Universität Karlsruhe (TH) oder an anderen Hochschulen erbracht wurden, werden angerechnet, soweit Gleichwertigkeit besteht. 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, können die Noten – soweit die Notensysteme vergleichbar sind – übernommen werden und in die Berechnung der Modulnoten und der Gesamtnote einbezogen werden. Liegen keine Noten vor, muss die Leistung nicht anerkannt werden. Die Studentin 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 in einem Studiengang mehr als die Hälfte der erforderlichen Leistungspunkte und/oder die Masterarbeit anerkannt werden soll/en. Dies gilt insbesondere bei einem Studiengangwechsel sowie bei einem Studienortwechsel.

(6) Zuständig für die Anrechnungen ist der Prüfungsausschuss. Vor Feststellungen über die Gleichwertigkeit sind die zuständigen Fachvertreterinnen 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

§ 17 Umfang und Art der Masterprüfung

(1) Die Masterprüfung besteht aus den Prüfungen nach Absatz 2, 3 und 4 sowie der Masterarbeit nach Absatz 6.

(2) Es sind Prüfungen aus folgenden Gebieten durch den Nachweis von Leistungspunkten in jeweils einem oder mehreren Modulen abzulegen:

Fach Mathematik:

1. Stochastik: im Umfang von 8 Leistungspunkten,

2. Angewandte und Numerische Mathematik/Optimierung: im Umfang von 8 Leistungspunkten,

3. Analysis: im Umfang von 8 Leistungspunkten.

Des Weiteren sind Prüfungen aus den mathematischen Gebieten Stochastik, Angewandte und Numerische Mathematik/Optimierung, Analysis oder Algebra und Geometrie der Fakultät für Mathematik im Umfang von 12 Leistungspunkten abzulegen.

Fach Wirtschaftswissenschaften:

4. Finance - Risikomanagement - Managerial Economics: im Umfang von 18 Leistungspunkten,

5. Operations Management - Datenanalyse - Informatik: im Umfang von 18 Leistungspunkten.

Die Module, die ihnen zugeordneten Leistungspunkte und die Zuordnung der Module zu den Gebieten und Fächern sind im Studienplan festgelegt. Zur entsprechenden Modulprüfung kann nur zugelassen werden, wer die Anforderungen nach § 5 erfüllt.

(3) Es sind zwei Seminarmodule über je 3 Leistungspunkte nachzuweisen. Dabei muss je ein Seminarmodul aus den beiden beteiligten Fakultäten bestanden werden.

(4) Es sind weiterhin 12 Leistungspunkte zu erbringen, wobei mindestens 8 Leistungspunkte aus den obigen Gebieten 1.-5. oder dem Berufspraktikum kommen müssen und 3 bis 4 Leistungspunkte aus Modulen zu Schlüsselqualifikationen nach § 13 Abs. 4.

(5) Im Studienplan oder Modulhandbuch können darüber hinaus inhaltliche Schwerpunkte definiert werden, denen Module zugeordnet werden können.

(6) Als weitere Prüfungsleistung ist eine Masterarbeit gemäß § 11 anzufertigen.

§ 18 Bestehen der Masterprüfung, Bildung der Gesamtnote

(1) Die Masterprüfung ist bestanden, wenn alle in § 17 genannten Prüfungsleistungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Masterprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt. Dabei werden alle Prüfungsleistungen nach § 17 mit ihren Leistungspunkten gewichtet.

(3) Hat die Studentin die Masterarbeit mit der Note 1.0 und die Masterprüfung mit einem Durchschnitt von 1.0 abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen. Mit einer Masterarbeit mit der Note 1.0 und bis zu einem Durchschnitt von 1.3 kann auf Antrag an den Prüfungsausschuss das Prädikat „mit Auszeichnung“ (with distinction) verliehen werden.

§ 19 Masterzeugnis, Masterurkunde, Transcript of Records und Diploma Supplement

(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 sechs Wochen nach der Bewertung 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. Sie werden der Studentin gleichzeitig ausgehändigt. In der Masterurkunde wird die Verleihung des akademischen Mastergrades beurkundet. Die Masterurkunde wird von der Rektorin und der Dekanin unterzeichnet und mit dem Siegel der Universität versehen.

(2) Das Zeugnis enthält die in den Fachprüfungen, den zugeordneten Modulprüfungen und der Masterarbeit erzielten Noten, deren zugeordnete Leistungspunkte und ECTS-Noten und die Gesamtnote und die ihr entsprechende ECTS-Note. Das Zeugnis ist von den Dekaninnen der beteiligten Fakultäten und von der Vorsitzenden des Prüfungsausschusses zu unterzeichnen.

