Karlsruher Institut für Technologie

Module Handbook
Information Engineering and Management (M.Sc.)

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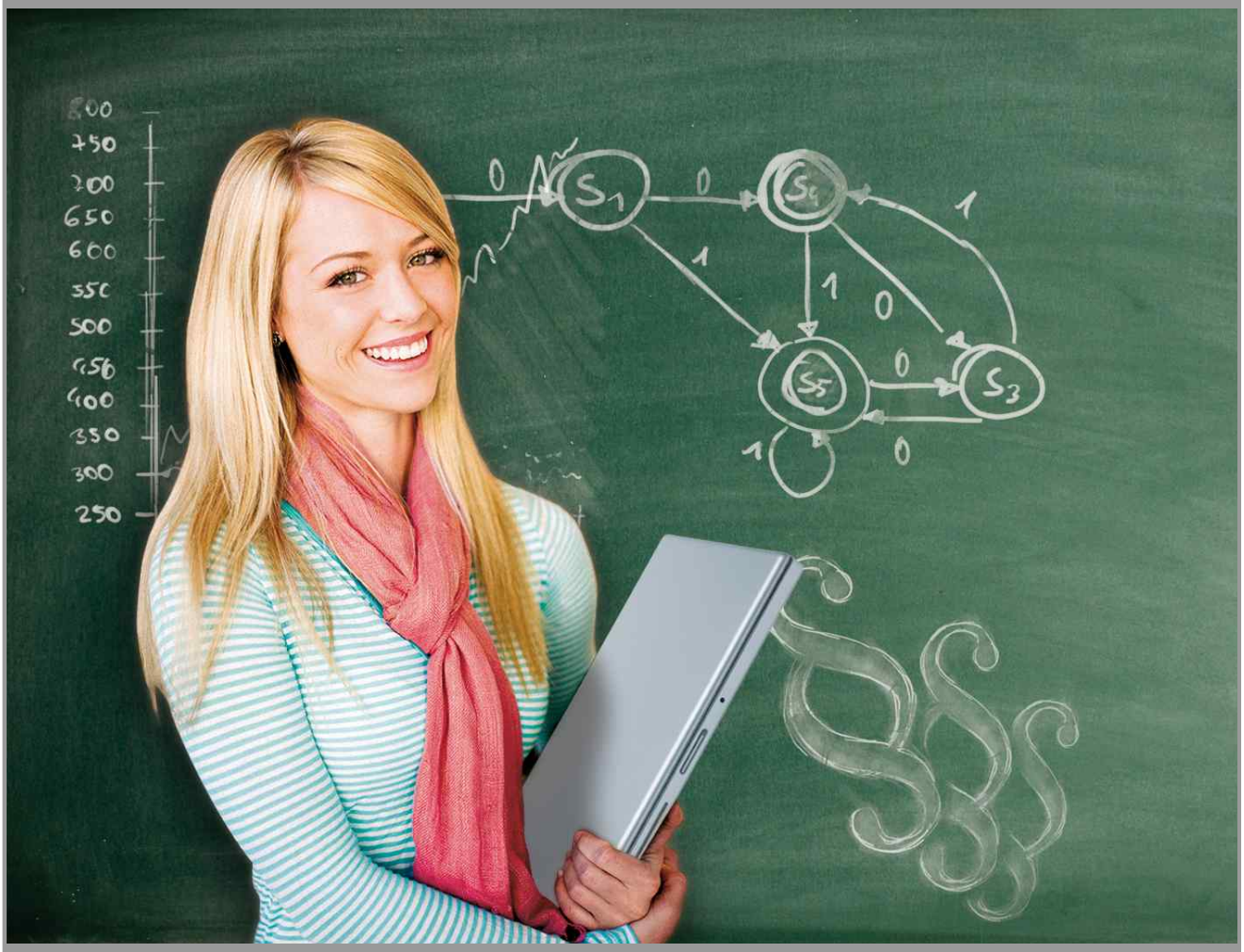

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KIT-Department of Economics and Management
Karlsruhe Institute of Technology (KIT)
76128 Karlsruhe
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VII Appendix: Study- and Examination Regulation SPO 2009 (2009/04/15) in german 668

Part I
About this handbook

1 Notes and rules

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

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

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

Begin and completion of a module

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

Module versions

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

General and partial examinations

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

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

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

Types of exams

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

Repeating exams

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

Additional accomplishments

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

Further information

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

2 Online Version

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

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

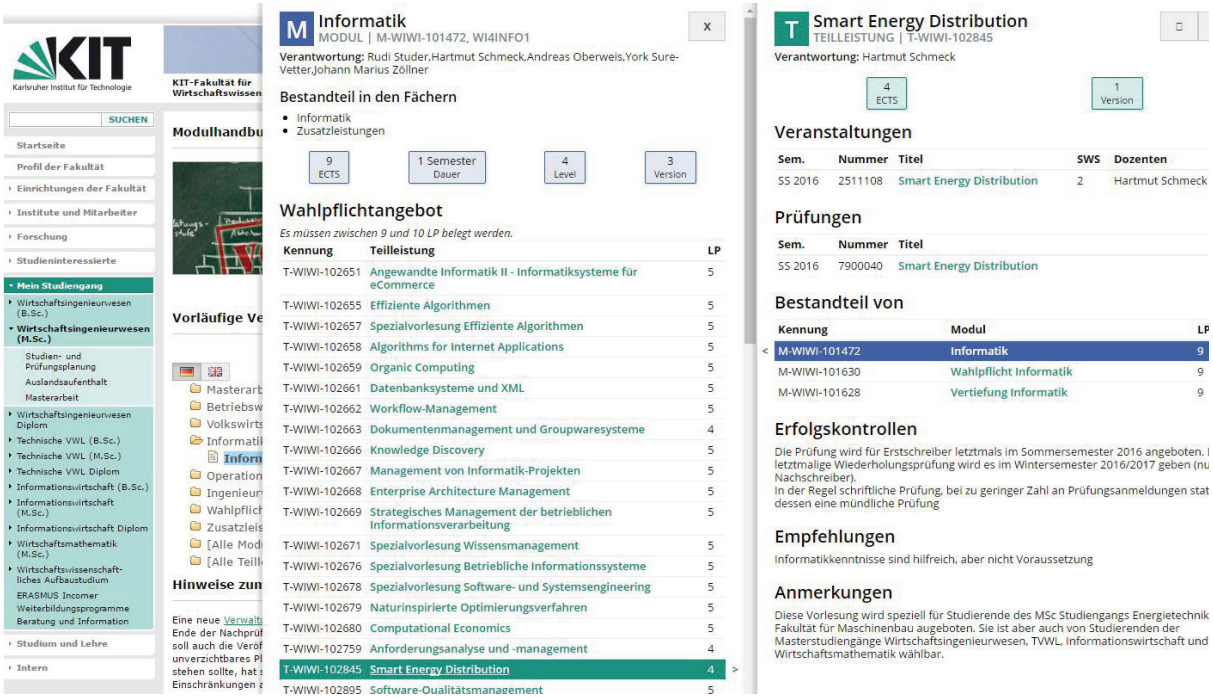


Figure 1: Screenshot of the webbased module handbook

3 Contact

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

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

If you have any questions about modules or exams with **INFO**-ID, please contact the student office of the KIT Department of Informatics:

Phone: +49 721 608-44204
E-Mail: beratung-inwi@informatik.kit.edu

Editorial responsibility:

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

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

1 Qualification objectives

Graduates of the interdisciplinary, four-semester Master's program in Information Engineering and Management have an advanced and in-depth research-based knowledge in the fields of informatics, economics and law as well as subject-independent competences that can be applied across multiple disciplines.

By combining their knowledge and competences, they are in a position to independently acknowledge economic and IT opportunities and development potentials for innovative change of structures and processes and implement them within the applicable legal framework. They are able to analyze, structure and describe complex, field-related problems and challenges.

They know how to identify advantages and disadvantages of existing procedures, models, technologies and approaches, compare alternatives, evaluate critically and apply the findings to new application areas.

If necessary, they are also in a position to combine different approaches, adapt them accordingly or even independently develop and apply new and innovative solutions.

They know how to critically interpret, validate and illustrate the achieved results.

Their decisions are made independently based on scientific facts under consideration of social and ethical aspects.

The graduates can communicate with expert representatives on a scientific level and even assume prominent responsibility in a team. Karlsruhe's Infonomics experts are characterized by their interdisciplinary methodological skills and innovative abilities.

Their qualifications are perfectly ideal particularly for interdisciplinary occupations in the fields of Information and Communication Technology (ICT), controlling, consulting, management and organization, for starting and management of firms as well as a downstream scientific career (PhD).

2 SPO 2015

The Master's degree program in *Information Engineering and Management* has 4 terms. The terms 1 to 3 of the program are method–oriented and provide the students with state-of-the-art knowledge in informatics, business administration, operations research, economics, statistics and law. The interdisciplinary approach is especially emphasized in the interdisciplinary seminar.
It is recommended to study the courses in the following sequence:

- The (mandatory) modules in business administration and operations research should be studied in the first two terms of the program.
- The interdisciplinary seminar module should be taken until the end of the third term of the program.
- The (elective) modules from business administration, economics, operations research, and statistics, from informatics, and from law should be studied in the first three terms of the program.
- The 4-th term is reserved for the Master Thesis in which the student proves his ability for independent scientific research in informatics, the economic sciences, and law.

Figure 2 shows a summary of this recommendation with the structure of the disciplines and with credit points allocated to the modules of the program.

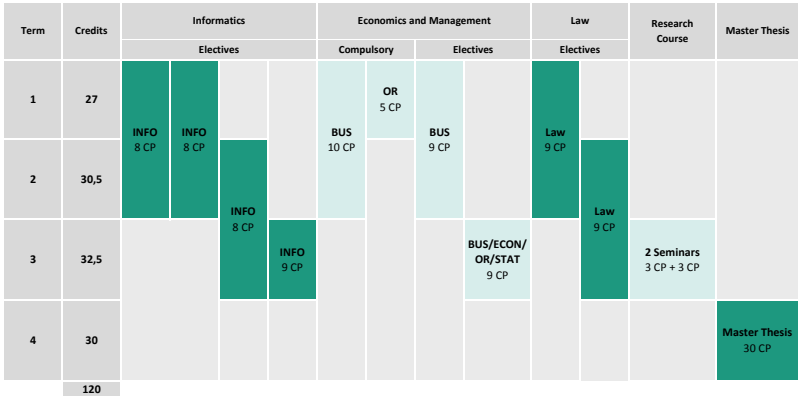


Figure 2: Structure of the Master's degree program in Information Engineering and Management SPO 2015 (Recommendation)

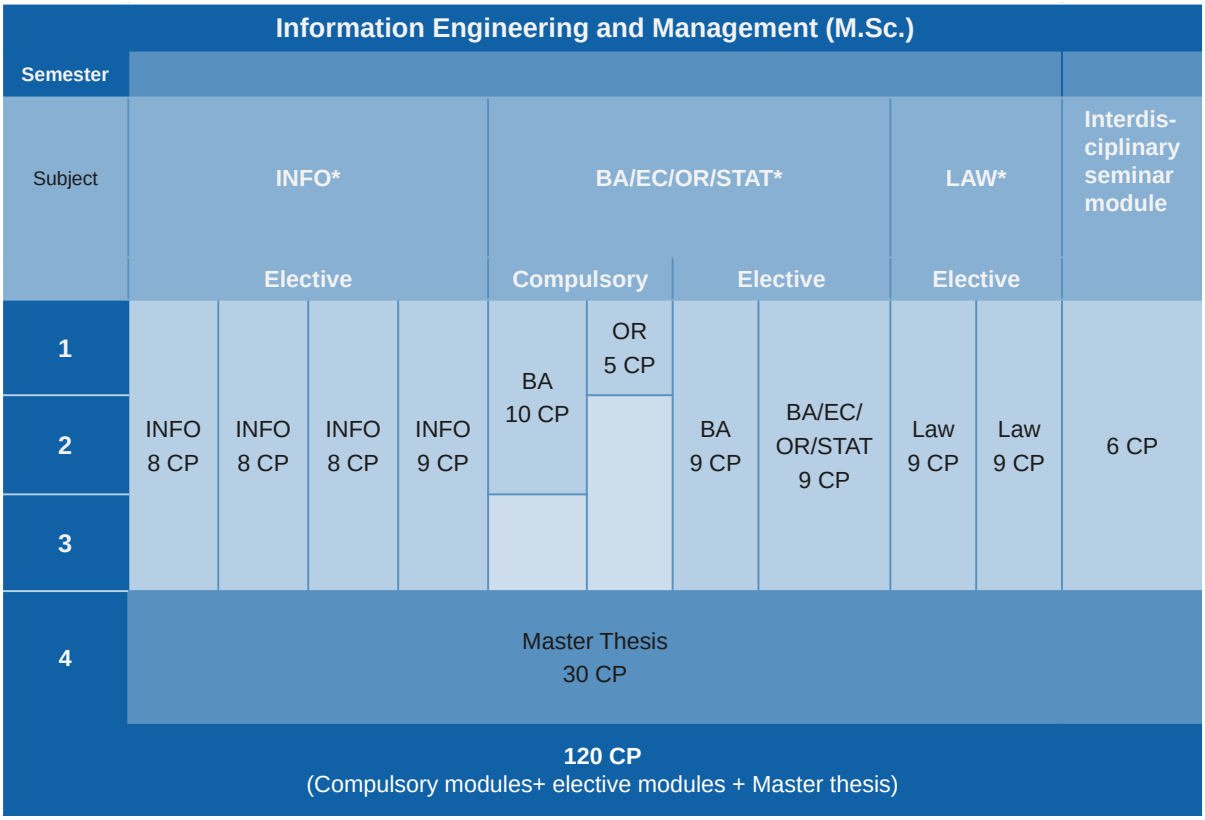
3 SPO 2007

The structure of the Master's degree program in Information Engineering and Management SPO 2009 slightly differs from the structure following SPO 2015. Offered modules and courses are quite similar and equal the presentation in this module handbook. Nevertheless, there are still some specificities, summarized in the following illustration:

SPO 2009	SPO 2015
Terms	
The structure of the Master's degree program in Economics Engineering is subdivided into the subjects **Informatics**, **Economics and Management** and **Law**.	The structure of the Master's degree program in Economics Engineering is subdivided into the subjects **Informatics**, **Economics and Management**, **Law** and **Research Course.**
The exams are split into written exams, oral exams and **non exam assessments**.	The exams are split into written exams, oral exams and **alternative exam assessments**. Exams are always graded. Non exam assessments can be repeated several times and are not graded.

Figure 3: Differences between SPO 2009 and SPO 2015

Illustration 4 shows the structure of fields and modules and their correlated credit points following SPO 2009.
The Study- and Examination Regulation SPO 2009 is part of the appendix.



*: The amount of credit points for the modules shown in the figure are only examples. In the elective field of „Informatics“ 33 CP have to be gained in total. The elective field of „BA/EC/OR/STAT“ has to be covered with 18 CP in total; whereby 9 CP have to be gained within a module of BA.

Figure 4: Structure of the Master's degree program in Information Engineering and Management SPO 2009 (recommended)

Part III
Field structure

1 Master Thesis

Identifier	Module	ECTS	Responsibility
M-WIWI-101656	Module Master Thesis (S. 158)	30	Sebastian Abeck,Hagen Lindstädt

2 Informatics

Identifier	Module	ECTS	Responsibility
M-INFO-101199	Advanced Algorithms: Design and Analysis (S. 22)	9	Dorothea Wagner
M-INFO-101200	Advanced Algorithms: Engineering and Applications (S. 23)	9	Dorothea Wagner
M-INFO-101198	Advanced Topics in Cryptography (S. 24)	9	Jörn Müller-Quade
M-INFO-100795	Algorithm Engineering (S. 26)	5	Peter Sanders,Dorothea Wagner
M-INFO-101237	Algorithmic Methods for Hard Optimization Problems (S. 27)	5	Dorothea Wagner
M-INFO-102400	Algorithmic Methods for Network Analysis (S. 28)	5	Henning Meyerhenke
M-INFO-100031	Algorithms for Routing (S. 29)	5	Dorothea Wagner
M-INFO-102094	Algorithms for Visualization of Graphs (S. 30)	5	Dorothea Wagner
M-INFO-101173	Algorithms II (S. 31)	6	Hartmut Prautzsch,Peter Sanders,Dorothea Wagner
M-INFO-100797	Algorithms in Cellular Automata (S. 32)	5	Thomas Worsch
M-INFO-101214	Algorithms in Computer Graphics (S. 33)	9	Hartmut Prautzsch
M-INFO-101240	Automated Planning and Decision-making (S. 34)	9	Jürgen Beyerer
M-INFO-101238	Automated visual inspection (S. 35)	9	Jürgen Beyerer
M-INFO-100826	Automated Visual Inspection and Image Processing (S. 36)	6	Jürgen Beyerer
M-INFO-101251	Autonomous Robotics (S. 37)	9	Rüdiger Dillmann
M-INFO-100768	Big Data Analytics (S. 38)	5	Klemens Böhm
M-INFO-100819	Cognitive Systems (S. 39)	6	Rüdiger Dillmann,Alexander Waibel
M-INFO-101178	Communication and Database Systems (S. 40)	8	Klemens Böhm,Martina Zitterbart
M-INFO-101197	Computer Security (S. 41)	9	Jörn Müller-Quade
M-INFO-100728	Context Sensitive Systems (S. 43)	5	Michael Beigl
M-INFO-102978	Digital Circuits Design (S. 44)	6	Uwe Hanebeck
M-INFO-101210	Dynamic IT-Infrastructures (S. 45)	9	Hannes Hartenstein
M-INFO-100799	Formal Systems (S. 46)	6	Bernhard Beckert
M-INFO-100744	Formal Systems II: Application (S. 47)	5	Bernhard Beckert
M-INFO-100841	Formal Systems II: Theory (S. 48)	5	Bernhard Beckert
M-INFO-101205	Future Networking (S. 58)	8	Martina Zitterbart
M-INFO-100729	Human Computer Interaction (S. 60)	6	Michael Beigl
M-INFO-101241	Image-based detection and classification (S. 61)	9	Jürgen Beyerer
M-INFO-101208	Innovative Concepts of Data and Information Management (S. 62)	8	Klemens Böhm
M-INFO-103138	Lab Course: Natural Language Processing and Software Engineering (S. 64)	5	Walter Tichy
M-INFO-103302	Lab: Graph Visualization in Practice (S. 65)	5	Dorothea Wagner

M-INFO-102072	Laboratory Course Algorithm Engineering (S. 66)	6	Peter Sanders,Dorothea Wagner
M-INFO-100806	Language Technology and Compiler (S. 67)	8	Gregor Snelting
M-INFO-100817	Machine Learning 1 - Basic Methods (S. 68)	3	Rüdiger Dillmann,Johann Marius Zöllner
M-INFO-100855	Machine Learning 2 - Advanced Methods (S. 69)	3	Rüdiger Dillmann,Johann Marius Zöllner
M-INFO-101239	Machine Vision (S. 70)	9	Jürgen Beyerer
M-INFO-101250	Medical Simulation and Neural Medicine (S. 71)	9	Rüdiger Dillmann
M-INFO-104061	Microservice-Based Web Applications (S. 72)	8	Sebastian Abeck
M-INFO-101206	Networking (S. 73)	8	Martina Zitterbart
M-INFO-101204	Networking Labs (S. 74)	9	Hannes Hartenstein,Martina Zitterbart
M-INFO-101207	Networking Security - Theory and Praxis (S. 75)	9	Martina Zitterbart
M-INFO-100846	Neural Networks (S. 76)	6	Alexander Waibel
M-INFO-100796	Parallel Algorithms (S. 77)	5	Peter Sanders
M-INFO-103235	Practical Course: Smart Data Analytics (S. 78)	6	Michael Beigl
M-INFO-100794	Randomized Algorithms (S. 81)	5	Thomas Worsch
M-INFO-100893	Robotics I - Introduction to Robotics (S. 82)	6	Tamim Asfour
M-INFO-101202	Software Methods (S. 85)	9	Ralf Reussner
M-INFO-101201	Software Systems (S. 86)	9	Ralf Reussner
M-INFO-100801	Telematics (S. 87)	6	Martina Zitterbart
M-INFO-101256	Theory and Practice of Data Warehousing and Mining (S. 88)	9	Klemens Böhm
M-INFO-100789	Ubiquitous Computing (S. 89)	5	Michael Beigl
M-INFO-101203	Wireless Networking (S. 90)	8	Martina Zitterbart
M-WIWI-104403	Critical Digital Infrastructures (S. 100)	9	Ali Sunyaev
M-WIWI-101477	Development of Business Information Systems (S. 110)	9	Andreas Oberweis
M-WIWI-104520	Human Factors in Security and Privacy (S. 131)	9	Melanie Volkamer
M-WIWI-101456	Intelligent Systems and Services (S. 147)	9	York Sure-Vetter
M-WIWI-103356	Machine Learning (S. 148)	9	Johann Marius Zöllner
M-WIWI-101457	Semantic Technologies (S. 165)	8	York Sure-Vetter
M-WIWI-102827	Service Computing (S. 170)	9	York Sure-Vetter
M-WIWI-101458	Ubiquitous Computing (S. 188)	9	N.N.,Hartmut Schmeck
M-WIWI-101455	Web Data Management (S. 189)	9	York Sure-Vetter

3 Economics and Management

Identifier	Module	ECTS	Responsibility
M-WIWI-103119	Advanced Topics in Strategy and Management (S. 91)	9	Hagen Lindstädt
M-WIWI-101637	Analytics and Statistics (S. 93)	9	Oliver Grothe
M-WIWI-101453	Applied Strategic Decisions (S. 95)	9	Johannes Philipp Reiß
M-WIWI-101410	Business & Service Engineering (S. 97)	9	Christof Weinhardt
M-WIWI-101504	Collective Decision Making (S. 99)	9	Clemens Puppe
M-WIWI-101470	Data Science: Advanced CRM (S. 102)	9	Andreas Geyer-Schulz
M-WIWI-103117	Data Science: Data-Driven Information Systems (S. 104)	9	Alexander Mädche,Christof Weinhardt
M-WIWI-103118	Data Science: Data-Driven User Modeling (S. 106)	9	Christof Weinhardt
M-WIWI-101647	Data Science: Evidence-based Marketing (S. 107)	9	Martin Klarmann
M-WIWI-104080	Designing Interactive Information Systems (S. 108)	9	Alexander Mädche
M-WIWI-102808	Digital Service Systems in Industry (S. 112)	9	Wolf Fichtner,Stefan Nickel
M-WIWI-103261	Disruptive FinTech Innovations (S. 114)	9	Maxim Ulrich
M-WIWI-101638	Econometrics and Statistics I (S. 115)	9	Melanie Schienle

M-WIWI-101639	Econometrics and Statistics II (S. 116)	9	Melanie Schienle
M-WIWI-101502	Economic Theory and its Application in Finance (S. 117)	9	Kay Mitusch
M-WIWI-103720	eEnergy: Markets, Services and Systems (S. 119)	9	Christof Weinhardt
M-WIWI-101409	Electronic Markets (S. 120)	9	Andreas Geyer-Schulz
M-WIWI-101451	Energy Economics and Energy Markets (S. 122)	9	Wolf Fichtner
M-WIWI-101452	Energy Economics and Technology (S. 124)	9	Wolf Fichtner
M-WIWI-101488	Entrepreneurship (EnTechnon) (S. 125)	9	Orestis Terzidis
M-WIWI-101505	Experimental Economics (S. 127)	9	Johannes Philipp Reiß
M-WIWI-101482	Finance 1 (S. 128)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101483	Finance 2 (S. 129)	9	Martin Ruckes,Marliese Uhrig-Homburg
M-WIWI-101471	Industrial Production II (S. 133)	9	Frank Schultmann
M-WIWI-101412	Industrial Production III (S. 135)	9	Frank Schultmann
M-WIWI-101443	Information Engineering and Management (S. 137)	10	Andreas Geyer-Schulz,Christof Weinhardt
M-WIWI-104068	Information Systems in Organizations (S. 139)	9	Alexander Mädche
M-WIWI-101507	Innovation Management (S. 141)	9	Marion Weissenberger-Eibl
M-WIWI-101469	Insurance Management I (S. 143)	9	Ute Werner
M-WIWI-101449	Insurance Management II (S. 144)	9	Ute Werner
M-WIWI-103247	Intelligent Risk and Investment Advisory (S. 146)	9	Maxim Ulrich
M-WIWI-101498	Management Accounting (S. 150)	9	Marcus Wouters
M-WIWI-101446	Market Engineering (S. 151)	9	Christof Weinhardt
M-WIWI-101490	Marketing Management (S. 153)	9	Martin Klarmann
M-WIWI-101473	Mathematical Programming (S. 155)	9	Oliver Stein
M-WIWI-101500	Microeconomic Theory (S. 157)	9	Clemens Puppe
M-WIWI-102832	Operations Research in Supply Chain Management (S. 160)	9	Stefan Nickel
M-WIWI-103243	Optimization under uncertainty in Information Engineering and Management (S. 162)	5	Steffen Rebennack
M-WIWI-101487	Sales Management (S. 163)	9	Martin Klarmann
M-WIWI-101506	Service Analytics (S. 168)	9	Hansjörg Fromm,Christof Weinhardt
M-WIWI-101503	Service Design Thinking (S. 172)	9	Gerhard Satzger,Christof Weinhardt
M-WIWI-102754	Service Economics and Management (S. 174)	9	Gerhard Satzger,Christof Weinhardt
M-WIWI-102806	Service Innovation, Design & Engineering (S. 176)	9	Alexander Mädche,Gerhard Satzger
M-WIWI-101448	Service Management (S. 178)	9	Gerhard Satzger,Christof Weinhardt
M-WIWI-102805	Service Operations (S. 180)	9	Stefan Nickel
M-WIWI-101657	Stochastic Modelling and Optimization (S. 182)	9	Karl-Heinz Waldmann
M-WIWI-101444	Stochastic Models in Information Engineering and Management (S. 184)	5	Karl-Heinz Waldmann
M-WIWI-103289	Stochastic Optimization (S. 185)	9	Steffen Rebennack
M-WIWI-101489	Strategy, Communication, and Data Analysis (S. 187)	9	Martin Klarmann

4 Law

Identifier	Module	ECTS	Responsibility
M-INFO-101242	Governance, Risk & Compliance (S. 59)	9	Thomas Dreier
M-INFO-101215	Intellectual Property Law (S. 63)	9	Thomas Dreier

M-INFO-101216	Private Business Law (S. 79)	9	Thomas Dreier
M-INFO-101217	Public Business Law (S. 80)	9	Matthias Bäcker

5 Research Course

Identifier	Module	ECTS	Responsibility
M-INFO-102822	Seminar Module Informatics (S. 83)	3	
M-INFO-101218	Seminar Module Law (S. 84)	3	Thomas Dreier
M-WIWI-102736	Seminar Module Economic Sciences (S. 166)	3	Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

6 Additional Examinations

Identifier	Module	ECTS	Responsibility
M-INFO-102233	Further Examinations (S. 49)	30	
M-WIWI-103117	Data Science: Data-Driven Information Systems (S. 104)	9	Alexander Mädche,Christof Weinhardt
M-WIWI-103118	Data Science: Data-Driven User Modeling (S. 106)	9	Christof Weinhardt
M-WIWI-103261	Disruptive FinTech Innovations (S. 114)	9	Maxim Ulrich
M-WIWI-103720	eEnergy: Markets, Services and Systems (S. 119)	9	Christof Weinhardt
M-WIWI-103247	Intelligent Risk and Investment Advisory (S. 146)	9	Maxim Ulrich
M-WIWI-103289	Stochastic Optimization (S. 185)	9	Steffen Rebennack

Part IV
Modules

M Module: Advanced Algorithms: Design and Analysis [M-INFO-101199]

Responsibility: Dorothea Wagner

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

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

Design and Analysis / Engineering and Applications
Non-Compulsory Block; You must choose at least 1 courses and at least 9 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101334	Algorithms in Cellular Automata (S. 211)	5	Thomas Worsch
T-INFO-101331	Randomized Algorithms (S. 529)	5	Thomas Worsch
T-INFO-101333	Parallel Algorithms (S. 477)	5	Peter Sanders
T-INFO-103334	Algorithmic Methods for Hard Optimization Problems (S. 203)	5	Dorothea Wagner
T-INFO-104390	Algorithms for Visualization of Graphs (S. 207)	5	Dorothea Wagner
T-INFO-104374	Laboratory Course Algorithm Engineering (S. 394)	6	Peter Sanders, Dorothea Wagner
T-INFO-101332	Algorithm Engineering (S. 202)	5	Peter Sanders, Dorothea Wagner
T-INFO-100002	Algorithms for Routing (S. 205)	5	Dorothea Wagner

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-102020] *Algorithms II* must have been passed.

Qualification Objectives
The student

- knows advanced methodical approaches with respect to the design and analysis of algorithms,
- can comment on theoretical aspects of algorithmics in a qualified and well-structured manner,
- identifies algorithmic problems from different areas and can formulate these formally,
- can analyze and judge the computational complexity of algorithmic problems from different areas,
- can recognize and design suitable algorithmic techniques to solve algorithmic problems.

Content
This module conveys profound knowledge concerning theoretical aspects of algorithmics. Its focus is on the design and analysis of advanced algorithms, particularly, on algorithms for graphs, randomized algorithms, parallel algorithms and algorithms for NP-hard problems.

Workload
approx. 270h

M Module: Advanced Algorithms: Engineering and Applications [M-INFO-101200]

Responsibility: Dorothea Wagner

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

Engineering and Applications / Design and Analysis
Non-Compulsory Block; You must choose at least 1 courses and at least 9 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-100002	Algorithms for Routing (S. 205)	5	Dorothea Wagner
T-INFO-101332	Algorithm Engineering (S. 202)	5	Peter Sanders, Dorothea Wagner
T-INFO-101333	Parallel Algorithms (S. 477)	5	Peter Sanders
T-INFO-103334	Algorithmic Methods for Hard Optimization Problems (S. 203)	5	Dorothea Wagner
T-INFO-104374	Laboratory Course Algorithm Engineering (S. 394)	6	Peter Sanders, Dorothea Wagner
T-INFO-104390	Algorithms for Visualization of Graphs (S. 207)	5	Dorothea Wagner
T-INFO-101331	Randomized Algorithms (S. 529)	5	Thomas Worsch

Conditions
None

Qualification Objectives
The Student

- knows advanced methodical approaches concerning the design of algorithms and their applications,
- can comment on the practical aspects of algorithmics in a qualified and well-structured manner,
- identifies algorithmic problems from different areas of application and can formulate these formally,
- can judge the computational complexity of algorithmic problems,
- recognizes suitable algorithmic techniques for solving these problems and can transfer and apply knowledge of these techniques to new problems,
- can implement solutions based on algorithmic techniques for practical problems and can evaluate these

Content
This module conveys profound knowledge concerning practical aspects of algorithmics and covers applications of algorithms for practical problems. Its focus is on the design, the practical implementation and the evaluation of algorithms, particularly, algorithms for graphs, parallel algorithms, algorithms for NP-hard problems, optimization algorithms inspired by nature, as well as algorithms from various areas of application.

Workload
270h

M Module: Advanced Topics in Cryptography [M-INFO-101198]

Responsibility: Jörn Müller-Quade

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101373	Selected Topics in Cryptography (S. 552)	3	Jörn Müller-Quade
T-INFO-101360	Signals and Codes (S. 585)	3	Jörn Müller-Quade
T-INFO-101260	Asymmetric Encryption Schemes (S. 223)	3	Jörn Müller-Quade
T-INFO-101390	Symmetric Encryption (S. 621)	3	Jörn Müller-Quade
T-INFO-101259	Provable Security in Cryptography (S. 523)	3	Dennis Hofheinz
T-INFO-101279	Cryptographic Voting Schemes (S. 276)	3	Jörn Müller-Quade
T-INFO-101280	Digital Signatures (S. 301)	3	Dennis Hofheinz

Conditions
None

Qualification Objectives
The student

- will be familiar with the theoretical foundations and the basic mechanisms of computer security and cryptography.
- can understand and explain the methods of computer security and cryptography,
- will be able to read and understand the latest scientific papers,
- will be able to critically assess appropriate security solutions, and identify weaknesses / threats,
- can design an own security solution to a given problem, (eg. later in the a master's thesis).

Content
The module is intended to provide depth theoretical and practical aspects of IT security and cryptography.

- Development of safety goals and classification of threats.
- Formal description of authentication systems.
- Analysis of typical vulnerabilities in programs and web applications and development of appropriate protective methods / avoidance strategies
- Overview of opportunities for side channel attacks
- Introduction to key management and Public Key Infrastructure
- Presentation and comparison of current safety certifications.
- The current research issues from some of the following areas are covered:
  - Block ciphers, hash functions,
  - Public-key encryption, digital signature, key exchange.
  - Basic security protocols such as fair coin toss over the phone, Byzantine Agreement, Dutch Flower Auctions, Zero Knowledge.
  - Threat models and security definitions.
  - Modular design and protocol composition.
  - Security definitions of simulatability.

- Universal Composability.
- Deniability as an additional safety feature.
- Electronic Voting.

M Module: Algorithm Engineering [M-INFO-100795]

Responsibility: Peter Sanders, Dorothea Wagner

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101332	Algorithm Engineering (S. 202)	5	Peter Sanders, Dorothea Wagner

M Module: Algorithmic Methods for Hard Optimization Problems [M-INFO-101237]

Responsibility: Dorothea Wagner

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Irregular	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-103334	Algorithmic Methods for Hard Optimization Problems (S. 203)	5	Dorothea Wagner

Qualification Objectives
The goal of this course is to familiarize the students with hard problems and possible approaches to solve them. Online problems may also be part of the course.

Content
There are many practical problems that cannot be solved optimally - some not at all and some not in a resonable amount of time. An example is the "bin packing problem" where a collection of
objects must be packed using a possibly small number of bins. Moreover, problems sometimes arise where knowledge about the future (or even about the present) is incomplete, but a decision
is required neverthelss ("online problems"). Regarding bin packing, for example, there must be a point in time when you close the bins and send them away. Even if there are some more objects arriving later.

M Module: Algorithmic Methods for Network Analysis [M-INFO-102400]

Responsibility: Henning Meyerhenke

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Irregular	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-104759	Algorithmic Methods for Network Analysis (S. 204)	5	Henning Meyerhenke

Workload
150 h

M Module: Algorithms for Routing [M-INFO-100031]

Responsibility: Dorothea Wagner

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-100002	Algorithms for Routing (S. 205)	5	Dorothea Wagner

M Module: Algorithms for Visualization of Graphs [M-INFO-102094]

Responsibility: Dorothea Wagner

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Irregular	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-104390	Algorithms for Visualization of Graphs (S. 207)	5	Dorothea Wagner

M Module: Algorithms II [M-INFO-101173]

Responsibility: Hartmut Prautzsch, Peter Sanders, Dorothea Wagner

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-102020	Algorithms II (S. 209)	6	Hartmut Prautzsch, Peter Sanders, Dorothea Wagner

M Module: Algorithms in Cellular Automata [M-INFO-100797]

Responsibility: Thomas Worsch

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101334	Algorithms in Cellular Automata (S. 211)	5	Thomas Worsch

M Module: Algorithms in Computer Graphics [M-INFO-101214]

Responsibility: Hartmut Prautzsch

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101349	Meshes and Point Clouds (S. 430)	3	Hartmut Prautzsch
T-INFO-104429	Computational Geometry (S. 257)	5	Dorothea Wagner
T-INFO-103550	Subdivision Algorithms (S. 615)	5	Hartmut Prautzsch
T-INFO-101267	Geometric Optimzation (S. 344)	3	Hartmut Prautzsch
T-INFO-103207	Practical course: Geometric Modeling (S. 492)	3	Hartmut Prautzsch

Conditions
None

Qualification Objectives
Fundamental knowledge in the area of geometric modelling and computer graphics with its applications in CAD/CAGD and medical simulation.

M Module: Automated Planning and Decision-making [M-INFO-101240]

Responsibility: Jürgen Beyerer

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101277	Probabilistic Planning (S. 515)	6	Marco Huber

Automatisches Planen und Entscheiden - Wahlpflicht
Non-Compulsory Block; You must choose 3 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101362	Pattern Recognition (S. 482)	3	Jürgen Beyerer

Conditions
None

M Module: Automated visual inspection [M-INFO-101238]

Responsibility: Jürgen Beyerer

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101363	Automated Visual Inspection and Image Processing (S. 227)	6	Jürgen Beyerer
T-INFO-101362	Pattern Recognition (S. 482)	3	Jürgen Beyerer
T-INFO-101354	Machine Learning 1 - Basic Methods (S. 403)	3	Rüdiger Dillmann
T-INFO-101292	Image Data Compression (S. 361)	3	Jürgen Beyerer, Alexey Pak

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-101363] *Automated Visual Inspection and Image Processing* must have been started.

M Module: Automated Visual Inspection and Image Processing [M-INFO-100826]

Responsibility: Jürgen Beyerer

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101363	Automated Visual Inspection and Image Processing (S. 227)	6	Jürgen Beyerer

M Module: Autonomous Robotics [M-INFO-101251]

Responsibility: Rüdiger Dillmann

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Version
9	Once	2 terms	1

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

Identifier	Course	ECTS	Responsibility
T-INFO-101351	Biologically Inspired Robot (S. 231)	3	Rüdiger Dillmann
T-INFO-101352	Robotics III - Sensors in Robotics (S. 546)	3	Tamim Asfour
T-INFO-101391	Anthropomatics: Humanoid Robotics (S. 215)	3	Tamim Asfour

Conditions
None

Modeled Conditions
The following conditions must be met:

- The module [M-INFO-100893] *Robotics I - Introduction to Robotics* must have been passed.

M Module: Big Data Analytics [M-INFO-100768]

Responsibility: Klemens Böhm

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101305	Big Data Analytics (S. 229)	5	Klemens Böhm

M Module: Cognitive Systems [M-INFO-100819]

Responsibility: Rüdiger Dillmann, Alexander Waibel

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101356	Cognitive Systems (S. 254)	6	Rüdiger Dillmann, Alexander Waibel

M Module: Communication and Database Systems [M-INFO-101178]

Responsibility: Klemens Böhm, Martina Zitterbart

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Level	Version
8	Each summer term	1 term	German	4	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101497	Database Systems (S. 285)	4	Klemens Böhm
T-INFO-102015	Introduction in Computer Networks (S. 382)	4	Martina Zitterbart

Qualification Objectives
The students will

- have learned fundamentals of data communication as well as the design of communication systems,
- be familiar with the composition of the different protocols and their mechanisms and be able to design simple protocols on their own,
- have understood the relationships between the different communication layers,
- be able to explain the benefits of database technology at the end of the course,
- have understood the development of database applications and be able to set up and access simple databases,
- be familiar with the terminology and the underlying database theory.

Content
Distributed information systems are worldwide information repositories which are accessible by everybody at any place of the world at any time. The physical distance is bridged by telecommunication systems, while database management technology manages and coordinates data for arbitrary periods of time. In order to understand globally running processes, one has to understand both data transmission techniques and database technology. Besides the telecommunication and database technologies on their own, an understanding of their cooperation is required, too.

Workload
approx. 240 h

M Module: Computer Security [M-INFO-101197]

Responsibility: Jörn Müller-Quade

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101371	Security (S. 549)	6	Dennis Hofheinz, Jörn Müller-Quade
T-INFO-101360	Signals and Codes (S. 585)	3	Jörn Müller-Quade
T-INFO-101390	Symmetric Encryption (S. 621)	3	Jörn Müller-Quade
T-INFO-101279	Cryptographic Voting Schemes (S. 276)	3	Jörn Müller-Quade
T-INFO-101260	Asymmetric Encryption Schemes (S. 223)	3	Jörn Müller-Quade

Conditions
None

Qualification Objectives
The student

- knows and understands the basic commonly used algorithms, their design, correctness and efficiency analysis, implementation, documentation and application,
- an handle new algorithmic problems, using this understanding,
- can apply the mathematical approaches learned in the basic computer science and mathematics courses to solve problems. Main topics are here formal correctness arguments and a mathematical analysis of efficiency.
- deals with a restricted problem in the field of computer security within the seminar,
- analyzes and discusses the problems associated to a distinct discipline in the lectures and in the final seminar paper,
- discusses, presents and defends subject-specific arguments within a given task,
- organizes the preparation of the final papers largely independent.

Content
Theoretical and practical aspects of computer security

- Development of safety goals and classification of threats
- Presentation and comparison of different formal access control models
- Formal description of authentication systems, presentation and comparison of different authentication methods (passwords, biometrics, challenge-response protocols)
- Analysis of typical vulnerabilities in programs and web applications and development of appropriate protective methods / avoidance strategies
- Overview of opportunities for side channel attacks
- Introduction to key management and Public Key Infrastructure
- Presentation and comparison of current safety certifications
- Block ciphers, hash functions, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (eg, Diffie-Hellman)
- Presentation of combinations of cryptographic modules using currently used protocols such as Secure Shell (SSH) and Transport Layer Security (TLS)

Workload
approx. 270h

M Module: Context Sensitive Systems [M-INFO-100728]

Responsibility: Michael Beigl

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each summer term	1 term	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-107499	Context Sensitive Systems (S. 266)	5	Michael Beigl

M Module: Digital Circuits Design [M-INFO-102978]

Responsibility: Uwe Hanebeck

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-103469	Digital Circuits Design (S. 295)	6	Wolfgang Karl

M Module: Dynamic IT-Infrastructures [M-INFO-101210]

Responsibility: Hannes Hartenstein

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101323	IT-Security Management for Networked Systems (S. 388)	5	Hannes Hartenstein
T-INFO-101326	Ubiquitous Computing (S. 639)	5	Michael Beigl
T-INFO-101276	Data and Storage Management (S. 279)	4	Bernhard Neumair
T-INFO-101284	Integrated Network and Systems Management (S. 372)	4	Bernhard Neumair
T-INFO-101298	Distributed Computing (S. 307)	4	Achim Streit
T-INFO-101345	Parallel Computer Systems and Parallel Programming (S. 478)	4	Achim Streit
T-INFO-106061	Access Control Systems: Foundations and Practice (S. 190)	4	Hannes Hartenstein

Conditions
None

Qualification Objectives
The students will get to know established as well as novel concepts for the design, implementation, operation and management of dynamic IT infrastructures (Web, Grid, Cloud, Internet):

- Getting to know established and novel concepts for IT infrastructures
- Application of methods for the evaluation and analysis of dynamic IT infrastructures
- Assessment of tools, protocols and procedures for the operation and management of dynamic IT infrastructures
- Assessment of the strengths and weaknesses of IT infrastructures
- Insight into the practical operation of dynamic IT infrastructures using the example of the operation within the Steinbuch Centre for Computing (SCC)

Content
This module covers various aspects of dynamic IT infrastructures such as layout, design, concept, development, operation and performance evaluation as well as optimization. These topics are considered from a theoretical-analytical approach as well as from the perspective of the practical experiences of day-to-day use. Being a modern IT service provider, the *Steinbuch Centre for Computing (SCC)* serves as object of study, since it combines both aspects in real life.