(3) Weiterhin erhält die Studentin 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 der Studentin (Transcript of Records).

(4) Die Abschrift der Studiendaten (Transcript of Records) enthält in strukturierter Form alle von der Studentin erbrachten Prüfungsleistungen. Sie 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 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

§ 20 Bescheid über Nicht-Bestehen, Bescheinigung von Prüfungsleistungen

(1) Der Bescheid über die endgültig nicht bestandene Masterprüfung wird der Studentin durch den Prüfungsausschuss in schriftlicher Form erteilt. Der Bescheid ist mit einer Rechtsbehelfsbelehrung zu versehen.

(2) Hat die Studentin die Masterprüfung endgültig nicht bestanden, wird ihr 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.

§ 21 Ungültigkeit der Masterprüfung, Entziehung des Mastergrades

(1) Hat die Studentin bei einer Prüfungsleistung getäuscht und wird diese Tatsache nach der Aushändigung des Zeugnisses bekannt, so können die Noten der Modulprüfungen, bei deren Erbringung die Studentin getäuscht hat, 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 Studentin darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat die Studentin 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 der Studentin 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 den gesetzlichen Vorschriften.

§ 22 Einsicht in die Prüfungsakten

(1) Nach Abschluss der Masterprüfung wird der Studentin auf Antrag innerhalb eines Jahres Einsicht in ihre 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) Die Prüferin bestimmt Ort und Zeit der Einsichtnahme.

(4) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 23 In-Kraft-Treten

(1) Diese Studien- und Prüfungsordnung tritt am 1. Oktober 2009 in Kraft.

(2) Studierende, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Diplomstudiengang Wirtschaftsmathematik vom 15. November 2001 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 30 vom 26. November 2001) in der Fassung der Änderungssatzung vom 10. September 2003 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 28 vom 20. Oktober 2003) ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, können einen Antrag auf Zulassung zur Prüfung letztmalig am 30. September 2020 stellen.

Karlsruhe, den 28. August 2009

Professor Dr. sc. tech. Horst Hippler
(Rektor)

Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Masterstudiengang Wirtschaftsmathematik

vom 17.12.2015

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 14.12.2015 die folgende Studien- und Prüfungsordnung für den Masterstudiengang Wirtschaftsmathematik beschlossen.

Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 KITG iVm. § 32 Absatz 3 Satz 1 LHG am 17. Dezember 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 Wirtschaftsmathematik 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 Wirtschaftsmathematik 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.

(3) Zu einer Erfolgskontrolle ist zuzulassen, wer

1. in den Masterstudiengang Wirtschaftsmathematik 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 Wirtschaftsmathematik 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/r 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 gewichteten 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.

(6) Die Prüfungsleistung ist endgültig nicht bestanden, wenn die mündliche Nachprüfung im Sinne des Absatzes 1 mit „nicht ausreichend“ (5,0) bewertet wurde. Die Prüfungsleistung ist ferner endgültig nicht bestanden, wenn die mündliche Prüfung im Sinne des Absatzes 2 oder die Prüfungsleistung anderer Art gemäß Absatz 4 zweimal mit „nicht bestanden“ bewertet wurde.

(7) Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

(8) Eine zweite Wiederholung derselben Prüfungsleistung gemäß § 4 Abs. 2 ist nur in Ausnahmefällen auf Antrag des/der Studierenden zulässig („Antrag auf Zweitwiederholung“). Der Antrag ist schriftlich beim Prüfungsausschuss in der Regel bis zwei Monate nach Bekanntgabe der Note zu stellen.

Über den ersten Antrag eines/einer Studierenden auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet ein Mitglied des Präsidiums. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses ein Mitglied des Präsidiums. Wird der Antrag genehmigt, hat die Zweitwiederholung spätestens zum übernächsten Prüfungstermin zu erfolgen. Absatz 1 Satz 2 und 3 gelten entsprechend.

(9) Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

(10) Die Masterarbeit kann bei einer Bewertung mit „nicht ausreichend“ (5,0) einmal wiederholt werden. Eine zweite Wiederholung der Masterarbeit ist ausgeschlossen.