M Module: Formal Systems [M-INFO-100799]

Responsibility: Bernhard Beckert

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101336	Formal Systems (S. 339)	6	Bernhard Beckert

M Module: Formal Systems II: Application [M-INFO-100744]

Responsibility: Bernhard Beckert

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101281	Formal Systems II: Application (S. 341)	5	Bernhard Beckert

M Module: Formal Systems II: Theory [M-INFO-100841]

Responsibility: Bernhard Beckert

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101378	Formal Systems II: Theory (S. 342)	5	Bernhard Beckert

M Module: Further Examinations [M-INFO-102233]

Responsibility:

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Additional Examinations

ECTS	Recurrence	Duration	Language	Version
30	Each term	2 terms	German	5

Weitere Leistungen
Non-Compulsory Block; You must choose at most 30 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-103926	Wildcard Additional Examinations 1 (S. 645)	1	
T-INFO-103980	Wildcard Additional Examinations 11 (S. 646)	2	
T-INFO-108306	Wildcard Additional Examinations 30 (S. 648)	4	
T-WIWI-103808	Wildcard Additional Examinations 4 (S. 650)	2	
T-WIWI-103825	Wildcard Additional Examinations 21 (S. 647)	5	
T-WIWI-108305	Wildcard Additional Examinations 31 (S. 649)	4	
T-INFO-100002	Algorithms for Routing (S. 205)	5	Dorothea Wagner
T-INFO-101256	Software-Evolution (S. 603)	3	Ralf Reussner
T-INFO-101257	Mechanisms and Applications of Workflow Systems (S. 426)	5	Jutta Mülle
T-INFO-101259	Provable Security in Cryptography (S. 523)	3	Dennis Hofheinz
T-INFO-101262	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy (S. 353)	3	Rüdiger Dillmann, Uwe Spetzger
T-INFO-101267	Geometric Optimzation (S. 344)	3	Hartmut Prautzsch
T-INFO-101272	Natural Language Processing and Software Engineering (S. 451)	3	Walter Tichy
T-INFO-101273	Introduction to Video Analysis (S. 387)	3	Jürgen Beyerer
T-INFO-101276	Data and Storage Management (S. 279)	4	Bernhard Neumair
T-INFO-101277	Probabilistic Planning (S. 515)	6	Marco Huber
T-INFO-101278	Model Driven Software Development (S. 438)	3	Ralf Reussner
T-INFO-101279	Cryptographic Voting Schemes (S. 276)	3	Jörn Müller-Quade
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T-INFO-101314	Tax Law II (S. 625)	3	Detlef Dietrich, Thomas Dreier
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T-INFO-101371	Security (S. 549)	6	Dennis Hofheinz, Jörn Müller-Quade
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T-INFO-101378	Formal Systems II: Theory (S. 342)	5	Bernhard Beckert
T-INFO-101379	Medical Simulation Systems I (S. 428)	3	Rüdiger Dillmann
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T-INFO-101389	Content-based Image and Video Retrieval (S. 265)	3	Rainer Stiefelhagen
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T-INFO-101391	Anthropomatics: Humanoid Robotics (S. 215)	3	Tamim Asfour
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T-INFO-101975	Consulting in Practice (S. 263)	1,5	Klemens Böhm
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T-INFO-101997	Seminar: Legal Studies I (S. 574)	3	Thomas Dreier
T-INFO-102015	Introduction in Computer Networks (S. 382)	4	Martina Zitterbart
T-INFO-102020	Algorithms II (S. 209)	6	Hartmut Prautzsch, Peter Sanders, Dorothea Wagner
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T-INFO-103201	Practical Course Database Systems (S. 490)	4	Klemens Böhm
T-INFO-103202	Analyzing Big Data - Laboratory Course (S. 214)	4	Klemens Böhm
T-INFO-103207	Practical course: Geometric Modeling (S. 492)	3	Hartmut Prautzsch
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T-INFO-103550	Subdivision Algorithms (S. 615)	5	Hartmut Prautzsch
T-INFO-104336	Seminar Informatics A (S. 570)	3	Sebastian Abeck
T-INFO-104374	Laboratory Course Algorithm Engineering (S. 394)	6	Peter Sanders, Dorothea Wagner
T-INFO-104386	Practical Course Protocol Engineering (S. 491)	4	Martina Zitterbart
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T-INFO-105742	Big Data Analytics 2 (S. 230)	3	Klemens Böhm
T-INFO-105796	Practical: Course Analysis of Complex Data Sets (S. 506)	4	Klemens Böhm
T-INFO-105943	Practical Course Computer Vision for Human-Computer Interaction (S. 489)	3	Rainer Stiefelhagen
T-INFO-106061	Access Control Systems: Foundations and Practice (S. 190)	4	Hannes Hartenstein
T-INFO-106219	Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data (S. 493)	4	Klemens Böhm
T-INFO-106239	Lab Course: Natural Language Processing and Software Engineering (S. 392)	5	Walter Tichy
T-INFO-106257	Human-Machine-Interaction (S. 359)	0	Michael Beigl
T-INFO-106417	Practical Course: Virtual Neurorobotics in the Human Brain Project (S. 496)	3	Rüdiger Dillmann
T-INFO-106426	Practical Course: Smart Data Analytics (S. 494)	6	Michael Beigl
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T-WIWI-102601	Insurance Marketing (S. 369)	4,5	Edmund Schwake
T-WIWI-102603	Principles of Insurance Management (S. 514)	4,5	Ute Werner
T-WIWI-102609	Advanced Topics in Economic Theory (S. 201)	4,5	Kay Mitusch
T-WIWI-102612	Managing New Technologies (S. 414)	5	Thomas Reiß
T-WIWI-102613	Auction Theory (S. 224)	4,5	Karl-Martin Ehrhart
T-WIWI-102614	Experimental Economics (S. 332)	4,5	Jella Pfeiffer, Christof Weinhardt
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T-WIWI-102622	Corporate Financial Policy (S. 271)	4,5	Martin Ruckes
T-WIWI-102625	Exchanges (S. 331)	1,5	Jörg Franke
T-WIWI-102626	Business Strategies of Banks (S. 249)	3	Wolfgang Müller
T-WIWI-102627	Simulation I (S. 590)	4,5	Karl-Heinz Waldmann
T-WIWI-102628	Optimization in a Random Environment (S. 472)	4,5	Karl-Heinz Waldmann
T-WIWI-102631	Planning and Management of Industrial Plants (S. 487)	5,5	Frank Schultmann
T-WIWI-102632	Production and Logistics Management (S. 517)	5,5	Frank Schultmann
T-WIWI-102634	Emissions into the Environment (S. 313)	3,5	Ute Karl
T-WIWI-102636	Insurance Risk Management (S. 371)	2,5	Harald Maser
T-WIWI-102637	Current Issues in the Insurance Industry (S. 278)	2	Wolf-Rüdiger Heilmann
T-WIWI-102638	Principles of Information Engineering and Management (S. 512)	5	Timm Teubner, Christof Weinhardt

T-WIWI-102639	Business Models in the Internet: Planning and Implementation (S. 247)	4,5	Timm Teubner
T-WIWI-102640	Market Engineering: Information in Institutions (S. 415)	4,5	Christof Weinhardt
T-WIWI-102641	Service Innovation (S. 581)	4,5	Gerhard Satzger
T-WIWI-102642	Social Network Analysis in CRM (S. 596)	4,5	Andreas Geyer-Schulz
T-WIWI-102643	Derivatives (S. 292)	4,5	Marliese Uhrig-Homburg
T-WIWI-102644	Fixed Income Securities (S. 338)	4,5	Marliese Uhrig-Homburg
T-WIWI-102645	Credit Risk (S. 274)	4,5	Marliese Uhrig-Homburg
T-WIWI-102646	International Finance (S. 377)	3	Marliese Uhrig-Homburg
T-WIWI-102647	Asset Pricing (S. 222)	4,5	Martin Ruckes, Marliese Uhrig-Homburg
T-WIWI-102648	Insurance Production (S. 370)	4,5	Ute Werner
T-WIWI-102649	Risk Communication (S. 538)	4,5	Ute Werner
T-WIWI-102650	Energy and Environment (S. 317)	4,5	Ute Karl
T-WIWI-102657	Special Topics of Efficient Algorithms (S. 605)	5	Hartmut Schmeck
T-WIWI-102661	Database Systems and XML (S. 286)	5	Andreas Oberweis
T-WIWI-102666	Knowledge Discovery (S. 391)	5	York Sure-Vetter
T-WIWI-102667	Management of IT-Projects (S. 412)	5	Roland Schätzle
T-WIWI-102669	Strategic Management of Information Technology (S. 612)	5	Thomas Wolf
T-WIWI-102670	Practical Seminar Knowledge Discovery (S. 499)	4	York Sure-Vetter
T-WIWI-102676	Special Topics of Enterprise Information Systems (S. 606)	5	Andreas Oberweis
T-WIWI-102679	Nature-Inspired Optimisation Methods (S. 453)	5	Pradyumn Kumar Shukla
T-WIWI-102691	Energy Trade and Risk Management (S. 323)	4	Clemens Cremer, Wolf Fichtner, Dogan Keles
T-WIWI-102692	Gas-Markets (S. 343)	3	Andrej Marko Pustisek
T-WIWI-102693	Simulation Game in Energy Economics (S. 588)	3	Massimo Genoese
T-WIWI-102694	Technological Change in Energy Economics (S. 627)	3	Martin Wietschel
T-WIWI-102695	Heat Economy (S. 352)	3	Wolf Fichtner
T-WIWI-102703	Simulation II (S. 591)	4,5	Karl-Heinz Waldmann
T-WIWI-102704	Facility Location and Strategic Supply Chain Management (S. 333)	4,5	Stefan Nickel
T-WIWI-102706	Special Topics in Information Engineering & Management (S. 604)	4,5	Christof Weinhardt
T-WIWI-102710	Markov Decision Models I (S. 423)	5	Karl-Heinz Waldmann
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T-WIWI-102712	Regulation Theory and Practice (S. 534)	4,5	Kay Mitusch
T-WIWI-102713	Telecommunication and Internet Economics (S. 630)	4,5	Kay Mitusch
T-WIWI-102714	Tactical and Operational Supply Chain Management (S. 623)	4,5	Stefan Nickel
T-WIWI-102715	Operations Research in Supply Chain Management (S. 471)	4,5	Stefan Nickel
T-WIWI-102716	Practical Seminar: Health Care Management (with Case Studies) (S. 504)	4,5	Stefan Nickel
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics (S. 305)	4,5	Stefan Nickel
T-WIWI-102719	Mixed Integer Programming I (S. 431)	4,5	Oliver Stein
T-WIWI-102720	Mixed Integer Programming II (S. 434)	4,5	Oliver Stein
T-WIWI-102723	Graph Theory and Advanced Location Models (S. 351)	4,5	Stefan Nickel
T-WIWI-102724	Nonlinear Optimization I (S. 460)	4,5	Oliver Stein
T-WIWI-102725	Nonlinear Optimization II (S. 464)	4,5	Oliver Stein
T-WIWI-102726	Global Optimization I (S. 345)	4,5	Oliver Stein
T-WIWI-102727	Global Optimization II (S. 349)	4,5	Oliver Stein
T-WIWI-102728	Quality Control I (S. 526)	4,5	Karl-Heinz Waldmann
T-WIWI-102729	Quality Control II (S. 527)	4,5	Karl-Heinz Waldmann

T-WIWI-102730	OR-Oriented Modeling and Analysis of Real Problems (Project) (S. 474)	4,5	Karl-Heinz Waldmann
T-WIWI-102733	Mixed Integer Programming I and II (S. 432)	9	Oliver Stein
T-WIWI-102740	Public Management (S. 524)	4,5	Berthold Wigger
T-WIWI-102759	Requirements Analysis and Requirements Management (S. 535)	4	Ralf Kneuper
T-WIWI-102761	Advanced Lab in Ubiquitous Computing (S. 193)	4	Michael Beigl, Hartmut Schmeck
T-WIWI-102762	Business Dynamics (S. 243)	4,5	Andreas Geyer-Schulz
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems (S. 619)	3,5	Claus J. Bosch, Mathias Göbelt
T-WIWI-102785	Theory of Endogenous Growth (S. 636)	4,5	Ingrid Ott
T-WIWI-102793	Efficient Energy Systems and Electric Mobility (S. 309)	3,5	Patrick Jochem, Russell McKenna
T-WIWI-102797	P&C Insurance Simulation Game (S. 475)	3	Ute Werner
T-WIWI-102799	Practical Seminar Service Innovation (S. 500)	4,5	Gerhard Satzger
T-WIWI-102800	Management Accounting 1 (S. 410)	4,5	Marcus Wouters
T-WIWI-102801	Management Accounting 2 (S. 411)	4,5	Marcus Wouters
T-WIWI-102803	Modeling Strategic Decision Making (S. 442)	4,5	Hagen Lindstädt
T-WIWI-102812	Product and Innovation Management (S. 516)	3	Martin Klarmann
T-WIWI-102821	Markets and Organizations: Principles (S. 422)	4,5	Andreas Geyer-Schulz
T-WIWI-102822	Industrial Services (S. 364)	4,5	Hansjörg Fromm
T-WIWI-102824	Theory of Business Cycles (S. 635)	4,5	Marten Hillebrand
T-WIWI-102826	Risk Management in Industrial Supply Networks (S. 539)	3,5	Marcus Wiens
T-WIWI-102828	Supply Chain Management in the Automotive Industry (S. 616)	3,5	Tilman Heupel, Hendrik Lang
T-WIWI-102830	Energy Systems Analysis (S. 322)	3	Valentin Bertsch
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management (S. 326)	3	Carsten Linz, Orestis Terzidis
T-WIWI-102834	Case Studies in Sales and Pricing (S. 250)	1,5	Martin Klarmann
T-WIWI-102835	Marketing Strategy Business Game (S. 420)	1,5	Martin Klarmann
T-WIWI-102841	Modelling, Measuring and Managing of Extreme Risks (S. 443)	2,5	Ute Werner
T-WIWI-102842	Strategic Brand Management (S. 611)	1,5	Joachim Blickhäuser, Martin Klarmann
T-WIWI-102847	Recommender Systems (S. 531)	4,5	Andreas Geyer-Schulz
T-WIWI-102848	Personalization and Services (S. 484)	4,5	Andreas Sonnenbichler
T-WIWI-102849	Service Design Thinking (S. 579)	9	Gerhard Satzger, Christof Weinhardt
T-WIWI-102851	Developing Business Models for the Semantic Web (S. 294)	3	Rudi Studer
T-WIWI-102852	Case Studies Seminar: Innovation Management (S. 251)	3	Marion Weissenberger-Eibl
T-WIWI-102853	Roadmapping (S. 541)	3	Daniel Jeffrey Koch
T-WIWI-102854	Technologies for Innovation Management (S. 628)	3	Daniel Jeffrey Koch
T-WIWI-102855	Parametric Optimization (S. 480)	4,5	Oliver Stein
T-WIWI-102856	Convex Analysis (S. 268)	4,5	Oliver Stein
T-WIWI-102858	Technology Assessment (S. 629)	3	Daniel Jeffrey Koch
T-WIWI-102859	Social Choice Theory (S. 595)	4,5	Clemens Puppe
T-WIWI-102860	Supply Chain Management in the Process Industry (S. 617)	4,5	Stefan Nickel
T-WIWI-102861	Advanced Game Theory (S. 192)	4,5	Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß
T-WIWI-102862	Predictive Mechanism and Market Design (S. 507)	4,5	Johannes Philipp Reiß
T-WIWI-102863	Topics in Experimental Economics (S. 637)	4,5	Johannes Philipp Reiß
T-WIWI-102864	Entrepreneurship (S. 327)	3	Orestis Terzidis
T-WIWI-102865	Business Planning (S. 248)	3	Orestis Terzidis

T-WIWI-102866	Design Thinking (S. 293)	3	Orestis Terzidis
T-WIWI-102872	Challenges in Supply Chain Management (S. 252)	4,5	Esther Mohr
T-WIWI-102873	Current Issues in Innovation Management (S. 277)	3	Marion Weissenberger-Eibl
T-WIWI-102874	Semantic Web Technologies (S. 554)	5	York Sure-Vetter
T-WIWI-102878	Computational Risk and Asset Management (S. 258)	4,5	Maxim Ulrich
T-WIWI-102881	Business and IT Service Management (S. 239)	4,5	Gerhard Satzger
T-WIWI-102882	International Management in Engineering and Production (S. 378)	3,5	Henning Sasse
T-WIWI-102883	Pricing (S. 511)	4,5	Sven Feurer
T-WIWI-102884	Operations Research in Health Care Management (S. 470)	4,5	Stefan Nickel
T-WIWI-102886	Business Administration in Information Engineering and Management (S. 237)	5	Andreas Geyer-Schulz
T-WIWI-102890	Sales Management and Retailing (S. 547)	3	Martin Klarmann
T-WIWI-102891	Price Negotiation and Sales Presentations (S. 510)	1,5	Martin Klarmann, Mark Schröder
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods (S. 368)	3	Marion Weissenberger-Eibl
T-WIWI-102894	Entrepreneurship Research (S. 328)	3	Orestis Terzidis
T-WIWI-102895	Software Quality Management (S. 601)	5	Andreas Oberweis
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R (S. 439)	4,5	Verena Dorner, Jella Pfeiffer, Christof Weinhardt
T-WIWI-102900	Financial Analysis (S. 335)	4,5	Torsten Luedecke
T-WIWI-102901	Open Innovation - Concepts, Methods and Best Practices (S. 468)	1,5	Alexander Hahn
T-WIWI-102902	Marketing Communication (S. 419)	4,5	Ju-Young Kim
T-WIWI-103064	Financial Econometrics (S. 336)	4,5	Melanie Schienle
T-WIWI-103065	Statistical Modeling of generalized regression models (S. 608)	4,5	Wolf-Dieter Heller
T-WIWI-103066	Data Mining and Applications (S. 280)	4,5	Rheza Nakhaeizadeh
T-WIWI-103110	Programming Internship: Solving Computational Risk and Asset Management Problems (S. 518)	4,5	Maxim Ulrich
T-WIWI-103112	Web Science (S. 643)	5	York Sure-Vetter
T-WIWI-103123	Advanced Statistics (S. 199)	4,5	Oliver Grothe
T-WIWI-103124	Multivariate Statistical Methods (S. 450)	4,5	Oliver Grothe
T-WIWI-103126	Non- and Semiparametrics (S. 459)	4,5	Melanie Schienle
T-WIWI-103127	Panel Data (S. 476)	4,5	Wolf-Dieter Heller
T-WIWI-103128	Portfolio and Asset Liability Management (S. 488)	4,5	Mher Safarian
T-WIWI-103129	Stochastic Calculus and Finance (S. 609)	4,5	Mher Safarian
T-WIWI-103133	Life Cycle Assessment (S. 401)	3,5	Heiko Keller
T-WIWI-103134	Project Management (S. 519)	3,5	Frank Schultmann
T-WIWI-103139	Marketing Analytics (S. 418)	4,5	Martin Klarmann
T-WIWI-103140	Services Marketing (S. 584)	3	Ju-Young Kim
T-WIWI-103141	Online Marketing (S. 467)	4,5	Ju-Young Kim

T-WIWI-103474	Seminar in Business Administration A (Master) (S. 556)	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. 562)	3	Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger
T-WIWI-103480	Seminar in Informatics B (Master) (S. 564)	3	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner
T-WIWI-103481	Seminar in Operations Research A (Master) (S. 567)	3	Stefan Nickel, Steffen Rebennack, Oliver Stein
T-WIWI-103483	Seminar in Statistics A (Master) (S. 569)	3	Oliver Grothe, Melanie Schienle
T-WIWI-103523	Advanced Lab Informatics (S. 194)	4	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner
T-WIWI-103549	Intelligent CRM Architectures (S. 373)	4,5	Andreas Geyer-Schulz
T-WIWI-103637	Nonlinear Optimization I and II (S. 462)	9	Oliver Stein
T-WIWI-103638	Global optimization I and II (S. 347)	9	Oliver Stein
T-WIWI-105773	Digital Service Design (S. 299)	4,5	Alexander Mädche
T-WIWI-105774	Practical Seminar: Digital Service Design (S. 503)	4,5	Norbert Koppenhagen, Alexander Mädche
T-WIWI-105777	Business Intelligence Systems (S. 245)	4,5	Alexander Mädche, Mario Nadj, Peyman Toreini
T-WIWI-105778	Service Analytics A (S. 576)	4,5	Hansjörg Fromm, Thomas Setzer
T-WIWI-105779	Service Analytics B - Enterprise Data Reduction and Prediction (S. 578)	4,5	Thomas Setzer
T-WIWI-105781	Incentives in Organizations (S. 362)	4,5	Petra Nieken
T-WIWI-105801	Service Oriented Computing (S. 583)	5	York Sure-Vetter
T-WIWI-106137	Country Manager Simulation (S. 273)	1,5	Sven Feurer
T-WIWI-106187	Business Data Strategy (S. 241)	4,5	Christof Weinhardt
T-WIWI-106191	Bayesian Methods for Financial Economics (S. 228)	4,5	Maxim Ulrich
T-WIWI-106193	Engineering FinTech Solutions (S. 325)	4,5	Maxim Ulrich
T-WIWI-106194	Macro-Finance (S. 409)	4,5	Maxim Ulrich
T-WIWI-106195	Machine Learning in Finance (S. 408)	4,5	Maxim Ulrich
T-WIWI-106200	Modeling and OR-Software: Advanced Topics (S. 441)	4,5	Stefan Nickel
T-WIWI-106201	Digital Transformation of Organizations (S. 303)	4,5	Alexander Mädche
T-WIWI-106207	Practical Seminar: Data-Driven Information Systems (S. 502)	4,5	Alexander Mädche, Thomas Setzer, Christof Weinhardt
T-WIWI-106340	Machine Learning 1 - Basic Methods (S. 404)	5	Johann Marius Zöllner

T-WIWI-106341	Machine Learning 2 – Advanced Methods (S. 406)	5	Johann Marius Zöllner
T-WIWI-106342	Interactive Systems (S. 376)	4,5	Alexander Mädche, Stefan Morana
T-WIWI-106423	Information Service Engineering (S. 366)	5	Harald Sack
T-WIWI-106442	Building Intelligent and Robo-Adviced Portfolios (S. 236)	9	Maxim Ulrich
T-WIWI-106494	Computational Risk and Asset Management II (S. 260)	4,5	Maxim Ulrich
T-WIWI-106495	Automated Financial Advisory (S. 225)	3	Maxim Ulrich
T-WIWI-106496	Computational FinTech with Python and C++ (S. 256)	1,5	
T-WIWI-106546	Introduction to Stochastic Optimization (S. 386)	4,5	Steffen Rebennack
T-WIWI-106548	Advanced Stochastic Optimization (S. 200)	4,5	Steffen Rebennack
T-WIWI-106549	Large-scale Optimization (S. 397)	4,5	Steffen Rebennack
T-WIWI-106552	Simulation of Stochastic Systems (S. 592)	4,5	Oliver Grothe, Steffen Rebennack
T-WIWI-106563	Practical Seminar Digital Service Systems (S. 498)	4,5	Wolf Fichtner, Alexander Mädche, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt
T-WIWI-106569	Consumer Behavior (S. 264)	3	Sven Feurer
T-WIWI-106981	Digital Marketing and Sales in B2B (S. 297)	1,5	Anja Konhäuser
T-WIWI-107032	Computational Risk and Asset Management I (S. 259)	4,5	Maxim Ulrich
T-WIWI-107043	Liberalised Power Markets (S. 399)	3	Wolf Fichtner
T-WIWI-107446	Quantitative Methods in Energy Economics (S. 528)	3	Dogan Keles, Patrick Plötz
T-WIWI-107464	Smart Energy Infrastructure (S. 593)	3	Armin Ardone, Andrej Marko Pustisek
T-WIWI-107501	Energy Market Engineering (S. 318)	4,5	Christof Weinhardt
T-WIWI-107503	Energy Networks and Regulation (S. 320)	4,5	Christof Weinhardt
T-WIWI-107720	Market Research (S. 417)	4,5	
T-INFO-101260	Asymmetric Encryption Schemes (S. 223)	3	Jörn Müller-Quade
T-INFO-101266	Human-Machine-Interaction (S. 357)	6	Michael Beigl
T-INFO-101497	Database Systems (S. 285)	4	Klemens Böhm
T-INFO-101977	Selling IT-Solutions Professionally (S. 553)	1,5	Klemens Böhm
T-WIWI-102623	Financial Intermediation (S. 337)	4,5	Martin Ruckes
T-WIWI-105946	Price Management (S. 508)	4,5	Andreas Geyer-Schulz, Paul Glenn
T-WIWI-106545	Optimization under uncertainty (S. 473)	5	Steffen Rebennack
T-ETIT-100675	Systems and Software Engineering (S. 622)	5	Eric Sax
T-MATH-106391	Numerical Mathematics 1 - Exam (S. 466)	6	Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners
T-INFO-101354	Machine Learning 1 - Basic Methods (S. 403)	3	Rüdiger Dillmann
T-INFO-101268	Photorealistic Rendering (S. 486)	5	Carsten Dachsbacher
T-WIWI-102735	Introduction to Programming with Java (S. 384)	5	N.N., Johann Marius Zöllner
T-WIWI-108437	Practical Seminar: Information Systems and Service Design (S. 505)	4,5	Norbert Koppenhagen, Alexander Mädche
T-WIWI-108438	Applied Analytics with Open Source Tools (S. 218)	4,5	Christof Weinhardt
T-WIWI-108461	Interactive Information Systems (S. 375)	4,5	Alexander Mädche, Stefan Morana
T-WIWI-108765	Practical Seminar: Advanced Analytics (S. 501)	4,5	Florian Glaser, Christof Weinhardt
T-INFO-109124	Deep Learning und Neural Networks (S. 290)	6	Alexander Waibel
T-WIWI-109248	Critical Information Infrastructures (S. 275)	5	Ali Sunyaev
T-WIWI-109246	Digital Health (S. 296)	4	Ali Sunyaev
T-WIWI-109250	Emerging Trends in Criticial Information Infrastructures (S. 312)	4	Ali Sunyaev

T-WIWI-109249	Sociotechnical Information Systems Development (S. 597)	4	Ali Sunyaev
T-WIWI-109251	Selected Issues in Critical Information Infrastructures (S. 550)	4	Ali Sunyaev
T-WIWI-108774	Analyzing and Evaluating Innovation Processes (S. 213)	3	Daniela Beyer, Marion Weissenberger-Eibl
T-WIWI-109271	Advanced Lab User Studies in Security (S. 198)	4	Melanie Volkamer
T-WIWI-109270	Human Factors in Security and Privacy (S. 355)	5	Melanie Volkamer

M Module: Future Networking [M-INFO-101205]

Responsibility: Martina Zitterbart

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Level	Version
8	Each term	1 term	4	2

Future networking
Non-Compulsory Block; You must choose at least 1 courses and at least 8 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101321	Next Generation Internet (S. 457)	4	Roland Bless, Martina Zitterbart
T-INFO-101320	Multimedia Communications (S. 448)	4	Roland Bless, Martina Zitterbart
T-INFO-101322	Mobile Communication (S. 436)	4	Oliver Waldhorst, Martina Zitterbart
T-INFO-101337	Internet of Everything (S. 380)	4	Martina Zitterbart
T-INFO-101338	Telematics (S. 633)	6	Martina Zitterbart

Qualification Objectives
Each student should be able

- to learn and use the concepts and principals of future network design
- to identify the flaws and benefits of future communication systems
- to judge the performance of protocols, future networks and architectures
- master advanced protocols, architectures and algorithms of future communication systems

Content
This module details selected aspects of future communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.

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

Responsibility: Thomas Dreier

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Law

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

Governance, Risk & Compliance
Non-Compulsory Block; You must choose at least 1 courses and at least 9 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101303	Data Protection Law (S. 284)	3	Nikolaus Marsch
T-INFO-101315	Tax Law I (S. 624)	3	Thomas Dreier
T-INFO-101316	Law of Contracts (S. 398)	3	Thomas Dreier
T-INFO-101288	Corporate Compliance (S. 270)	3	Thomas Dreier
T-INFO-101997	Seminar: Legal Studies I (S. 574)	3	Thomas Dreier
T-INFO-108405	Data Protection by Design (S. 283)	3	Oliver Raabe

M Module: Human Computer Interaction [M-INFO-100729]

Responsibility: Michael Beigl

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101266	Human-Machine-Interaction (S. 357)	6	Michael Beigl
T-INFO-106257	Human-Machine-Interaction (S. 359)	0	Michael Beigl

M Module: Image-based detection and classification [M-INFO-101241]

Responsibility: Jürgen Beyerer

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101362	Pattern Recognition (S. 482)	3	Jürgen Beyerer
T-INFO-101273	Introduction to Video Analysis (S. 387)	3	Jürgen Beyerer
T-INFO-101292	Image Data Compression (S. 361)	3	Jürgen Beyerer, Alexey Pak
T-INFO-101363	Automated Visual Inspection and Image Processing (S. 227)	6	Jürgen Beyerer
T-INFO-101354	Machine Learning 1 - Basic Methods (S. 403)	3	Rüdiger Dillmann
T-INFO-101392	Machine Learning 2 - Advanced Methods (S. 405)	3	Rüdiger Dillmann

M Module: Innovative Concepts of Data and Information Management [M-INFO-101208]

Responsibility: Klemens Böhm

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Level	Version
8	Each term	1 term	4	2

Innovative Konzepte des Daten- und Informationsmanagements
Non-Compulsory Block; You must choose at least 1 courses and at least 8 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101305	Big Data Analytics (S. 229)	5	Klemens Böhm
T-INFO-101306	Datamanagement in the Cloud (S. 288)	5	Klemens Böhm
T-INFO-101317	Deployment of Database Systems (S. 291)	5	Klemens Böhm
T-INFO-101975	Consulting in Practice (S. 263)	1,5	Klemens Böhm
T-INFO-101976	Project Management in Practice (S. 521)	1,5	Klemens Böhm
T-INFO-101977	Selling IT-Solutions Professionally (S. 553)	1,5	Klemens Böhm
T-INFO-101257	Mechanisms and Applications of Workflow Systems (S. 426)	5	Jutta Mülle
T-INFO-105742	Big Data Analytics 2 (S. 230)	3	Klemens Böhm
T-INFO-108377	Data Privacy: From Anonymization to Access Control (S. 282)	3	Klemens Böhm

Learning Control / Examinations
Siehe Teilleistung.

Conditions
None

Qualification Objectives
The students

- know the research area of information systems in its various facets and are able to do scientific work in this area,
- are able to develop complex information systems on their own,
- are able to structure and manage complex projects in the field of information systems with unpredictable difficulties,
- are able to explain and to discuss complex aspects of the topics covered by this module with both experts and informed outsiders.

Content
This module aims at exposing students to modern information management, both, in 'breadth´ and 'depth´. We achieve 'breadth´ by means of a close inspection and comparison of different systems and their respective aims. We achieve 'depth´ by means of an extensive examination of the underlying concepts and design alternatives, their assessment as well as by discussing applications.

Remarks
The courses of this module are offered irregularly. Nonetheless, it is guaranteed that the module can be passed anytime.

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

Responsibility: Thomas Dreier

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Law

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-102036	Computer Contract Law (S. 261)	3	Thomas Dreier
T-INFO-101308	Copyright (S. 269)	3	Thomas Dreier
T-INFO-101310	Patent Law (S. 481)	3	Thomas Dreier
T-INFO-101313	Trademark and Unfair Competition Law (S. 638)	3	Yvonne Matz
T-INFO-101307	Internet Law (S. 379)	3	Thomas Dreier
T-INFO-108462	Selected legal issues of Internet law (S. 551)	3	Thomas Dreier

Conditions
None

M Module: Lab Course: Natural Language Processing and Software Engineering [M-INFO-103138]

Responsibility: Walter Tichy

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-106239	Lab Course: Natural Language Processing and Software Engineering (S. 392)	5	Walter Tichy

M Module: Lab: Graph Visualization in Practice [M-INFO-103302]

Responsibility: Dorothea Wagner

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Irregular	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-106580	Lab: Graph Visualization in Practice (S. 393)	5	Dorothea Wagner

M Module: Laboratory Course Algorithm Engineering [M-INFO-102072]

Responsibility: Peter Sanders, Dorothea Wagner

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Irregular	1 term	German/English	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-104374	Laboratory Course Algorithm Engineering (S. 394)	6	Peter Sanders, Dorothea Wagner

M Module: Language Technology and Compiler [M-INFO-100806]

Responsibility: Gregor Snelting

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
8	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101343	Language Technology and Compiler (S. 395)	8	Gregor Snelting

M Module: Machine Learning 1 - Basic Methods [M-INFO-100817]

Responsibility: Rüdiger Dillmann, Johann Marius Zöllner

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
3	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101354	Machine Learning 1 - Basic Methods (S. 403)	3	Rüdiger Dillmann

Modeled Conditions
The following conditions must be met:

- The module [M-WIWI-103356] *Machine Learning* must not have been started.

M Module: Machine Learning 2 - Advanced Methods [M-INFO-100855]

Responsibility: Rüdiger Dillmann, Johann Marius Zöllner

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
3	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101392	Machine Learning 2 - Advanced Methods (S. 405)	3	Rüdiger Dillmann

Modeled Conditions
The following conditions must be met:

- The module [M-WIWI-103356] *Machine Learning* must not have been started.

M Module: Machine Vision [M-INFO-101239]

Responsibility: Jürgen Beyerer

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

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

MVW Pflichtblock
Non-Compulsory Block; You must choose at least 1 courses and at least 3 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101273	Introduction to Video Analysis (S. 387)	3	Jürgen Beyerer
T-INFO-101292	Image Data Compression (S. 361)	3	Jürgen Beyerer, Alexey Pak
T-INFO-101363	Automated Visual Inspection and Image Processing (S. 227)	6	Jürgen Beyerer

MVW - Wahlpflicht
Non-Compulsory Block; You must choose at least 1 courses and at least 6 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101362	Pattern Recognition (S. 482)	3	Jürgen Beyerer
T-INFO-101347	Computer Vision for Human-Computer Interaction (S. 262)	6	Rainer Stiefelhagen
T-INFO-101297	Biometric Systems for Person Identification (S. 233)	3	Rainer Stiefelhagen
T-INFO-105943	Practical Course Computer Vision for Human-Computer Interaction (S. 489)	3	Rainer Stiefelhagen
T-INFO-108484	Deep Learning for Computer Vision (S. 289)	3	Rainer Stiefelhagen

M Module: Medical Simulation and Neural Medicine [M-INFO-101250]

Responsibility: Rüdiger Dillmann

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101379	Medical Simulation Systems I (S. 428)	3	Rüdiger Dillmann
T-INFO-101380	Medical Simulation Systems II (S. 429)	3	Rüdiger Dillmann
T-INFO-101262	Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy (S. 353)	3	Rüdiger Dillmann, Uwe Spetzger

Conditions
None

Qualification Objectives
On completion of this module students will know the essential components of medical simulation systems and their interaction. The objective is a basic methodological understanding regarding the identification of different problems as-well-as imparting knowledge of fundamental solution approaches for the design of medical simulation systems. The lecture aims to impart the competence to conceive dedicated systems and to make important design decisions correctly.
Students will have an understanding of construction and the complex functions of the human brain and the central nerve system. The basic principles of neural physiology are conveyed. Furthermore, diagnostic procedures are presented, with a focus on computer assisted and robot assisted surgical procedures.

Content
The module gives an overview of medical simulation systems and gives insight into applications of computer science to medical problems. Focus is on the fields of imaging and image processing, intra-operative assistance systems, and modeling and simulation of biological systems.
Furthermore, an overview on neural medicine and a basic understanding of physiology regarding senses and nerves is conveyed, which are an important interface to the innovative research area of neural prosthodontics. A close connection to the areas of imaging, image processing and operative support systems is shown. Concrete application examples from medical diagnosis and therapy are presented.

M Module: Microservice-Based Web Applications [M-INFO-104061]

Responsibility: Sebastian Abeck

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
8	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101271	Web Applications and Service-Oriented Architectures (II) (S. 642)	4	Sebastian Abeck
T-INFO-103121	Practical Course: Web Applications and Service-Oriented Architectures (II) (S. 497)	5	Sebastian Abeck

M Module: Networking [M-INFO-101206]

Responsibility: Martina Zitterbart

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Level	Version
8	Each term	1 term	4	3

Networking
Non-Compulsory Block; You must choose at least 1 courses and at least 8 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101321	Next Generation Internet (S. 457)	4	Roland Bless, Martina Zitterbart
T-INFO-101320	Multimedia Communications (S. 448)	4	Roland Bless, Martina Zitterbart
T-INFO-101319	Network Security: Architectures and Protocols (S. 454)	4	Martina Zitterbart
T-INFO-104386	Practical Course Protocol Engineering (S. 491)	4	Martina Zitterbart
T-INFO-101338	Telematics (S. 633)	6	Martina Zitterbart

Qualification Objectives
Each student should be able

- to learn and use the concepts and principals of wired network design
- to identify the flaws and benefits of wired communication systems
- to judge the performance of protocols, wired networks and architectures
- master advanced protocols, architectures and algorithms of wired communication systems

Content
This module details selected aspects of wired communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.

M Module: Networking Labs [M-INFO-101204]

Responsibility: Hannes Hartenstein, Martina Zitterbart

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101323	IT-Security Management for Networked Systems (S. 388)	5	Hannes Hartenstein
T-INFO-101319	Network Security: Architectures and Protocols (S. 454)	4	Martina Zitterbart
T-INFO-106061	Access Control Systems: Foundations and Practice (S. 190)	4	Hannes Hartenstein

Modeled Conditions
The following conditions must be met:

- The module [M-INFO-100801] *Telematics* must have been passed.

Qualification Objectives
Each student should be able

- to learn and apply the concepts and principals of wireless network design
- to identify the flaws and benefits of wireless communication systems
- to judge the performance of protocols, wireless networks and architectures
- master advanced protocols, architectures and algorithms of wireless communication systems

Content
This module details and applies selected aspects of communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.

M Module: Networking Security - Theory and Praxis [M-INFO-101207]

Responsibility: Martina Zitterbart

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101319	Network Security: Architectures and Protocols (S. 454)	4	Martina Zitterbart
T-INFO-101323	IT-Security Management for Networked Systems (S. 388)	5	Hannes Hartenstein
T-INFO-101371	Security (S. 549)	6	Dennis Hofheinz, Jörn Müller-Quade
T-INFO-101390	Symmetric Encryption (S. 621)	3	Jörn Müller-Quade

Conditions
None

Qualification Objectives
Each student should be able

- to recall the basic security mechanisms and theoretical foundations of networking security and cryptography
- to read and understand actual academic papers
- to judge the security level of actual security solutions
- to identify possible attacks on security solutions

Content
This module details selected aspects of networking security and cryptography in theory and praxis.

M Module: Neural Networks [M-INFO-100846]

Responsibility: Alexander Waibel

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each summer term	1 term	German/English	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101383	Neural Networks (S. 456)	6	Alexander Waibel

M Module: Parallel Algorithms [M-INFO-100796]

Responsibility: Peter Sanders

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101333	Parallel Algorithms (S. 477)	5	Peter Sanders

M Module: Practical Course: Smart Data Analytics [M-INFO-103235]

Responsibility: Michael Beigl

Organisation: KIT-Fakultät für Informatik

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-106426	Practical Course: Smart Data Analytics (S. 494)	6	Michael Beigl

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

Responsibility: Thomas Dreier

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Law

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101329	Employment Law I (S. 315)	3	Thomas Dreier
T-INFO-101330	Employment Law II (S. 316)	3	Thomas Dreier
T-INFO-101316	Law of Contracts (S. 398)	3	Thomas Dreier
T-INFO-101314	Tax Law II (S. 625)	3	Detlef Dietrich, Thomas Dreier
T-INFO-101315	Tax Law I (S. 624)	3	Thomas Dreier

Conditions
None

Qualification Objectives
The student

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

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

M Module: Public Business Law [M-INFO-101217]

Responsibility: Matthias Bäcker

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Law

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101309	Telecommunications Law (S. 632)	3	Nikolaus Marsch
T-INFO-101303	Data Protection Law (S. 284)	3	Nikolaus Marsch
T-INFO-101311	Public Media Law (S. 525)	3	Thomas Dreier
T-INFO-101312	European and International Law (S. 330)	3	Ulf Brühann
T-INFO-101348	Environmental Law (S. 329)	3	Matthias Bäcker

Learning Control / Examinations
see course description.

M Module: Randomized Algorithms [M-INFO-100794]

Responsibility: Thomas Worsch

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101331	Randomized Algorithms (S. 529)	5	Thomas Worsch

M Module: Robotics I - Introduction to Robotics [M-INFO-100893]

Responsibility: Tamim Asfour

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	3

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-108014	Robotics I – Introduction to Robotics (S. 542)	6	Tamim Asfour

M Module: Seminar Module Informatics [M-INFO-102822]

Responsibility:

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Research Course

ECTS	Recurrence	Duration	Language	Version
3	Each term	1 term	German/English	1

Seminar Informatik
Non-Compulsory Block; You must choose one course.

Identifier	Course	ECTS	Responsibility
T-INFO-104336	Seminar Informatics A (S. 570)	3	Sebastian Abeck
T-WIWI-103480	Seminar in Informatics B (Master) (S. 564)	3	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

M Module: Seminar Module Law [M-INFO-101218]

Responsibility: Thomas Dreier

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Research Course

ECTS	Recurrence	Duration	Language	Version
3	Each term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101997	Seminar: Legal Studies I (S. 574)	3	Thomas Dreier

M Module: Software Methods [M-INFO-101202]

Responsibility: Ralf Reussner

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101381	Software Architecture and Quality (S. 598)	3	Ralf Reussner
T-INFO-101256	Software-Evolution (S. 603)	3	Ralf Reussner
T-INFO-101272	Natural Language Processing and Software Engineering (S. 451)	3	Walter Tichy
T-INFO-101278	Model Driven Software Development (S. 438)	3	Ralf Reussner
T-INFO-101335	Empirical Software Engineering (S. 314)	4	Walter Tichy
T-INFO-101300	Requirements Engineering (S. 536)	3	Anne Koziolek

Conditions
None

Qualification Objectives
The students learn the foundations and advanced methods for systematic planning, design, implementation, evaluation and enhancement of software systems. By acquiring knowledge and capabilities to critically evaluate modern technologies, the students are enabled to use these technologies purposefully and effectively. Apart from functional viewpoints and software properties, extra-functional properties such as security and performance are taught. Additionally, an overview of current research topics and challenges are offered.

Content
The content is explained in the course descriptions.

M Module: Software Systems [M-INFO-101201]

Responsibility: Ralf Reussner

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

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

Identifier	Course	ECTS	Responsibility
T-INFO-101381	Software Architecture and Quality (S. 598)	3	Ralf Reussner
T-INFO-101256	Software-Evolution (S. 603)	3	Ralf Reussner
T-INFO-101272	Natural Language Processing and Software Engineering (S. 451)	3	Walter Tichy
T-INFO-101278	Model Driven Software Development (S. 438)	3	Ralf Reussner
T-INFO-101339	Software Development for Modern, Parallel Platforms (S. 599)	3	Walter Tichy
T-INFO-101325	Multicore Computers and Computer Clusters (S. 446)	4	Walter Tichy
T-INFO-101281	Formal Systems II: Application (S. 341)	5	Bernhard Beckert
T-INFO-101378	Formal Systems II: Theory (S. 342)	5	Bernhard Beckert
T-INFO-101300	Requirements Engineering (S. 536)	3	Anne Koziolek

Conditions
None

Qualification Objectives
In the courses that comprise this module, students learn different approaches and techniques for systematic and high-quality development of software systems, e.g. requirements engineering, implementing components and services, use of parallelism and multi-core platforms, as well as the verification of created software systems.

Content
The content will be explained in the course descriptions.

M Module: Telematics [M-INFO-100801]

Responsibility: Martina Zitterbart

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101338	Telematics (S. 633)	6	Martina Zitterbart

M Module: Theory and Practice of Data Warehousing and Mining [M-INFO-101256]

Responsibility: Klemens Böhm

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

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

Praktikum
Non-Compulsory Block; You must choose at most 1 courses and at most 4 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-103202	Analyzing Big Data - Laboratory Course (S. 214)	4	Klemens Böhm
T-INFO-105796	Practical: Course Analysis of Complex Data Sets (S. 506)	4	Klemens Böhm
T-INFO-106219	Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data (S. 493)	4	Klemens Böhm
T-INFO-103201	Practical Course Database Systems (S. 490)	4	Klemens Böhm

Vorlesung
Non-Compulsory Block; You must choose at most 5 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101305	Big Data Analytics (S. 229)	5	Klemens Böhm
T-INFO-105742	Big Data Analytics 2 (S. 230)	3	Klemens Böhm
T-INFO-101317	Deployment of Database Systems (S. 291)	5	Klemens Böhm
T-INFO-101306	Datamanagement in the Cloud (S. 288)	5	Klemens Böhm
T-INFO-108377	Data Privacy: From Anonymization to Access Control (S. 282)	3	Klemens Böhm

Conditions
None

Qualification Objectives
The students

- know the research area of information systems in its various facets and are able to do scientific work in this area,
- are able to explain and to discuss complex aspects of the topics covered by this module with both experts and informed outsiders,
- know the concepts, algorithms, techniques and selected tools in the areas of data warehousing and data mining,
- are familiar with the practical challenges of data analysis and are able to develop respective solutions on their own.

Content
This module aims at exposing students to modern information management, both, in 'breadth´ and 'depth´. We achieve 'breadth´ by means of a close inspection and comparison of different systems and their respective aims. We achieve 'depth´ by means of an extensive examination of the underlying concepts and design alternatives, their assessment as well as by discussing applications. In particular, we look at data warehousing and mining techniques not only from a theoretical point of view but deploy and realise such technologies in a practical course.

Remarks
The courses of this module are offered irregularly. Nonetheless, it is guaranteed that the module can be passed anytime.

M Module: Ubiquitous Computing [M-INFO-100789]

Responsibility: Michael Beigl

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective

Contained in: Informatics

ECTS	Recurrence	Duration	Language	Version
5	Each winter term	1 term	German/English	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101326	Ubiquitous Computing (S. 639)	5	Michael Beigl

M Module: Wireless Networking [M-INFO-101203]

Responsibility: Martina Zitterbart

Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Informatics

ECTS	Recurrence	Duration	Level	Version
8	Each term	1 term	4	2

Wireless Networking
Non-Compulsory Block; You must choose at least 1 courses and at least 8 credits.