§ 9 Verlust des Prüfungsanspruchs

Ist eine nach dieser Studien- und Prüfungsordnung erforderliche Studien- oder Prüfungsleistung endgültig nicht bestanden oder die Masterprüfung bis zum Ende des Prüfungszeitraums des siebten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Masterstudiengang Wirtschaftsmathematik, 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 24:00 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 § 8 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 70 LP erfolgreich abgelegt hat. Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

(2) Die Masterarbeit kann von Hochschullehrer/innen, leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG oder einem habilitierten Mitglied 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 Mathematik oder 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, einem habilitierten Mitglied 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 Wirtschaftsmathematik wird ein Prüfungsausschuss gebildet. Er besteht aus sechs stimmberechtigten Mitgliedern, die jeweils zur Hälfte von der Fakultät für Mathematik und der Fakultät für Wirtschaftswissenschaften bestellt werden: vier Hochschullehrer/innen / leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG / Privatdozentinnen bzw. -dozenten, zwei akademischen Mitarbeiterinnen und Mitarbeitern nach § 52 LHG / wissenschaftlichen Mitarbeiter/innen gemäß § 14 Abs. 3 Ziff. 2 KITG und einer bzw. einem Studierenden mit beratender Stimme. 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 Hochschullehrer/innen sowie leitende Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG, habilitierte Mitglieder und akademische Mitarbeiter/innen gemäß § 52 LHG, welche der KIT-Fakultät für Mathematik oder der KIT-Fakultät für Wirtschaftswissenschaften 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 die KIT-Fakultät für Mathematik oder die KIT-Fakultät für Wirtschaftswissenschaften 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 Wirtschaftsmathematik 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 Wirtschaftsmathematik 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 und 3 sowie dem Modul Masterarbeit (§ 14).

(2) Es sind Modulprüfungen in folgenden Pflichtfächern abzulegen:

1. Fach: "Mathematische Methoden": Modul(e) im Umfang von 36 LP, wovon mindestens 8 LP aus Modulen der Stochastik und weitere 8 LP aus Modulen der Analysis oder Angewandter und Numerischer Mathematik, Optimierung stammen müssen.
2. Fach: "Finance - Risk Management - Managerial Economics": Modul(e) im Umfang von 18 LP.
3. Fach: "Operations Management - Datenanalyse - Informatik": Modul(e) im Umfang von 18 LP.
4. Fach: „Wirtschaftswissenschaftliches Seminar“: Modul(e) im Umfang von 3 LP.
5. Fach: „Mathematisches Seminar“: Modul(e) im Umfang von 3 LP.

Die Festlegung der zur Auswahl stehenden Module und deren Fachzuordnung werden im Modulhandbuch getroffen.

(3) Im Wahlpflichtfach sind Modulprüfungen im Umfang von 12 LP abzulegen. Die Festlegung der zur Auswahl stehenden Module wird 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 der Fächer 1 – 4 gemäß § 19 Abs. 2, dem Wahlpflichtfach gemäß § 19 Abs. 3 und dem Modul Masterarbeit.

(3) Haben Studierende die Masterarbeit mit der Note 1,0 und die Masterprüfung mit einem Durchschnitt von 1,2 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 den KIT-Dekaninnen/ den KIT-Dekanen der KIT-Fakultät für Mathematik und 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 den KIT-Dekaninnen/ den KIT-Dekanen der KIT-Fakultät für Mathematik und 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. April 2016 in Kraft und gilt
1. für Studierende, die ihr Studium im Masterstudiengang Wirtschaftsmathematik am KIT im ersten Fachsemester aufnehmen, sowie
2. für Studierende, die ihr Studium im Masterstudiengang Wirtschaftsmathematik 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 Wirtschaftsmathematik vom 28. August 2009 (Amtliche Bekanntmachung des KIT Nr. 76 vom 28. August 2009), 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 Wirtschaftsmathematik am KIT zuletzt im Wintersemester 2015/16 aufgenommen haben, sowie
2. für Studierende, die ihr Studium im Masterstudiengang Wirtschaftsmathematik am KIT ab dem Sommersemester 2016 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 Wirtschaftsmathematik vom 28. August 2009 (Amtliche Bekanntmachung des KIT Nr. 76 vom 28. August 2009), 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 Sommersemesters 2020 ablegen.

(4) Studierende, die auf Grundlage der Studien- und Prüfungsordnung für den Diplomstudiengang Wirtschaftsmathematik vom 15. November 2001 (Amtliche Bekanntmachung des KIT Nr. 30 vom 26. November 2001), zuletzt geändert durch Satzung vom 10. September 2003 (Amtliche Bekanntmachung des KIT Nr. 28 vom 20. Oktober 2003) ihr Studium am KIT aufgenommen haben, können Prüfungen auf Grundlage dieser Studien- und Prüfungsordnung letztmalig bis zum Ende des Prüfungszeitraums des Sommersemesters 2020 ablegen.

Karlsruhe, den 17. Dezember 2015

Professor Dr.-Ing. Holger Hanselka
(Präsident)