Identifier	Course	ECTS	Responsibility
T-INFO-101337	Internet of Everything (S. 380)	4	Martina Zitterbart
T-INFO-101322	Mobile Communication (S. 436)	4	Oliver Waldhorst, Martina Zitterbart
T-INFO-101326	Ubiquitous Computing (S. 639)	5	Michael Beigl
T-INFO-101319	Network Security: Architectures and Protocols (S. 454)	4	Martina Zitterbart

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-101338] *Telematics* must have been passed.

Qualification Objectives
Each student should be able

- to learn and use the concepts and principals of wireless network design
- to identify the flaws and benefits of wireless communication systems
- to judge the performance of protocols, wireless networks and architectures
- master advanced protocols, architectures and algorithms of wireless communication systems

Content
This module details selected aspects of wireless communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.

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

Responsibility: Hagen Lindstädt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

ECTS	Recurrence	Duration	Language	Version
9	Irregular	2 terms	German	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106188	Workshop Current Topics in Strategy and Management (S. 652)	3	Hagen Lindstädt
T-WIWI-106189	Workshop Business Wargaming – Analyzing Strategic Interactions (S. 651)	3	Hagen Lindstädt
T-WIWI-106190	Strategy and Management Theory: Developments and "Classics" (S. 613)	3	Hagen Lindstädt

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

Conditions
None

Qualification Objectives
Students

- are able to analyze business strategies and derive recommendations using appropriate frameworks
- learn to express their position through compelling reasoning in structured discussions
- are qualified to critically examine recent research topics in the field of strategic management
- can derive own conclusions from less structured information by using interdisciplinary knowledge

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

- analyze and discuss a wide range of business strategies on the basis of collectively selected case studies.
- participate in a business wargaming workshop and analyze strategic interactions.
- write a paper about current topics in the field of strategic management theory.

Recommendations
None

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

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

Responsibility: Oliver Grothe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-103123	Advanced Statistics (S. 199)	4,5	Oliver Grothe

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106341	Machine Learning 2 – Advanced Methods (S. 406)	5	Johann Marius Zöllner
T-WIWI-103124	Multivariate Statistical Methods (S. 450)	4,5	Oliver Grothe

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

Conditions
The course "*Advanced Statistics*" is compulsory.

Qualification Objectives
A Student

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

Content

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

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

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

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

Responsibility: Johannes Philipp Reiß

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102613	Auction Theory (S. 224)	4,5	Karl-Martin Ehrhart
T-WIWI-102614	Experimental Economics (S. 332)	4,5	Jella Pfeiffer, Christof Weinhardt
T-WIWI-102622	Corporate Financial Policy (S. 271)	4,5	Martin Ruckes
T-WIWI-102623	Financial Intermediation (S. 337)	4,5	Martin Ruckes
T-WIWI-102640	Market Engineering: Information in Institutions (S. 415)	4,5	Christof Weinhardt
T-WIWI-102862	Predictive Mechanism and Market Design (S. 507)	4,5	Johannes Philipp Reiß
T-WIWI-105781	Incentives in Organizations (S. 362)	4,5	Petra Nieken

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102861	Advanced Game Theory (S. 192)	4,5	Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß
T-WIWI-106623	Technical conditions met (S. 626)	0	

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

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

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

Qualification Objectives
Students

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

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

Recommendations
Basic knowledge in game theory is assumed.

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

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

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

Responsibility: Christof Weinhardt

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102639	Business Models in the Internet: Planning and Implementation (S. 247)	4,5	Timm Teubner
T-WIWI-102706	Special Topics in Information Engineering & Management (S. 604)	4,5	Christof Weinhardt
T-WIWI-102847	Recommender Systems (S. 531)	4,5	Andreas Geyer-Schulz
T-WIWI-102848	Personalization and Services (S. 484)	4,5	Andreas Sonnenbichler
T-WIWI-102641	Service Innovation (S. 581)	4,5	Gerhard Satzger
T-WIWI-102799	Practical Seminar Service Innovation (S. 500)	4,5	Gerhard Satzger
T-WIWI-106201	Digital Transformation of Organizations (S. 303)	4,5	Alexander Mädche

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

Conditions
None

Qualification Objectives
The student should

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

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

Recommendations
None

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

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

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

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102740	Public Management (S. 524)	4,5	Berthold Wigger
T-WIWI-102859	Social Choice Theory (S. 595)	4,5	Clemens Puppe

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

Conditions
None

Qualification Objectives
Students

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

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

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

M Module: Critical Digital Infrastructures [M-WIWI-104403]

Responsibility: Ali Sunyaev

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

ECTS	Recurrence	Duration	Version
9	Each term	2 terms	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-109248	Critical Information Infrastructures (S. 275)	5	Ali Sunyaev

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

Identifier	Course	ECTS	Responsibility
T-WIWI-109246	Digital Health (S. 296)	4	Ali Sunyaev
T-WIWI-109250	Emerging Trends in Criticial Information Infrastructures (S. 312)	4	Ali Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development (S. 597)	4	Ali Sunyaev
T-WIWI-109251	Selected Issues in Critical Information Infrastructures (S. 550)	4	Ali Sunyaev

Learning Control / Examinations
The assessment is carried out as partial exams according to § 4 paragraph 2 Nr. 1 – Nr. 3 SPO of the examination regulation of the core course and further single courses of this module, whose sum of credits must meet 9 credits.
The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

Conditions
None

Qualification Objectives
The students . . .

- have foundational knowledge about the design and operation of critical digital infrastructures
- have in-depth methodological knowledge in design science research and related scientific domains
- can distinguish between the challenges and opportunities of critical digital infrastructures in different domains
- can evaluate and improve sociotechnical systems
- combine theoretical and practical contents of the courses in the module to solve existing problems in the domain of critical digital infrastructures

Content
Critical digital infrastructures are sociotechnical systems comprising essential software components and information systems with pivotal impact on individuals, organizations, governments, economies, and society. Critical information infrastructures require careful design, development, and evaluation to ensure reliable, secure, and purposeful operation. This module features a strong focus on different subject areas, including, but not limited to, internet technologies, health care, and information privacy. The lectures in the module introduce students to a domain relevant to critical digital infrastructures and the labs allow to gain hands-on experience in this interesting domain.

Recommendations
The courses in the module may be held in English. Participants should be well versed in written and spoken English.
The courses can be visited independently. Participants can start the module in the winter as well as in the summer term.
Programming skills may be required in some courses.
Experience in writing scientific papers is helpful but not required.

Remarks
This new module can be chosen from summer term 2018.

Workload
30 hours per ECTS
Total workload for 9 ECTS: approx. 270 hours
The exact allocation is made according to the credit points of the courses.

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

Responsibility: Andreas Geyer-Schulz

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102847	Recommender Systems (S. 531)	4,5	Andreas Geyer-Schulz
T-WIWI-102848	Personalization and Services (S. 484)	4,5	Andreas Sonnenbichler
T-WIWI-102762	Business Dynamics (S. 243)	4,5	Andreas Geyer-Schulz
T-WIWI-105778	Service Analytics A (S. 576)	4,5	Hansjörg Fromm, Thomas Setzer
T-WIWI-103549	Intelligent CRM Architectures (S. 373)	4,5	Andreas Geyer-Schulz

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

Conditions
None

Qualification Objectives
The student

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

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

generation of recommendations based on the collected data of products and customers are discussed. The importance of user modeling and -recognition, data security and privacy are adressed as well.

Recommendations
None

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

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

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

Responsibility: Alexander Mädche, Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Economics and Management
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Each term	1 term	4

Wahlpflichtangebot
Non-Compulsory Block;

Identifier	Course	ECTS	Responsibility
T-WIWI-108438	Applied Analytics with Open Source Tools (S. 218)	4,5	Christof Weinhardt
T-WIWI-106187	Business Data Strategy (S. 241)	4,5	Christof Weinhardt
T-WIWI-105777	Business Intelligence Systems (S. 245)	4,5	Alexander Mädche, Mario Nadj, Peyman Toreini
T-WIWI-106207	Practical Seminar: Data-Driven Information Systems (S. 502)	4,5	Alexander Mädche, Thomas Setzer, Christof Weinhardt
T-WIWI-105778	Service Analytics A (S. 576)	4,5	Hansjörg Fromm, Thomas Setzer

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

Conditions
None.

Qualification Objectives
The student

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

Content
The amount of business-related data availabe in modern enterprise information systems grows exponentially, and the various data sources are more and more integrated, transformed, and analyzed jointly to gain valuable business insights, pro-actively control and manage business processes, to leverage planning and decision making, and to provide appropriate, potentially novel services to customers based on relationships and developments observed in the data.
Also, data sources are more and more connected and single business unit that used to operate on separate data pools are now becoming highly integrated, providing tremendeous business opportunities but also challenges regarding how the

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

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

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

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

Responsibility: Christof Weinhardt

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

Contained in: Economics and Management
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Each term	1 term	3

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

Identifier	Course	ECTS	Responsibility
T-WIWI-108438	Applied Analytics with Open Source Tools (S. 218)	4,5	Christof Weinhardt
T-WIWI-102614	Experimental Economics (S. 332)	4,5	Jella Pfeiffer, Christof Weinhardt
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R (S. 439)	4,5	Verena Dorner, Jella Pfeiffer, Christof Weinhardt
T-WIWI-108765	Practical Seminar: Advanced Analytics (S. 501)	4,5	Florian Glaser, Christof Weinhardt

Learning Control / Examinations
The assessment is carried out as partial exams of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

Conditions
None

Qualification Objectives
Students of this module

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

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

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

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

Responsibility: Martin Klarmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-103139	Marketing Analytics (S. 418)	4,5	Martin Klarmann
T-WIWI-107720	Market Research (S. 417)	4,5	

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

Conditions
Keine.

Qualification Objectives
Students

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

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

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

Recommendations
None

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

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

Responsibility: Alexander Mädche

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-108461	Interactive Information Systems (S. 375)	4,5	Alexander Mädche, Stefan Morana

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

Identifier	Course	ECTS	Responsibility
T-WIWI-105773	Digital Service Design (S. 299)	4,5	Alexander Mädche
T-WIWI-108437	Practical Seminar: Information Systems and Service Design (S. 505)	4,5	Norbert Koppenhagen, Alexander Mädche

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

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

Qualification Objectives
The student

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

Content
Advanced information and communication technologies make interactive systems ever-present in the users' private and business life. They are an integral part of smartphones, devices in the smart home, mobility vehicles as well as at the working place in production and administration (e.g. in the form of dashboards).
With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. This module focuses on design processes and principles for interactive systems. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for the design of interactive systems. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.
Each lecture in the module is accompanied with a capstone project that is carried out with an industry partner.

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

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

M Module: Development of Business Information Systems [M-WIWI-101477]

Responsibility: Andreas Oberweis

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

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102661	Database Systems and XML (S. 286)	5	Andreas Oberweis
T-WIWI-102895	Software Quality Management (S. 601)	5	Andreas Oberweis

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102667	Management of IT-Projects (S. 412)	5	Roland Schätzle
T-WIWI-102676	Special Topics of Enterprise Information Systems (S. 606)	5	Andreas Oberweis
T-WIWI-102669	Strategic Management of Information Technology (S. 612)	5	Thomas Wolf
T-WIWI-103523	Advanced Lab Informatics (S. 194)	4	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions
The course *Datenbanksysteme und XML* or the course *Software Quality Management* must be examined.

Qualification Objectives
Students

- describe the structure and the components of enterprise information systems,
- explain functionality and architecture of the enterprise information system components ,
- choose and apply relevant components to solve given problems in a methodic approach,
- describe roles, activities and products in the field of software engineering management,
- compare process and quality models and choose an appropriate model in a concrete situation,
- write scientific theses in the areas of enterprise information system components and software engineering management and find own solutions for given problems and research questions.

Content
An enterprise information system contains the complete application software to store and process data and information in an organisation including design and management of databases, workflow management and strategic information planning.

Due to global networking and geographical distribution of enterprises as well as the increasing acceptation of eCommerce the application of distributed information systems becomes particular important.
This module teaches concepts and methods for design and application of information systems.

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

Workload
See German version

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

Responsibility: Wolf Fichtner, Stefan Nickel

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102872	Challenges in Supply Chain Management (S. 252)	4,5	Esther Mohr
T-WIWI-102822	Industrial Services (S. 364)	4,5	Hansjörg Fromm
T-WIWI-107043	Liberalised Power Markets (S. 399)	3	Wolf Fichtner
T-WIWI-106200	Modeling and OR-Software: Advanced Topics (S. 441)	4,5	Stefan Nickel
T-WIWI-106201	Digital Transformation of Organizations (S. 303)	4,5	Alexander Mädche
T-WIWI-106563	Practical Seminar Digital Service Systems (S. 498)	4,5	Wolf Fichtner, Alexander Mädche, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt

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

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

Qualification Objectives
Students

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

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

Recommendations
None

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

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

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

Responsibility: Maxim Ulrich

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

Contained in: Economics and Management
Additional Examinations

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106193	Engineering FinTech Solutions (S. 325)	4,5	Maxim Ulrich
T-WIWI-106496	Computational FinTech with Python and C++ (S. 256)	1,5	
T-WIWI-106495	Automated Financial Advisory (S. 225)	3	Maxim Ulrich

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

Conditions
None.

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

Content
See respective lecture

Recommendations
None

Remarks
See respective lecture

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

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

Responsibility: Melanie Schienle

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-103125	Applied Econometrics (S. 220)	4,5	Melanie Schienle

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

Identifier	Course	ECTS	Responsibility
T-WIWI-103066	Data Mining and Applications (S. 280)	4,5	Rheza Nakhaeizadeh
T-WIWI-103064	Financial Econometrics (S. 336)	4,5	Melanie Schienle
T-WIWI-103126	Non- and Semiparametrics (S. 459)	4,5	Melanie Schienle
T-WIWI-103127	Panel Data (S. 476)	4,5	Wolf-Dieter Heller
T-WIWI-103065	Statistical Modeling of generalized regression models (S. 608)	4,5	Wolf-Dieter Heller

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

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

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

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

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

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

Responsibility: Melanie Schienle

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-103066	Data Mining and Applications (S. 280)	4,5	Rheza Nakhaeizadeh
T-WIWI-103064	Financial Econometrics (S. 336)	4,5	Melanie Schienle
T-WIWI-103124	Multivariate Statistical Methods (S. 450)	4,5	Oliver Grothe
T-WIWI-103126	Non- and Semiparametrics (S. 459)	4,5	Melanie Schienle
T-WIWI-103127	Panel Data (S. 476)	4,5	Wolf-Dieter Heller
T-WIWI-103128	Portfolio and Asset Liability Management (S. 488)	4,5	Mher Safarian
T-WIWI-103065	Statistical Modeling of generalized regression models (S. 608)	4,5	Wolf-Dieter Heller
T-WIWI-103129	Stochastic Calculus and Finance (S. 609)	4,5	Mher Safarian

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

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

Modeled Conditions
The following conditions must be met:

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

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

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

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

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

Responsibility: Kay Mitusch

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102622	Corporate Financial Policy (S. 271)	4,5	Martin Ruckes
T-WIWI-102623	Financial Intermediation (S. 337)	4,5	Martin Ruckes
T-WIWI-102647	Asset Pricing (S. 222)	4,5	Martin Ruckes, Marliese Uhrig-Homburg

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102609	Advanced Topics in Economic Theory (S. 201)	4,5	Kay Mitusch
T-WIWI-102861	Advanced Game Theory (S. 192)	4,5	Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß

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

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

Qualification Objectives
The students

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

Content
The mandatory course "Advanced Topics in Economic Theory" is devoted in equal parts to General Equilibrium Theory and to contract theory. The course "Asset Pricing" will apply techniques of General Equilibrium Theory to valuation

of financial assets. The courses "Corporate Financial Policy" and "Finanzintermediation" will apply the techniques of contract theory to issues of corporate finance and financial institutions.

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

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

Responsibility: Christof Weinhardt

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

Contained in: Economics and Management
Additional Examinations

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-107501	Energy Market Engineering (S. 318)	4,5	Christof Weinhardt
T-WIWI-107503	Energy Networks and Regulation (S. 320)	4,5	Christof Weinhardt
T-WIWI-107504	Smart Grid Applications (S. 594)	4,5	Johannes Gärttner, Christof Weinhardt

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

Conditions
None.

Qualification Objectives
The student

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

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

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

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

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

Responsibility: Andreas Geyer-Schulz

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-108880	Blockchains & Cryptofinance (S. 234)	4,5	Philipp Schuster, Marliese Uhrig-Homburg
T-WIWI-102762	Business Dynamics (S. 243)	4,5	Andreas Geyer-Schulz
T-WIWI-102886	Business Administration in Information Engineering and Management (S. 237)	5	Andreas Geyer-Schulz
T-WIWI-102640	Market Engineering: Information in Institutions (S. 415)	4,5	Christof Weinhardt
T-WIWI-105946	Price Management (S. 508)	4,5	Andreas Geyer-Schulz, Paul Glenn
T-WIWI-102713	Telecommunication and Internet Economics (S. 630)	4,5	Kay Mitusch

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

Conditions
None

Qualification Objectives
The student

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

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

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

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

Recommendations
None

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

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

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

Responsibility: Wolf Fichtner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-107043	Liberalised Power Markets (S. 399)	3	Wolf Fichtner

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102691	Energy Trade and Risk Management (S. 323)	4	Clemens Cremer, Wolf Fichtner, Dogan Keles
T-WIWI-107501	Energy Market Engineering (S. 318)	4,5	Christof Weinhardt
T-WIWI-108016	Simulation Game in Energy Economics (S. 586)	3	Massimo Genoese
T-WIWI-107446	Quantitative Methods in Energy Economics (S. 528)	3	Dogan Keles, Patrick Plötz
T-WIWI-102712	Regulation Theory and Practice (S. 534)	4,5	Kay Mitusch

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

Conditions
The lecture Liberalised Power Markets has to be examined.

Qualification Objectives
The student

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

Content
Liberalised Power Markets: The European liberalisation process, energy markets, pricing, market failure, investment incentives, market power
Energy Trade and Risk Management: trade centres, trade products, market mechanisms, position and risk management
Gas-Markets: producing countries, provision structures, market places, pricing
Energy Policy: Management of energy flows, energy-political targets and instruments (emission trading etc.)
Simulation Game in Energy Economics: Simulation of the German electricity system

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

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

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

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

Responsibility: Wolf Fichtner

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102793	Efficient Energy Systems and Electric Mobility (S. 309)	3,5	Patrick Jochem, Russell McKenna
T-WIWI-102650	Energy and Environment (S. 317)	4,5	Ute Karl
T-WIWI-102830	Energy Systems Analysis (S. 322)	3	Valentin Bertsch
T-WIWI-107464	Smart Energy Infrastructure (S. 593)	3	Armin Ardone, Andrej Marko Pustisek
T-WIWI-102694	Technological Change in Energy Economics (S. 627)	3	Martin Wietschel
T-WIWI-102695	Heat Economy (S. 352)	3	Wolf Fichtner

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

Conditions
None

Qualification Objectives
The student

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

Content
Strategical Aspects of Energy Economy: Long-term planning methods, generation technologies
Technological Change in Energy Economics: Future energy technologies, learning curves, energy demand
Heat Economy: district heating, heating technologies, reduction of heat demand, statutory provisions
Energy Systems Analysis: Interdependencies in energy economics, energy systems modelling approaches in energy economics
Energy and Environment: emission factors, emission reduction measures, environmental impact
Efficient Energy Systems and Electric Mobility: concepts and current trends in energy efficiency, Overview of and economical, ecological and social impacts through electric mobility

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

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

Responsibility: Orestis Terzidis

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102864	Entrepreneurship (S. 327)	3	Orestis Terzidis

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102865	Business Planning (S. 248)	3	Orestis Terzidis
T-WIWI-102866	Design Thinking (S. 293)	3	Orestis Terzidis
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management (S. 326)	3	Carsten Linz, Orestis Terzidis
T-WIWI-102894	Entrepreneurship Research (S. 328)	3	Orestis Terzidis

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102612	Managing New Technologies (S. 414)	5	Thomas Reiß
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods (S. 368)	3	Marion Weissenberger-Eibl
T-WIWI-102639	Business Models in the Internet: Planning and Implementation (S. 247)	4,5	Timm Teubner
T-WIWI-102851	Developing Business Models for the Semantic Web (S. 294)	3	Rudi Studer
T-WIWI-102852	Case Studies Seminar: Innovation Management (S. 251)	3	Marion Weissenberger-Eibl
T-WIWI-102853	Roadmapping (S. 541)	3	Daniel Jeffrey Koch
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management (S. 326)	3	Carsten Linz, Orestis Terzidis
T-WIWI-102865	Business Planning (S. 248)	3	Orestis Terzidis
T-WIWI-102866	Design Thinking (S. 293)	3	Orestis Terzidis
T-WIWI-102894	Entrepreneurship Research (S. 328)	3	Orestis Terzidis
T-WIWI-109064	Joint Entrepreneurship Summer School (S. 390)	6	Orestis Terzidis

Learning Control / Examinations
See German version.

Conditions
None

Qualification Objectives
See German version.

Recommendations
None

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

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

Responsibility: Johannes Philipp Reiß

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102862	Predictive Mechanism and Market Design (S. 507)	4,5	Johannes Philipp Reiß
T-WIWI-102863	Topics in Experimental Economics (S. 637)	4,5	Johannes Philipp Reiß
T-WIWI-105781	Incentives in Organizations (S. 362)	4,5	Petra Nieken
T-WIWI-102614	Experimental Economics (S. 332)	4,5	Jella Pfeiffer, Christof Weinhardt

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

Conditions
None.

Qualification Objectives
Students

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

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

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

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

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

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

Responsibility: Martin Ruckes, Marliese Uhrig-Homburg

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102643	Derivatives (S. 292)	4,5	Marliese Uhrig-Homburg
T-WIWI-102621	Valuation (S. 641)	4,5	Martin Ruckes
T-WIWI-102647	Asset Pricing (S. 222)	4,5	Martin Ruckes, Marliese Uhrig-Homburg

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

Conditions
None

Qualification Objectives
The student

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

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

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

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

Responsibility: Martin Ruckes, Marliese Uhrig-Homburg

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102647	Asset Pricing (S. 222)	4,5	Martin Ruckes, Marliese Uhrig-Homburg
T-WIWI-108880	Blockchains & Cryptofinance (S. 234)	4,5	Philipp Schuster, Marliese Uhrig-Homburg
T-WIWI-102625	Exchanges (S. 331)	1,5	Jörg Franke
T-WIWI-102622	Corporate Financial Policy (S. 271)	4,5	Martin Ruckes
T-WIWI-109050	Corporate Risk Management (S. 272)	3	Martin Ruckes
T-WIWI-102643	Derivatives (S. 292)	4,5	Marliese Uhrig-Homburg
T-WIWI-102600	eFinance: Information Engineering and Management for Securities Trading (S. 310)	4,5	Christof Weinhardt
T-WIWI-102644	Fixed Income Securities (S. 338)	4,5	Marliese Uhrig-Homburg
T-WIWI-102900	Financial Analysis (S. 335)	4,5	Torsten Luedecke
T-WIWI-102623	Financial Intermediation (S. 337)	4,5	Martin Ruckes
T-WIWI-102626	Business Strategies of Banks (S. 249)	3	Wolfgang Müller
T-WIWI-102646	International Finance (S. 377)	3	Marliese Uhrig-Homburg
T-WIWI-102645	Credit Risk (S. 274)	4,5	Marliese Uhrig-Homburg
T-WIWI-102621	Valuation (S. 641)	4,5	Martin Ruckes

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

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

Modeled Conditions
The following conditions must be met:

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

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

Content
The module Finance 2 is based on the module Finance 1. The courses of this module equip the students with advanced

skills in economics and methodology in the field of modern finance on a broad basis.

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

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

M Module: Human Factors in Security and Privacy [M-WIWI-104520]

Responsibility: Melanie Volkamer

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

ECTS	Recurrence	Duration	Version
9	Each term	2 terms	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-109270	Human Factors in Security and Privacy (S. 355)	5	Melanie Volkamer
T-WIWI-109271	Advanced Lab User Studies in Security (S. 198)	4	Melanie Volkamer

Learning Control / Examinations
The module examination is carried out in the form of partial examinations on the selected courses of the module, with which the minimum requirement at creditpoints is fulfilled. The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

Conditions
None

Qualification Objectives
Students ...

- know why many existing security and privacy mechanisms are not usable and why many awareness/education/training approaches are not effective
- can explain for concrete examples why these are not usable / not effective including why people are likely to face problems with these
- can explain what mental models are, why they are important and how they can be identified
- know how to conduct a cognitive walkthrough to identify problems with existing mechanisms and approaches
- know how to conduct semi-structured interviews
- know how user studies in the security context differ from those conducted in other contexts
- can explain the process of human centered security / privacy by design
- know the advantages and disadvantages of various graphical password schemes
- know concepts such as just in time and place security interventions

Content
The history of information security and privacy has taught us that it takes more than technological innovation to develop effective security and privacy mechanisms: Many aspects of information security and privacy actually depend on both technical and human factors. As a result of focusing on the technical factors, we are seeing a persistent gap between theoretical security and actual security in real world which becomes an increasing problem in the age of digitalization. The gap is mainly caused by strong and actually unrealistic assumptions regarding the users' knowledge and behavior.
Human factors in security and privacy research addresses several types of security and privacy mechanisms, e.g., authentication mechanisms including text and graphical passwords, security and privacy indicators (such as the icons in the address bar of nowadays web browsers) and security and privacy interventions like warning messages, permission dialogs and security and privacy policies as well as corresponding configuration interfaces. Besides security and privacy mechanisms, human factors in security and privacy researchers deal with security and privacy awareness, education, and training approaches.
'Human factors in security & privacy' research areas are:

- identifying users' mental models using techniques such as (semi-)structured interviews or focus groups,

- evaluating existing approaches regarding their effectiveness in supporting their users in making secure decisions / informed decisions in the context of privacy using techniques such as cognitive walkthroughs, lab user studies or even field studies,
- proposing improved / new approaches and evaluating their effectiveness using the so called human-centered security / privacy by design approach.

This module discusses the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note,the main part of the exercise is replicating an interview based study. The main focus of the lab will be to replicate a quantitative based user study.

Remarks
This new module can be chosen from winter term 2018/2019.

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

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

Responsibility: Frank Schultmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102631	Planning and Management of Industrial Plants (S. 487)	5,5	Frank Schultmann

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems (S. 619)	3,5	Claus J. Bosch, Mathias Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks (S. 539)	3,5	Marcus Wiens
T-WIWI-102828	Supply Chain Management in the Automotive Industry (S. 616)	3,5	Tilman Heupel, Hendrik Lang
T-WIWI-103134	Project Management (S. 519)	3,5	Frank Schultmann

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102634	Emissions into the Environment (S. 313)	3,5	Ute Karl
T-WIWI-102882	International Management in Engineering and Production (S. 378)	3,5	Henning Sasse
T-WIWI-103133	Life Cycle Assessment (S. 401)	3,5	Heiko Keller

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

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

Qualification Objectives

- Students shall be able to describe the tasks of tactical production management with special attention drawn upon

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

Content

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

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

Workload
Total effort will account to 270 hours (9 credit points) and can be allocated according to the credit point rating. Therefore, a course with 3.5 credits requires an effort of approximately 105h and a course with 5.5 credits 165h.
The total effort for each course consists of attending lectures and tutorials, examination times and the time an average student needs to prepare himself in order to pass the exam with an average grade.

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

Responsibility: Frank Schultmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102632	Production and Logistics Management (S. 517)	5,5	Frank Schultmann

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102634	Emissions into the Environment (S. 313)	3,5	Ute Karl
T-WIWI-102882	International Management in Engineering and Production (S. 378)	3,5	Henning Sasse
T-WIWI-103133	Life Cycle Assessment (S. 401)	3,5	Heiko Keller

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems (S. 619)	3,5	Claus J. Bosch, Mathias Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks (S. 539)	3,5	Marcus Wiens
T-WIWI-102828	Supply Chain Management in the Automotive Industry (S. 616)	3,5	Tilman Heupel, Hendrik Lang
T-WIWI-103134	Project Management (S. 519)	3,5	Frank Schultmann

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

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

Qualification Objectives

- Students describe the tasks concerning general problems of an operative production and logistics management.
- Students describe the planning tasks of supply chain management.
- Students use proficiently approaches to solve general planning problems.

- Students explain the existing interdependencies between planning tasks and applied methods.
- Students describe the mail goals and set-up of software supporting tools in production and logistics management (i.e. APS, PPS-, ERP- and SCM Systems).
- Students discuss the scope of these software tools and their general disadvantages.

Content

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

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

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

M Module: Information Engineering and Management [M-WIWI-101443]

Responsibility: Andreas Geyer-Schulz, Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory

Contained in: Economics and Management

ECTS	Recurrence	Duration	Level	Version
10	Once	2 terms	4	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102638	Principles of Information Engineering and Management (S. 512)	5	Timm Teubner, Christof Weinhardt
T-WIWI-102886	Business Administration in Information Engineering and Management (S. 237)	5	Andreas Geyer-Schulz

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

Conditions
None

Qualification Objectives
The student

- understands and analyzes the central role of information as an economic good, a production factor, and a competitive factor,
- identifies, evaluates, prices, and markets information goods,
- evaluates informations flows and the value of information in an interdisciplinary context,
- works out solutions in teams,
- transfers models from Business Administration to situations in business whose basic conditions are changed due to the implementation of information and communication technology,
- applies methods from Business Administration (Decision theory, game theory, operations research, etc.) to questions of Information Engineering and Management,
- analyzes the potential to automize the decision making process in businesses by data bases,
- describes the process to extract relevant data for decision making from operational accounting systems.

Content
The module Information Engineering and Management comprises the lectures Principles of Information Engineering and Management and Business Administration in Information Engineering and Management.
In the lecture Principles of Information Engineering and Management, a clear distinction of information as a production, competitive, and economic good is introduced. The central role of information is explained through the concept of the information lifecycle. The single phases from extraction/generation through storage transformation and evaluation until the marketing and usage of information are analyzed from the business administration perspective and the microeconomic perspective. The state of the art of economic theory is presented throughout the different phases of the information lifecycle. The lecture is complemented by accompanying exercise courses.
In the lecture Business Administration in Information Engineering and Management, classical Business Administration is applied to businesses in an information- and communicationtechnological environment. The process to extract relevant

data for decision making from operational accounting systems receives special attention. In order to do so, topics such as activity-based costing and transaction costs models are addressed. The automization of the decision making process in businesses by data bases is another focus of the module. To solve such issues within a company, relevant methods such as decision theory and game theory are lectured. Finally, complex business relevant questions in a dynamically changing environment are adressed by presenting models and methods from system dynamics.

M Module: Information Systems in Organizations [M-WIWI-104068]

Responsibility: Alexander Mädche

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-105777	Business Intelligence Systems (S. 245)	4,5	Alexander Mädche, Mario Nadj, Peyman Toreini
T-WIWI-106201	Digital Transformation of Organizations (S. 303)	4,5	Alexander Mädche
T-WIWI-108461	Interactive Information Systems (S. 375)	4,5	Alexander Mädche, Stefan Morana
T-WIWI-108437	Practical Seminar: Information Systems and Service Design (S. 505)	4,5	Norbert Koppenhagen, Alexander Mädche

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

Conditions
None

Qualification Objectives
The student

- has a comprehensive understanding of conceptual and theoretical foundations of informations systems in organizations
- is aware of the most important classes of information systems used in organizations:. process-centric, information-centric and people-centric information systems.
- knows the most important activities required to execute in the pre-implementation, implementation and post-implementation phase of information systems in organizations in order to create business value
- has a deep understanding of key capabilities of business intelligence systems and/or interactive information systems used in organizations

Content
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, companies have to rethink their way of doing business, from an internal as well as an external digitalization perspective.
This module focuses on the internal digitalization perspective. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for information systems in organizations. The students get the necessary knowledge to guide the successful digitalization of organizations. Each lecture in the module is accompanied with a capstone project that is carried out in cooperation with an industry partner.

Remarks
New module starting summer term 2018.

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

M Module: Innovation Management [M-WIWI-101507]

Responsibility: Marion Weissenberger-Eibl

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

Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods (S. 368)	3	Marion Weissenberger-Eibl

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102873	Current Issues in Innovation Management (S. 277)	3	Marion Weissenberger-Eibl
T-WIWI-102852	Case Studies Seminar: Innovation Management (S. 251)	3	Marion Weissenberger-Eibl
T-WIWI-108774	Analyzing and Evaluating Innovation Processes (S. 213)	3	Daniela Beyer, Marion Weissenberger-Eibl
T-WIWI-102853	Roadmapping (S. 541)	3	Daniel Jeffrey Koch
T-WIWI-102858	Technology Assessment (S. 629)	3	Daniel Jeffrey Koch
T-WIWI-102854	Technologies for Innovation Management (S. 628)	3	Daniel Jeffrey Koch

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102873	Current Issues in Innovation Management (S. 277)	3	Marion Weissenberger-Eibl
T-WIWI-102866	Design Thinking (S. 293)	3	Orestis Terzidis
T-WIWI-108875	Digital Transformation and Business Models (S. 302)	3	Daniel Jeffrey Koch
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management (S. 326)	3	Carsten Linz, Orestis Terzidis
T-WIWI-102864	Entrepreneurship (S. 327)	3	Orestis Terzidis
T-WIWI-102852	Case Studies Seminar: Innovation Management (S. 251)	3	Marion Weissenberger-Eibl
T-WIWI-108774	Analyzing and Evaluating Innovation Processes (S. 213)	3	Daniela Beyer, Marion Weissenberger-Eibl
T-WIWI-102853	Roadmapping (S. 541)	3	Daniel Jeffrey Koch
T-WIWI-102854	Technologies for Innovation Management (S. 628)	3	Daniel Jeffrey Koch
T-WIWI-102858	Technology Assessment (S. 629)	3	Daniel Jeffrey Koch

Learning Control / Examinations
See German version.

Conditions
The lecture "Innovation Management: Concepts, Strategies and Methods" and one of the seminars of the chair for Innovation and Technology Management are compulsory. The third course can be chosen from the courses of the module.

Qualification Objectives
Students develop a comprehensive understanding of the innovation process and its conditionality. There is an additional focus on the concepts and processes which are of particular relevance with regard to shaping the entire process. Various strategies and methods are then taught based on this.
After completing the module, students should have developed a systemic understanding of the innovation process and be able to shape this by developing and applying suitable methods.

Content
The Innovation Management: Concepts, Strategies and Methods lecture course teaches concepts, strategies and methods which help students to form a systemic understanding of the innovation process and how to shape it. Building on this holistic understanding, the seminar courses then go into the subjects in greater depth and address specific processes and methods which are central to innovation management.

Recommendations
None

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

M Module: Insurance Management I [M-WIWI-101469]

Responsibility: Ute Werner

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102603	Principles of Insurance Management (S. 514)	4,5	Ute Werner
T-WIWI-102601	Insurance Marketing (S. 369)	4,5	Edmund Schwake
T-WIWI-102648	Insurance Production (S. 370)	4,5	Ute Werner
T-WIWI-102637	Current Issues in the Insurance Industry (S. 278)	2	Wolf-Rüdiger Heilmann
T-WIWI-102636	Insurance Risk Management (S. 371)	2,5	Harald Maser
T-WIWI-102797	P&C Insurance Simulation Game (S. 475)	3	Ute Werner
T-WIWI-102649	Risk Communication (S. 538)	4,5	Ute Werner
T-WIWI-102841	Modelling, Measuring and Managing of Extreme Risks (S. 443)	2,5	Ute Werner

Learning Control / Examinations
From 01.10.2017 (winter term 2017/2018) the module is no longer available.
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
None

Qualification Objectives
See German version.

Content
See German version.

Remarks
Please note:

- T-WIWI-102636Insurance Risk Managementwill be offered as a seminar startingsummer term2017.
- T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on;
- T-WIWI-102603Principles of Insurance Managementwill be offered latest until summer term 2017 (beginners only);
- T-WIWI-102648Insurance Productionwill be offered latest until summer term 2017 (beginners only);
- T-WIWI-102636Insurance Risk Managementwill be offered latest until summer term 2017 (beginners only);
- T-WIWI-102649Risk Communication will be offered latest until winterterm 2017/2018 (beginners only);
- T-WIWI-102841Modelling, Measuring and Managing of Extreme Riskswill be offered latest until summer term 2017 (beginners only).

Workload
See German version.

M Module: Insurance Management II [M-WIWI-101449]

Responsibility: Ute Werner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102601	Insurance Marketing (S. 369)	4,5	Edmund Schwake
T-WIWI-102648	Insurance Production (S. 370)	4,5	Ute Werner
T-WIWI-102637	Current Issues in the Insurance Industry (S. 278)	2	Wolf-Rüdiger Heilmann
T-WIWI-102636	Insurance Risk Management (S. 371)	2,5	Harald Maser
T-WIWI-102649	Risk Communication (S. 538)	4,5	Ute Werner
T-WIWI-102797	P&C Insurance Simulation Game (S. 475)	3	Ute Werner
T-WIWI-102603	Principles of Insurance Management (S. 514)	4,5	Ute Werner
T-WIWI-102841	Modelling, Measuring and Managing of Extreme Risks (S. 443)	2,5	Ute Werner

Learning Control / Examinations
From 01.10.2017 (winter term 2017/2018) the module is no longer available.
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
It is only possible to choose this module in combination with the module *Insurance Management I*. The module is passed only after the final partial exam of *Insurance Management I* has been passed.

Modeled Conditions
The following conditions must be met:

- The module [M-WIWI-101469] *Insurance Management I* must have been started.

Qualification Objectives
See German version.

Content
See German version.

Recommendations
The courses chosen from the modules Insurance Management I or Insurance Management II are supposed to complement each other. Advice and information is available from the person responsible for the examination process at the Insurance Department of FBV.

Remarks
Please note:

- T-WIWI-102636 Insurance Risk Management will be offered as a seminar starting summer term 2017.

- T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on;
- T-WIWI-102603 Principles of Insurance Management will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102648 Insurance Production will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102636 Insurance Risk Management will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102649 Risk Communication will be offered latest until winter term 2017/2018 (beginners only);
- T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks will be offered latest until summer term 2017 (beginners only).

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

M Module: Intelligent Risk and Investment Advisory [M-WIWI-103247]

Responsibility: Maxim Ulrich

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

Contained in: Economics and Management
Additional Examinations

ECTS	Recurrence	Duration	Language	Version
9	Each term	1 term	English	3

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106442	Building Intelligent and Robo-Adviced Portfolios (S. 236)	9	Maxim Ulrich
T-WIWI-107032	Computational Risk and Asset Management I (S. 259)	4,5	Maxim Ulrich
T-WIWI-106494	Computational Risk and Asset Management II (S. 260)	4,5	Maxim Ulrich
T-WIWI-106193	Engineering FinTech Solutions (S. 325)	4,5	Maxim Ulrich

Learning Control / Examinations
In winter semester 2018/2019 no exam for the courses "Building Intelligent and Robo-Adviced Portfolios" and "Computational Risk and Asset Management I / II" will be offered.
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
None.

Qualification Objectives
Students obtain a practical and yet research oriented introduction into the field of quantitative and computational risk and investment management. Students learn how to use concepts from computer science, statistics, OR and economics to build intelligent risk and investment systems. Based on personal preferences, students can specialize within the module on either more practical programming and statistical learning points or more on the economic and mathematical insights and intuition.
After successful completion of the module, students know the industry intuition as well as state-of-the-art academic 'financial engineering' methods necessary to successfully contribute to sustainable and value oriented innovations in the field of intelligent risk and investment advisory.

Content
See respective lecture

Recommendations
None

Remarks
See respective lecture

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

M Module: Intelligent Systems and Services [M-WIWI-101456]

Responsibility: York Sure-Vetter

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

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102661	Database Systems and XML (S. 286)	5	Andreas Oberweis
T-WIWI-106423	Information Service Engineering (S. 366)	5	Harald Sack
T-WIWI-102666	Knowledge Discovery (S. 391)	5	York Sure-Vetter
T-WIWI-103523	Advanced Lab Informatics (S. 194)	4	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner
T-WIWI-105801	Service Oriented Computing (S. 583)	5	York Sure-Vetter
T-WIWI-108751	Special Topics of Web Science (S. 607)	5	York Sure-Vetter

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.
Algorithms for Internet Applications [T-WIWI-102658]: The examination will be offered latest until summer term 2017 (repeaters only).

Conditions
None

Qualification Objectives
Students

- know the different machine learning procedures for the supervised as well as the unsupervised learning,
- identify the pros and cons of the different learning methods,
- apply the discussed network learning methods in specific scenarios,
- compare the practicality of methods and algorithms with alternative approaches.

Content
In the broader sense learning systems are understood as biological organisms and artificial systems which are able to change their behavior by processing outside influences. Network leaning methods based on symbolic, statistic and neuronal approaches are the focus of Computer Sciences.
In this module the most important network learning methods are introduced and their applicability is discussed with regard to different information sources such as data texts and images considering especially procedures for knowledge acquirement via data and text mining, natural analogue procedures as well as the application of organic learning procedures within the finance sector.

M Module: Machine Learning [M-WIWI-103356]

Responsibility: Johann Marius Zöllner

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

ECTS	Recurrence	Duration	Version
9	Each term	1 term	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106340	Machine Learning 1 - Basic Methods (S. 404)	5	Johann Marius Zöllner
T-WIWI-106341	Machine Learning 2 – Advanced Methods (S. 406)	5	Johann Marius Zöllner
T-WIWI-103523	Advanced Lab Informatics (S. 194)	4	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

Learning Control / Examinations
The module examination is carried out in the form of partial examinations on the selected courses of the module, with which the minimum requirement at creditpoints is fulfilled. The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

Conditions
None

Modeled Conditions
The following conditions must be met:

1. The module [M-INFO-100817] *Machine Learning 1 - Basic Methods* must not have been started.
2. The module [M-INFO-100855] *Machine Learning 2 - Advanced Methods* must not have been started.

Qualification Objectives

- 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 1" covers both symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as subsymbolic techniques such as neural networks, support vector machines, genetics Algorithms and reinforcement learning. The lecture introduces the basic principles as well as fundamental structures of learning systems and the learning theory and examines the previously developed algorithms. The design and operation of learning systems is presented and explained in some examples, especially in the fields of robotics, autonomous mobile systems and image processing.

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.).

Remarks
This new module can be chosen from summer term 2017.

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

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

Responsibility: Marcus Wouters

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102800	Management Accounting 1 (S. 410)	4,5	Marcus Wouters
T-WIWI-102801	Management Accounting 2 (S. 411)	4,5	Marcus Wouters

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

Conditions
None

Qualification Objectives
Students
- are familiar with various management accounting methods,
- can apply these methods for cost estimation, profitability analysis, and product costing,
- are able to analyze short-term and long-decisions with these methods,
- have the capacity to devise instruments for organizational control.

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

Remarks
The following courses are part of this module:

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

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

M Module: Market Engineering [M-WIWI-101446]

Responsibility: Christof Weinhardt

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

Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102640	Market Engineering: Information in Institutions (S. 415)	4,5	Christof Weinhardt

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102613	Auction Theory (S. 224)	4,5	Karl-Martin Ehrhart
T-WIWI-108880	Blockchains & Cryptofinance (S. 234)	4,5	Philipp Schuster, Marliese Uhrig-Homburg
T-WIWI-102600	eFinance: Information Engineering and Management for Securities Trading (S. 310)	4,5	Christof Weinhardt
T-WIWI-107501	Energy Market Engineering (S. 318)	4,5	Christof Weinhardt
T-WIWI-107503	Energy Networks and Regulation (S. 320)	4,5	Christof Weinhardt
T-WIWI-102614	Experimental Economics (S. 332)	4,5	Jella Pfeiffer, Christof Weinhardt

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

Conditions
The course *Market Engineering: Information in Institutions* [2540460] is compulsory and must be examined.

Qualification Objectives
The students

- know the design criterias of market mechanisms and the systematic approach to create new markets,
- understand the basics of the mechanism design and auction theory,
- analyze and evaluate existing markets regarding the missing incentives and the optimal solution of a given market mechanism, respectively,
- develop solutions in teams.

Content
This module explains the dependencies between the design von markets and their success. Markets are complex interaction of different institution and participants in a market behave strategically according to the market rules. The development and the design of markets or market mechanisms has a strong influence on the behavior of the participants. A systematic

approach and a thorough analysis of existing markets is inevitable to design, create and operate a market place successfully. the approaches for a systematic analysis are explained in the mandatory course *Market Engineering* [2540460] by discussing theories about mechanism design and institutional economics. The student can deepen his knowledge about markets in a second course.

Recommendations
None

Remarks
The course "Computational Economics" [2590458] will not be offered any more in this module from winter term 2015/2016 on. The examination will be offered latest until summer term 2016 (repeaters only).

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

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

Responsibility: Martin Klarmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

ECTS	Recurrence	Duration	Version
9	Each summer term	1 term	9

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

Identifier	Course	ECTS	Responsibility
T-WIWI-107720	Market Research (S. 417)	4,5	
T-WIWI-102883	Pricing (S. 511)	4,5	Sven Feurer
T-WIWI-102812	Product and Innovation Management (S. 516)	3	Martin Klarmann

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106137	Country Manager Simulation (S. 273)	1,5	Sven Feurer
T-WIWI-102835	Marketing Strategy Business Game (S. 420)	1,5	Martin Klarmann
T-WIWI-102842	Strategic Brand Management (S. 611)	1,5	Joachim Blickhäuser, Martin Klarmann

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.
When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
None

Qualification Objectives
Students
- have an advanced knowledge about central marketing contents
- have a fundamental understanding of the marketing instruments
- know and understand several strategic concepts and how to implement them
- are able to implement their extensive marketing knowledge in a practical context
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the Marketing department

Content
The aim of this module is to deepen central marketing contents in different areas. Therefore the students can choose between the following marketing courses:

- Product and Innovation Marketing
- Market Research – this course has to be completed successfully by students interested in seminar or master thesis positions at the chair of marketing

- Marketing Strategy Business Game
- Strategic Brand Management

Remarks
Please note that only one of the listed 1,5-ECTS courses can be chosen in the Marketing Management module.

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

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

Responsibility: Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102719	Mixed Integer Programming I (S. 431)	4,5	Oliver Stein
T-WIWI-102726	Global Optimization I (S. 345)	4,5	Oliver Stein
T-WIWI-103638	Global optimization I and II (S. 347)	9	Oliver Stein
T-WIWI-102856	Convex Analysis (S. 268)	4,5	Oliver Stein
T-WIWI-102724	Nonlinear Optimization I (S. 460)	4,5	Oliver Stein
T-WIWI-103637	Nonlinear Optimization I and II (S. 462)	9	Oliver Stein
T-WIWI-102855	Parametric Optimization (S. 480)	4,5	Oliver Stein

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106548	Advanced Stochastic Optimization (S. 200)	4,5	Steffen Rebennack
T-WIWI-102720	Mixed Integer Programming II (S. 434)	4,5	Oliver Stein
T-WIWI-102727	Global Optimization II (S. 349)	4,5	Oliver Stein
T-WIWI-102723	Graph Theory and Advanced Location Models (S. 351)	4,5	Stefan Nickel
T-WIWI-106549	Large-scale Optimization (S. 397)	4,5	Steffen Rebennack
T-WIWI-102725	Nonlinear Optimization II (S. 464)	4,5	Oliver Stein
T-WIWI-102715	Operations Research in Supply Chain Management (S. 471)	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
There is no compulsory course in the module.

Qualification Objectives
The student

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
- knows the indispensable methods and models for quantitative analysis,

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

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

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

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

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

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102609	Advanced Topics in Economic Theory (S. 201)	4,5	Kay Mitusch
T-WIWI-102861	Advanced Game Theory (S. 192)	4,5	Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß
T-WIWI-102859	Social Choice Theory (S. 595)	4,5	Clemens Puppe
T-WIWI-102613	Auction Theory (S. 224)	4,5	Karl-Martin Ehrhart
T-WIWI-105781	Incentives in Organizations (S. 362)	4,5	Petra Nieken

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

Conditions
None

Qualification Objectives
Students

- are able to model practical microoeconomic problems mathematically and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs.

An example of a positive question is: which regulation policy results in which firm decistions under imperfect competition? An example of a normative question is: which voting rule has appealing properties?

Content
The student should gain an understanding of advanced topics in economic theory, game theory and welfare economics. Core topics are, among others, strategic interactions in markets, cooperative and non-cooperative bargaining (Advanced Game Theory), allocation under asymmetric information and general equilibrium over time (Advanced Topics in Economic Theory), voting and the aggregation of preferences and judgements (Social Choice Theory).

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

M Module: Module Master Thesis [M-WIWI-101656]

Responsibility: Sebastian Abeck, Hagen Lindstädt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory

Contained in: Master Thesis

ECTS	Language	Version
30	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-103142	Master Thesis (S. 425)	30	Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

Learning Control / Examinations
Examination by two examiners from the two faculties. For details refer to examination regulation. The examiner has to be involved in the degree programme. Involved in the degree programme are the persons that coordinate a module or a lecture of the degree programme.

Conditions
Regulated in §11 of the examination regulation.
The requirements for the examiner are described in §14 (2) of the examination regulation.

Qualification Objectives
The student can independently handle a complex and unfamiliar subject based on scientific criteria and the current state of research.
He/she is in a position to critically analyze and structure the researched information as well as derive principles and regularities. He/she knows how to apply the thereby achieved results to solve the task at hand. Taking into account this knowledge and his/her interdisciplinary knowledge, he/she can draw own conclusions, derive improvement potentials, propose and implement science-based decisions.
This is basically also done under consideration of social and/or ethical aspects.
He/she can interpret, evaluate and if required, graphically present the obtained results.
He/she is in a position to sensibly structure a research paper, document results and clearly communicate the results in scientific form.

Content

- The master thesis shows that the candidate can autonomously investigate a problem from his discipline with scientific methods according to the state-of-the-art of the discipline within a specified time period.
- The master thesis can be written in German or English.
- The topic of a master thesis can be accepted or chosen by each of the examiners according to examination regulation. The examiner accepting a topic for a master thesis acts as the first supervisor of this thesis.
- Writing a master thesis with a supervisor who is not a member of the two faculties participating in the degree programme (Departement of Informatics, Department of Economics and Management) requires acceptance by the examination board of the degree programme. The candidate must have an opportunity to make suggestions for the topic of the master thesis.
- Candidates can write a master thesis in teams. However, this requires that the contribution and performance of each candidate to the thesis is identifiable according to objective criteria which allow a unique delineation of each candidate's contribution. The contribution of each candidate regarded in isolation must fulfill the requirements a individual master thesis.
- In exceptional cases and upon request of the candidate, the chairman of the examination board chooses a supervisor and requests that this supervisor provides the candidate with a topic for the master thesis within 4 weeks after the request. In this case, the candidate is informed by the chairman of the examination board about the topic selected.

- Topic, specification of research tasks and the volume of the master thesis should be limited by the supervisor, so that the master thesis can be written with the assigned workload of 30 credits (750-900h).
- The master thesis must contain the following declaration of the candidate: "I truthfully assure that I have autonomously written this master thesis. I have quoted all sources used precisely and completely. I have labelled everything which has been taken from the work of others with or without change." A master thesis without this declaration will not be accepted.
- The date of the assignment of the topic to a candidate as well as the date of delivery of the master thesis should be registered at the examination board. The candidate can return a topic for the master thesis only one time and only within a period of two month after he has received the topic. Upon a request of the candidate with reasons supporting an extension, the examination board may extend the deadline for the delivery of the master thesis by a maximum of three months. A master thesis not delivered within time is graded as "fail" except when the candidate is not responsible for this delay (e.g. protection of motherhood).
- The master thesis is reviewed and graded by the supervisor and the additional examiner. The team of supervisor and examiner must represent both faculties participating in the degree programme (Department of Informatics, Department of Economics and Management). At least one of the two must be professor or junior professor. If the grades of the supervisor and the examiner differ, the examination board sets the mark within this limit.
- Reviewing and grading should be done within 8 weeks after delivery of the master thesis.

Workload
The total workload for this module is approximately 900 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: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102723	Graph Theory and Advanced Location Models (S. 351)	4,5	Stefan Nickel
T-WIWI-106200	Modeling and OR-Software: Advanced Topics (S. 441)	4,5	Stefan Nickel
T-WIWI-102715	Operations Research in Supply Chain Management (S. 471)	4,5	Stefan Nickel

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106546	Introduction to Stochastic Optimization (S. 386)	4,5	Steffen Rebennack
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics (S. 305)	4,5	Stefan Nickel
T-WIWI-102719	Mixed Integer Programming I (S. 431)	4,5	Oliver Stein
T-WIWI-102720	Mixed Integer Programming II (S. 434)	4,5	Oliver Stein
T-WIWI-106549	Large-scale Optimization (S. 397)	4,5	Steffen Rebennack
T-WIWI-102704	Facility Location and Strategic Supply Chain Management (S. 333)	4,5	Stefan Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management (S. 623)	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
There is no compulsory course in the module.

Qualification Objectives
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of SCM and their respective optimization problems,
- is acquainted with classical location problem models (in planes, in networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,

- is 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 toOperations Research*[WI1OR] is assumed.

Remarks
Some lectures and courses are offered irregularly.
The planned lectures and courses for the next three years are announced online.

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

Responsibility: Steffen Rebennack

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Economics and Management

ECTS	Recurrence	Duration	Version
5	Each winter term	1 term	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-106545	Optimization under uncertainty (S. 473)	5	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

Qualification Objectives
The students are familiar with the modern concepts of stochastic modeling and are in a position to describe and to analyse simple systems in an adequate way.

Content
Markov chains are no longer a nice theory but an important tool in order to model, analyse, and optimize a stochastic system as it evolves over time.
Topics overview: Markov chains, Poisson Processes.

Remarks
New module starting summer term 2017.
The planned lectures and courses for the next two years are announced online (http://www.ior.kit.edu/)

Workload
See German version.

M Module: Sales Management [M-WIWI-101487]

Responsibility: Martin Klarmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

ECTS	Recurrence	Duration	Version
9	Each winter term	1 term	6

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102890	Sales Management and Retailing (S. 547)	3	Martin Klarmann

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106137	Country Manager Simulation (S. 273)	1,5	Sven Feurer
T-WIWI-102834	Case Studies in Sales and Pricing (S. 250)	1,5	Martin Klarmann
T-WIWI-106981	Digital Marketing and Sales in B2B (S. 297)	1,5	Anja Konhäuser
T-WIWI-102891	Price Negotiation and Sales Presentations (S. 510)	1,5	Martin Klarmann, Mark Schröder

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

Identifier	Course	ECTS	Responsibility
T-WIWI-107720	Market Research (S. 417)	4,5	
T-WIWI-102883	Pricing (S. 511)	4,5	Sven Feurer

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

Conditions
The course "Sales Management and Retailing" is compulsory.

Qualification Objectives
Students

- have an advanced knowledge about sales management (design and structure of sales systems, relationship with sales partners and important customers)
- have a fundamental understanding of price management (in particular consumer behavior of pricing, pricing strategy, price determination)
- are able to handle particularities and challenges in sales management
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- are able to implement their extensive sales and pricing knowledge in a practical context
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the sales department

Content
The aim of the module is to deepen the sales management knowledge of the students. Theoretical approaches often have a combined view on marketing and sales, whereas in practical surroundings the sales department is completely separated from the marketing tasks. Given this fact, we concentrate on pure sales management topics and address different facets of the sales management.

Remarks
For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu).

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

M Module: Semantic Technologies [M-WIWI-101457]

Responsibility: York Sure-Vetter

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

ECTS	Recurrence	Duration	Level	Version
8	Once	1 term	4	1

Wahlplfichtangebot
Non-Compulsory Block; You must choose between 8 and 10 credits.

Identifier	Course	ECTS	Responsibility
T-WIWI-102874	Semantic Web Technologies (S. 554)	5	York Sure-Vetter
T-WIWI-103112	Web Science (S. 643)	5	York Sure-Vetter
T-WIWI-103523	Advanced Lab Informatics (S. 194)	4	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner
T-WIWI-103480	Seminar in Informatics B (Master) (S. 564)	3	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions
None

Qualification Objectives
The student

- understands the koncepts behind Semantic Web and Linked Data technologies
- develops ontologies to be employed in semantic web-based applications and chooses suitable representation languages,
- is familiar with approaches in the area of knowledge representation and modelling,
- is able to transfer the methods and technologies of semantic web technologies to new application sectors,
- evaluates the potential of semantic web for new application sectors,
- understands the challenges in the areas of Data and system integration on the web is able to develop solutions.

Content
The module Semantic Technologies covers the basics, methods and applications for intelligent systems in the World Wide Web. Fundamental to this are the scalable provision of knowledge, the provision of data as linked data, and methods for analyzing networks.Formal basics and practical aspects such as knowledge modelling and available tools for representation languages for ontologies are dealt with in detail. Methods for implementing intelligent systems on the World Wide Web will also be clarified and applications such as Web 2.0 or Service Science will be discussed and evaluated.Furthermore, methods for network analysis and the resulting findings are taught. These findings can be used to design recommendation systems and explain social networking phenomena. A variety of procedures exist to identify patterns that, if interpreted valuable, may provide previously unknown insights. This information can be predictive or descriptive.

Workload
The total workload for this module is approximately 240 hours. For further information see German version.

M Module: Seminar Module Economic Sciences [M-WIWI-102736]

Responsibility: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Research Course

ECTS	Language	Version
3	German	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-103474	Seminar in Business Administration A (Master) (S. 556)	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. 562)	3	Johannes Brumm, Jan Kowalski, Kay Mitusch, Ingrid Ott, Clemens Puppe, Johannes Philipp Reiß, Nora Szech, Berthold Wigger
T-WIWI-103481	Seminar in Operations Research A (Master) (S. 567)	3	Stefan Nickel, Steffen Rebennack, Oliver Stein
T-WIWI-103483	Seminar in Statistics A (Master) (S. 569)	3	Oliver Grothe, Melanie Schienle

Learning Control / Examinations
The assessment is done by a seminar with at least 3 CP.
The assessment of the seminar (following §4(2), 3 ER) is described at the course description.

Conditions
None.

Qualification Objectives

- Students are able to independently deal with a defined problem in a specialized field based on scientific criteria.
- They are able to research, analyze the information, abstract and derive basic principles and regularities from unstructured information.
- They can solve the problems in a structured manner using their interdisciplinary know-how.
- They know how to validate the obtained results.
- Finally, they are able to logically and systematically present the results both orally and in written form in accordance

with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Content
The module consists of a seminar, that is related to the research field of economic sciences. A complete list of available seminars is published in the internet.

Remarks
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are publishedat the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

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

M Module: Service Analytics [M-WIWI-101506]

Responsibility: Hansjörg Fromm, Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-108715	Artificial Intelligence in Service Systems (S. 221)	4,5	Gerhard Satzger
T-WIWI-105777	Business Intelligence Systems (S. 245)	4,5	Alexander Mädche, Mario Nadj, Peyman Toreini
T-WIWI-102822	Industrial Services (S. 364)	4,5	Hansjörg Fromm
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R (S. 439)	4,5	Verena Dorner, Jella Pfeiffer, Christof Weinhardt
T-WIWI-105778	Service Analytics A (S. 576)	4,5	Hansjörg Fromm, Thomas Setzer
T-WIWI-102706	Special Topics in Information Engineering & Management (S. 604)	4,5	Christof Weinhardt

Learning Control / Examinations
The course T-WIWI-105779 "Service Analytics B - Enterprise Data Reduction and Prediction" will be discontinued in the winter semester 2018/2019.
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
None

Qualification Objectives
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or

transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.
It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Recommendations
The courses Service Analytics A [2595501] or Service Analytics B [2540498] should be applied.

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

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

M Module: Service Computing [M-WIWI-102827]

Responsibility: York Sure-Vetter

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

ECTS	Language	Level	Version
9	German	4	1

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102874	Semantic Web Technologies (S. 554)	5	York Sure-Vetter
T-WIWI-105801	Service Oriented Computing (S. 583)	5	York Sure-Vetter
T-WIWI-102666	Knowledge Discovery (S. 391)	5	York Sure-Vetter
T-WIWI-103112	Web Science (S. 643)	5	York Sure-Vetter
T-WIWI-103523	Advanced Lab Informatics (S. 194)	4	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner
T-WIWI-102670	Practical Seminar Knowledge Discovery (S. 499)	4	York Sure-Vetter

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

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

Conditions
None.

Qualification Objectives
Students

- demonstrates basic competency in the areas of data and system integration on the web
- learn new Web-based architectures and applications, as well as concepts related to Web 2.0, Cloud Computing and Semantic Web
- know the different machine learning procedures for the supervised as well as the unsupervised learning
- learn methods regarding network theory and network analysis

Content
Services can be considered from different perspectives. Computer Science considers Services and Web Services traditionally as a piece of software, which fulfills a specific task. By the permanent rise of Cloud Applications, these services become more important. The offered Services and their functionalities have to be described sufficiently in order to be detectable. In this module the most important network learning methods are introduced and their applicability is discussed with regard to different information sources
Furthermore, network analysis is presented, as well as architectures and descriptions for Services.
Thereby, the practical usability of the presented methods and algorithms in their particular fields of application are compared.

Recommendations
None

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

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

M Module: Service Design Thinking [M-WIWI-101503]

Responsibility: Gerhard Satzger, Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102849	Service Design Thinking (S. 579)	9	Gerhard Satzger, Christof Weinhardt

Learning Control / Examinations
The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

Conditions
None

Qualification Objectives

- Deep knowledge of the innovation method Design Thinking, as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Learn to apply the method to a real innovation projects issued by industry partners.

Content

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (intern. Design Thinking network).
- Design Space Exploration: Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are in the focus of this phase.
- Funky Prototype: Integration of the individually tested and successful functions to several complete solution scenarios, which are further tested and developed.
- Functional Prototype: Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is lade out in detail and tested with users.
- Final Prototype: Implementing the functional prototype and presenting it to the customer.

Recommendations
This course is held in English – proficiency in writing and communication is required.
Our past students recommend to take this course at the beginning of the masters program.

Remarks
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems". For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

Workload
Workload for this course is comparably high as the course runs in cooperation with partner universities from around the world as well as partner companies. This causes overhead.

M Module: Service Economics and Management [M-WIWI-102754]

Responsibility: Gerhard Satzger, Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102881	Business and IT Service Management (S. 239)	4,5	Gerhard Satzger
T-WIWI-102640	Market Engineering: Information in Institutions (S. 415)	4,5	Christof Weinhardt
T-WIWI-106201	Digital Transformation of Organizations (S. 303)	4,5	Alexander Mädche

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

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

Conditions
None

Qualification Objectives
Students

- understand the scientific basics of the management of digital services and corresponding systems
- gain a comprehensive insight in the importance and the most important features of information systems as an central component of the digitalization of business processes, products and services
- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully
- understand the OR methods in the sector of service management and apply them adequately
- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems
- are able to develop market-oriented coordination mechanisms and apply service systems.

Content
This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

Recommendations
None

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

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

M Module: Service Innovation, Design & Engineering [M-WIWI-102806]

Responsibility: Alexander Mädche, Gerhard Satzger

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-105773	Digital Service Design (S. 299)	4,5	Alexander Mädche
T-WIWI-102639	Business Models in the Internet: Planning and Implementation (S. 247)	4,5	Timm Teubner
T-WIWI-108437	Practical Seminar: Information Systems and Service Design (S. 505)	4,5	Norbert Koppenhagen, Alexander Mädche
T-WIWI-102799	Practical Seminar Service Innovation (S. 500)	4,5	Gerhard Satzger
T-WIWI-102641	Service Innovation (S. 581)	4,5	Gerhard Satzger

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

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

Conditions
Dependencies between courses:
The course Practical Seminar Service Innovation cannot be applied in combination with the course Practical Seminar Digital Service Design.

Qualification Objectives
Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.
- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.
- are able to embed the concepts of innovation management, development and design of services into organisations
- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation
- elaborate concrete and problem-solving solutions for practical tasks in teams.

Content
This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the

implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

Recommendations
Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].
Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

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

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

M Module: Service Management [M-WIWI-101448]

Responsibility: Gerhard Satzger, Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102881	Business and IT Service Management (S. 239)	4,5	Gerhard Satzger

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

Identifier	Course	ECTS	Responsibility
T-WIWI-108715	Artificial Intelligence in Service Systems (S. 221)	4,5	Gerhard Satzger
T-WIWI-106201	Digital Transformation of Organizations (S. 303)	4,5	Alexander Mädche
T-WIWI-102822	Industrial Services (S. 364)	4,5	Hansjörg Fromm
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R (S. 439)	4,5	Verena Dorner, Jella Pfeiffer, Christof Weinhardt
T-WIWI-105778	Service Analytics A (S. 576)	4,5	Hansjörg Fromm, Thomas Setzer
T-WIWI-102641	Service Innovation (S. 581)	4,5	Gerhard Satzger

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

Conditions
The course *Business and IT Service Management* [2590484] is compulsory and must be examined.

Qualification Objectives
The students

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- systematically use vast amounts of available data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

Content
The module service management addresses the basics of developing and managing IT-based services. The lectures contained in this module teach the basics of developing and managing IT-based services and the application of OR methods in the field of service management. Moreover, students learn to systematically analyze vast amounts of data for planning, operation and improvement for complex service offerings. These tools enhance operational and strategic

decision support and help to analyze and understand the overall innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

Recommendations
None

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

M Module: Service Operations [M-WIWI-102805]

Responsibility: Stefan Nickel

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

ECTS	Recurrence	Duration	Language	Level	Version
9	Each term	1 term	German	4	5

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics (S. 305)	4,5	Stefan Nickel
T-WIWI-102884	Operations Research in Health Care Management (S. 470)	4,5	Stefan Nickel
T-WIWI-102715	Operations Research in Supply Chain Management (S. 471)	4,5	Stefan Nickel
T-WIWI-102716	Practical Seminar: Health Care Management (with Case Studies) (S. 504)	4,5	Stefan Nickel

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102860	Supply Chain Management in the Process Industry (S. 617)	4,5	Stefan Nickel
T-WIWI-102872	Challenges in Supply Chain Management (S. 252)	4,5	Esther Mohr

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

Conditions
There is no compulsory course in the module.

Qualification Objectives
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.
It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Recommendations
The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.

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

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

M Module: Stochastic Modelling and Optimization [M-WIWI-101657]

Responsibility: Karl-Heinz Waldmann

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

Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106546	Introduction to Stochastic Optimization (S. 386)	4,5	Steffen Rebennack
T-WIWI-102628	Optimization in a Random Environment (S. 472)	4,5	Karl-Heinz Waldmann
T-WIWI-102730	OR-Oriented Modeling and Analysis of Real Problems (Project) (S. 474)	4,5	Karl-Heinz Waldmann
T-WIWI-102728	Quality Control I (S. 526)	4,5	Karl-Heinz Waldmann
T-WIWI-102729	Quality Control II (S. 527)	4,5	Karl-Heinz Waldmann
T-WIWI-102627	Simulation I (S. 590)	4,5	Karl-Heinz Waldmann
T-WIWI-102703	Simulation II (S. 591)	4,5	Karl-Heinz Waldmann
T-WIWI-102711	Markov Decision Models II (S. 424)	4,5	Karl-Heinz Waldmann

Learning Control / Examinations
The module ist 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-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: Stochastic Models in Information Engineering and Management [M-WIWI-101444]

Responsibility: Karl-Heinz Waldmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory

Contained in: Economics and Management

ECTS	Recurrence	Duration	Level	Version
5	Each winter term	1 term	4	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102710	Markov Decision Models I (S. 423)	5	Karl-Heinz Waldmann

Learning Control / Examinations
The module is not offered from winter term 2017/2018. The module is replaced by the module M-WIWI-103243 "Optimization under uncertainty in Information Engineering and Management".
The assessment of the module is in a written examination according to §4(2), 1 of the examination regulation of the Bachelor programme in Information Engineering and Management. In each term (usually in March and July), one examination is held for both courses. The grade of the module corresponds to the grade of this examination

Conditions
None

Qualification Objectives
The students are familiar with the modern concepts of stochastic modeling and are in a position to describe and to analyse simple systems in an adequate way.

Content
Markov chains are no longer a nice theory but an important tool in order to model, analyse, and optimize a stochastic system as it evolves over time.
Topics overview: Markov chains, Poisson Processes.

Remarks
The examination 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/)

Workload
See German version.

M Module: Stochastic Optimization [M-WIWI-103289]

Responsibility: Steffen Rebennack

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

Contained in: Economics and Management
Additional Examinations

ECTS	Recurrence	Duration	Version
9	Each term	1 term	5

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

Identifier	Course	ECTS	Responsibility
T-WIWI-106546	Introduction to Stochastic Optimization (S. 386)	4,5	Steffen Rebennack
T-WIWI-106548	Advanced Stochastic Optimization (S. 200)	4,5	Steffen Rebennack
T-WIWI-106549	Large-scale Optimization (S. 397)	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. 351)	4,5	Stefan Nickel
T-WIWI-102719	Mixed Integer Programming I (S. 431)	4,5	Oliver Stein
T-WIWI-102720	Mixed Integer Programming II (S. 434)	4,5	Oliver Stein
T-WIWI-103124	Multivariate Statistical Methods (S. 450)	4,5	Oliver Grothe
T-WIWI-102715	Operations Research in Supply Chain Management (S. 471)	4,5	Stefan Nickel
T-WIWI-106545	Optimization under uncertainty (S. 473)	5	Steffen Rebennack
T-WIWI-106552	Simulation of Stochastic Systems (S. 592)	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
There is no compulsory course in the module.

Qualification Objectives
The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,
- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,

- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content
The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

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

Remarks
The course "Introduction to Stochastic Optimization" will be offered until the winter semester 2018/2019 as an additional option in the elective offer of the module. Thereafter, the course can only be selected in the supplementary offer.
The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

M Module: Strategy, Communication, and Data Analysis [M-WIWI-101489]

Responsibility: Martin Klarmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics and Management

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

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R (S. 439)	4,5	Verena Dorner, Jella Pfeiffer, Christof Weinhardt
T-WIWI-102883	Pricing (S. 511)	4,5	Sven Feurer

Learning Control / Examinations
The module can not be attended as of winter term 18/19. Students already enrolled in the module can complete it regularly.

Conditions
None

Qualification Objectives
Students

- are familiar with general procedures and characteristics to develop new products and services under conditions of market orientation,
- can analyse customer needs, learn to realize competitive advantages and to work out interdisciplinary solutions,
- improve their statistic skills to cope with applied Marketing issues.

Content
The core product is everything a customer or business consumer receives. Marketers must understand what it takes to develop a new product successfully. It is important to understand that innovations differ in their degree of newness (up to radical innovations). This helps to determine how quickly the products will be adopted by a target market. Market orientation is on the front side of the medal, the reverse side includes meeting the needs of diverse stakeholders. To find out the critical drivers of success a deep understanding of analytical and statistical methods is essential. As a result, the developing of an effective marketing strategy is discussed as an empirical, scientific process. In addition, consumer behavior approaches in marketing are discussed as an important research area with a strong interdisciplinary and empirical orientation.

Recommendations
None

Remarks
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

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

M Module: Ubiquitous Computing [M-WIWI-101458]

Responsibility: N.N., Hartmut Schmeck

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Informatics

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-INFO-101326	Ubiquitous Computing (S. 639)	5	Michael Beigl

Ergänzungsangebot

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

Identifier	Course	ECTS	Responsibility
T-WIWI-102761	Advanced Lab in Ubiquitous Computing (S. 193)	4	Michael Beigl, Hartmut Schmeck
T-INFO-101323	IT-Security Management for Networked Systems (S. 388)	5	Hannes Hartenstein

Learning Control / Examinations

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

Conditions

See German version

Qualification Objectives

The student

- gets comprehensive knowledge about topics in the area of Ubiquitous Computing
- can design and evaluate ubiquitous systems in different application areas
- acquires appropriate knowledge for addressing specialized aspects in the area of ubiquitous computing

Content

Ubiquitous information technology (Ubiquitous Computing) addresses the ubiquitous (or pervasive) availability of information processing. The availability of these systems has the objective to facilitate the operational environment in technical scenarios or in daily life of humans and to enrich it with new capabilities. This module provides fundamentals of ubiquitous computing and further topics like network and Internet technologies, security aspects, the analysis of autonomously operating systems in Organic Computing and also the utilisation of information and communication technologies in highly decentralized energy systems.

Workload

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

M Module: Web Data Management [M-WIWI-101455]

Responsibility: York Sure-Vetter

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

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

Compulsory

Identifier	Course	ECTS	Responsibility
T-WIWI-102874	Semantic Web Technologies (S. 554)	5	York Sure-Vetter

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

Identifier	Course	ECTS	Responsibility
T-WIWI-103112	Web Science (S. 643)	5	York Sure-Vetter
T-WIWI-103523	Advanced Lab Informatics (S. 194)	4	Andreas Oberweis, Harald Sack, Ali Sunyaev, York Sure-Vetter, Melanie Volkamer, Johann Marius Zöllner

Learning Control / Examinations
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Conditions
The lecture*Semantic Web Technologies*[2511310] is obligatory and has to be absolved.

Qualification Objectives
Students

- develop ontologies for semantic web technologies und choose suitable representation languages,
- are able to provide data and applications via a cloud-based infrastructure
- transfer the methods and technologies of semantic web technologies and cloud computing to new application sectors,
- evaluate the potential of semantic web technologies and the cloud computing approaches for new application sectors.

Content
The module Web Data Management covers the basic principles, methods and applications for intelligent systems in the World Wide Web. Cloud Services are essential for the decentralized, scalable provision of data and applications as well as the methods of semantic web based on the description of data and services via metadata in form of so called ontologies. Formal principles and practical aspects such as knowledge modeling and available representation language tools for ontologies are covered in detail. Methods for the realization of intelligent systems within the World Wide Web are treated and applications as in Web 2.0 or Service Science are discussed and evaluated.
Furthermore the application of modern Cloud technologies for the use of software and hardware as a service via internet is introduced. Cloud technologies allow the efficient implementation of applications on distributed computer clusters and permit a high scalability as well as new business models in the internet.

Workload
See German version.

Part V
Module component exams

T Course: Access Control Systems: Foundations and Practice [T-INFO-106061]

Responsibility: Hannes Hartenstein
Contained in: [M-INFO-101204] Networking Labs
[M-INFO-101210] Dynamic IT-Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	englisch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400089	Access Control Systems: Foundations and Practice	Vorlesung (V)	2	Matthias Grundmann, Hannes Hartenstein, Till Neudecker

V Event excerpt: Access Control Systems: Foundations and Practice (SS 2018)

Aim

Summary: the student is able to derive suitable access control models from scenario requirements and is able to specify concrete access control systems. The student is aware of the limits of access control models and systems with respect to their analyzability and performance and security characteristics. The student is able to identify the resulting tradeoffs. The student knows the state of the art with respect to current research endeavors in the field of access control.

The specific competences are as follows. The student...

... is able to analyze a specific instance of an access control system and identify roles that enable a role-based access control realization.

... is able to decide which concrete architectures and protocols are technically suited for realizing a given access control model.
... is able to design an access control system architecture adhering to the requirements of a concrete scenario.
... knows access control models derived from social graphs and is able to analyze the opportunities for deanonymization of persons through metrics from the literature.

... knows specific access control protocols employed by providers of modern cloud-based services.

... knows the challenges of access control in inter and intra-vehicle communication and is able to identify the fundamental access control problems in the domain.
... knows access control mechanisms for secure data outsourcing and is able to analyze and compare the performance and security garantees of the different approaches.

... knows access control protocols to enable decentralized data sharing through cryptographic methods and is able to compare protocol realizations based on different cryptographic building blocks with respect to their performance.

... knows blockchain-based approaches to ensure the consistency in decentralized systems and is able to identify tradeoffs between consistency and anonymity.

Content
An information security model defines access rights that express for a given system which subjects are allowed to perform which actions on which objects. A system is said to be secure with respect to a given information security model, if it enforces the corresponding access rights. Thus, access control modeling and access control systems represent the fundamental building blocks of secure services, be it on the Web or in the Internet of Everything.
In this master-level course, we thoroughly investigate the evolution of access control models (access control matrix, role-based access control, attribute access control) and describe usage control models as a unified framework for both access control and digital rights management. We analyze current access control systems and APIs from both, the developers and the end users perspective, including Identity-as-a-Serivce. We look at current research aspects of secure data outsourcing and sharing, blockchains, and vehicular systems. Finally, we also discuss the ethical dimension of access management. Students prepare for each session by studying previously announced literature that is then jointly discussed in the lecture.

Workload
(2 SWS + 2,0 x 2 SWS) x 15 + 30 h Klausurvorbereitung = 120h
4 ECTS

T Course: Advanced Game Theory [T-WIWI-102861]

Responsibility: Karl-Martin Ehrhart, Clemens Puppe, Johannes Philipp Reiß
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101453] Applied Strategic Decisions
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2521533	Advanced Game Theory	Vorlesung (V)	2	Karl-Martin Ehrhart, Michael Müller, Clemens Puppe
WS 18/19	2521534		Übung (Ü)	1	Michael Müller, Clemens Puppe

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

Conditions
None

Recommendations
Basic knowledge of mathematics and statistics is assumed.

V Event excerpt: Advanced Game Theory (WS 18/19)

Aim
The student
- deepens and broadens his/her basic knowledge of Game Theory,
- develops a rigorous understanding of newer concepts in Game Theory,
- develops the capability to independently model and analyze complex systems of strategic decision-making, and to develop appropriate solutions.

Content
This course offers an advanced and rigorous treatment of game theory.

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

T Course: Advanced Lab in Ubiquitous Computing [T-WIWI-102761]

Responsibility: Michael Beigl, Hartmut Schmeck
Contained in: [M-WIWI-101458] Ubiquitous Computing
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Unregelmäßig	Prüfungsleistung anderer Art	1

Learning Control / Examinations
See German version

Conditions
None

Remarks
See German Version

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

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

Contained in: [M-WIWI-102827] Service Computing
[M-WIWI-101477] Development of Business Information Systems
[M-WIWI-101455] Web Data Management
[M-WIWI-101456] Intelligent Systems and Services
[M-WIWI-103356] Machine Learning
[M-WIWI-101457] Semantic Technologies
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch/englisch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400115	Machine Learning Practical Course	Praktikum (P)	3	Rüdiger Dillmann, Johann Marius Zöllner
SS 2018	2512101		Praktikum (P)	3	Andreas Drescher, Andreas Oberweis, Frederic Toussaint, Meike Ullrich
SS 2018	2512300		Seminar / Praktikum (S/P)	3	Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma
SS 2018	2512400		Praktikum (P)		Theresa Kromat, Ali Sunyaev
SS 2018	2512500		Praktikum (P)	3	Johann Marius Zöllner
SS 2018	2512550	Advanced Lab Privacy Friendly Apps	Praktikum (P)	3	Oksana Kulyk, Peter Mayer, Melanie Volkamer
SS 2018	2513306	Data Science & Real-time Big Data Analytics	Seminar / Praktikum (S/P)	2	Dominik Riemer, Suad Sejdovic, York Sure-Vetter
WS 18/19	2512100	Security	Praktikum (P)	4	Ingmar Baumgart, Sven Maier, Melanie Volkamer
WS 18/19	2512301	Linked Data and the Semantic Web	Seminar / Praktikum (S/P)	3	Maribel Acosta Deibe, Lars Heling, Tobias Christof Käfer, York Sure-Vetter, Tobias Weller
WS 18/19	2512311	Data Science with Open Data	Seminar / Praktikum (S/P)	3	Matthias Frank, York Sure-Vetter
WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	Seminar / Praktikum (S/P)	3	David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller
WS 18/19	2512400		Praktikum (P)		Theresa Kromat, Ali Sunyaev
WS 18/19	2512501		Praktikum (P)	3	Johann Marius Zöllner

WS 18/19	2512551	Praktikum (P)	3	Melanie Volkamer
WS 18/19	2512600	Praktikum (P)	2	Harald Sack

Learning Control / Examinations
Advanced Lab "Privacy Friendly Apps":
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of of a practical work in which a software functionality must be implemented and three interim submissions of the software to be developed. The weighting of the individual components will be announced during the first meeting.
All other courses of the Institute AIFB:
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

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

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

Conditions
None

Remarks
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at https://portal.wiwi.kit.edu.

V Event excerpt: Linked Data and the Semantic Web (WS 18/19)

Workload
Topics of interest include, but are not limited to:

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

V Event excerpt: Machine Learning Practical Course (SS 2018)

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

Die einzelnen Projekte erfordern die Analyse der gestellten Aufgabe, Auswahl geeigneter Lernverfahren, Spezifikation und Implementierung und Evaluierung eines Lösungsansatzes. Schließlich ist die gewählte Lösung zu dokumentieren und in einem Kurzvortrag vorzustellen.
Die Studierenden können Kenntnisse aus der Vorlesung Maschinelles Lernen auf einem ausgewählten Gebiet der aktuellen Forschung im Bereich Robotik oder kognitive Automobile praktisch anwenden.
Die Studierenden beherrschen die Analyse und Lösung entsprechender Problemstellungen im Team.
Die Studierenden können ihre Konzepte und Ergebnisse evaluieren, dokumentieren und präsentieren.

V Event excerpt: (SS 2018)

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

- Medicine
- Social Media
- Finance Market

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

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

V Event excerpt: (WS 18/19)

Aim

- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

Workload
4 ECTS = approx. 120 h

V Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

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

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V Event excerpt: Advanced Lab Privacy Friendly Apps (SS 2018)

Aim
The students

- are able to identify privacy-critical parts of an app and to model and implement them in a privacy-friendly way,
- know frameworks for the development of mobile apps as well as the dedicated development environments,
- have the ability to use "git" (on the example of Github) as a basis for software development,
- have experience in software development using "Human Centered Design".

Content
The Privacy Friendly Apps (PFAs) are a group of Android apps that are optimized regarding privacy. In the past, more than 20 Privacy Friendly Apps have been developed at the Technische Universität Darmstadt and published in the Google Playstore as well as in the alternative App Store F-Droid. The source code of each Privacy Friendly App is available on Github and licensed "open-source". The "Privacy Friendly QR Scanner" was downloaded more than 15,000 times from the Playstore. Further information can be found at https://secuso.org/pfa.
In the practical course "Privacy Friendly Apps", apps are implemented in small groups or existing Privacy Friendly Apps are extended. Initially, Android apps will be in the foreground. In the medium term, it is planned to develop IOS apps as well.
The focus of the practical course is on the privacy-friendly and user-centered implementation of the respective task as an app. Therefore, privacy-critical points are identified and technical measures for the protection of privacy (for example the

blocking of screenshots) as well as for the support of the user (for example explanations) are determined. These will be implemented during the internship.

V Event excerpt: (WS 18/19)

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

Workload
Der Arbeitsaufwand von 3 SWS setzt sich zusammen aus Präsenzzeit am Versuchsort zur praktischen Umsetzung der gewählten Lösung, sowie der Zeit für Literaturrecherchen und Planung/Spezifikation der geplanten Lösung. Zusätzlich wird ein kurzer Bericht und eine Präsentation der durchgeführten Arbeit erstellt.

V Event excerpt: (SS 2018)

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

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

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

Workload
Der Arbeitsaufwand von 3 SWS setzt sich zusammen aus Präsenzzeit am Versuchsort zur praktischen Umsetzung der gewählten Lösung, sowie der Zeit für Literaturrecherchen und Planung/Spezifikation der geplanten Lösung. Zusätzlich wird ein kurzer Bericht und eine Präsentation der durchgeführten Arbeit erstellt.

T Course: Advanced Lab User Studies in Security [T-WIWI-109271]

Responsibility: Melanie Volkamer
Contained in: [M-WIWI-104520] Human Factors in Security and Privacy
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

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

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

Conditions
None

T Course: Advanced Statistics [T-WIWI-103123]

Responsibility: Oliver Grothe
Contained in: [M-WIWI-101637] Analytics and Statistics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	I	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2550552		Vorlesung (V)	2	Oliver Grothe
WS 18/19	2550553		Übung (Ü)	2	Maximilian Coblenz, Oliver Grothe, Anika Kaplan

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4). The exam is offered every semester. Re-examinations are offered only for repeaters.

Conditions
None

Remarks
New course starting winter term 2015/2016

V Event excerpt: (WS 18/19)

Aim
Students

- cope with advanced fundamentals of statistics as well as simulation and resampling methods.
- know the fundamentals of point and interval estimation as well as testing of hypotheses.
- know basic principles of information theory.
- learn, how to conduct controlled simulation studies.

Content
Basic principles
Types of convergence and limit theorems
Multivariate Distributions
Copulas
Simulation techniques, Bootstrap
Statistical Estimation
Statistical Testing
Simulation studies

Literature
Comprehensive lecture notes

T Course: Advanced Stochastic Optimization [T-WIWI-106548]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

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

Conditions
None.

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

Responsibility: Kay Mitusch
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The course T-WIWI-102609 "Advanced Topics in Economic Theory" restarts in summer term 2019.
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

Conditions
None

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

T Course: Algorithm Engineering [T-INFO-101332]

Responsibility: Peter Sanders, Dorothea Wagner
Contained in: [M-INFO-100795] Algorithm Engineering
[M-INFO-101200] Advanced Algorithms: Engineering and Applications
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Sommersemester	Prüfungsleistung mündlich	1

T Course: Algorithmic Methods for Hard Optimization Problems [T-INFO-103334]

Responsibility: Dorothea Wagner
Contained in: [M-INFO-101200] Advanced Algorithms: Engineering and Applications
[M-INFO-101237] Algorithmic Methods for Hard Optimization Problems
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Max Term	Exam type	Version
5	Unregelmäßig	5	Prüfungsleistung mündlich	1

T Course: Algorithmic Methods for Network Analysis [T-INFO-104759]

Responsibility: Henning Meyerhenke
Contained in: [M-INFO-102400] Algorithmic Methods for Network Analysis

ECTS	Recurrence	Exam type	Version
5	Unregelmäßig	Prüfungsleistung mündlich	1

T Course: Algorithms for Routing [T-INFO-100002]

Responsibility: Dorothea Wagner
Contained in: [M-INFO-101200] Advanced Algorithms: Engineering and Applications
[M-INFO-100031] Algorithms for Routing
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24638		Vorlesung / Übung (VÜ)	3	Valentin Buchhold, Dorothea Wagner, Tim Zeitz, Tobias Zündorf

V Event excerpt: (SS 2018)

Aim

Die Teilnehmer beherrschen die Methodik des Algorithm Engineering und insbesondere ihre Anwendung im Bereich Routenplanung. Sie kennen algorithmische Problemstellungen, die sich in verschiedenen praktischen Anwendungen der Routenplanung in Transportnetzwerken ergeben. Sie sind in der Lage, diese Probleme zu identifizieren und verstehen es, die auftretenden Fragestellungen auf ihren algorithmischen Kern zu reduzieren und anschließend effizient zu lösen. Sie sind in der Lage, dabei Wissen aus den Bereichen der Graphentheorie und der Algorithmik praktisch umzusetzen. Zudem kennen die Teilnehmer verschiedene Techniken, die in der Praxis genutzt werden, um effiziente Verfahren zur Routenplanung zu implementieren. Sie kennen Verfahren zur Routenberechnung in Straßennetzen, öffentlichen Verkehrsnetzwerken sowie multimodalen Netzwerken. Studierende sind in der Lage, auch für komplexere Szenarien, wie etwa der zeitabhängigen Routenplanung, in der Praxis effizient umsetzbare Verfahren zu identifizieren und analysieren. Sie können theoretische und experimentelle Ergebnisse interpretieren und untereinander vergleichen.

Studierende sind außerdem in der Lage, neue Problemstellungen im Bereich der Routenplanung mit Methoden des Algorithm Engineering zu analysieren und Algorithmen unter Berücksichtigung moderner Rechnerarchitektur zu entwerfen, sowie aussagekräftige experimentelle Evaluationen zu planen und auszuwerten. Auf der Ebene der Modellierung sind sie in der Lage, verschiedene Modellierungsansätze zu entwickeln und deren Interpretationen zu beurteilen und zu vergleichen. Die Teilnehmer können zudem die vorgestellten Methoden und Techniken autonom auf verwandte Fragestellungen anwenden.

Content

Optimale Routen in Verkehrsnetzen zu bestimmen ist ein alltägliches Problem. Wurden früher Reiserouten mit Hilfe von Karten am Küchentisch geplant, ist heute die computergestützte Routenplanung in weiten Teilen der Bevölkerung etabliert: Die beste Eisenbahnverbindung ermittelt man im Internet, für Routenplanung in Straßennetzen benutzt man häufig mobile Endgeräte.
Ein Ansatz, um die besten Verbindungen in solchen Netzen computergestützt zu finden, stammt aus der Graphentheorie. Man modelliert das Netzwerk als Graphen und berechnet darin einen kürzesten Weg, eine mögliche Route. Legt man Reisezeiten als Metrik zu Grunde, ist die so berechnete Route die beweisbar schnellste
Verbindung. Dijkstra's Algorithmus aus dem Jahre 1959 löst dieses Problem zwar beweisbar optimal, allerdings sind Verkehrsnetze so groß (das Straßennetzwerk von West- und Mittel-Europa besteht aus ca. 45 Millionen Abschnitten), dass der klassische Ansatz von Dijsktra zu lange für eine Anfrage braucht. Aus diesem Grund ist die Entwicklung von Beschleunigungstechniken für Dijkstra's Algorithmus Gegenstand aktueller Forschung. Dabei handelt es sich um zweistufige Verfahren, die in einem Vorverarbeitungsschritt das Netzwerk mit Zusatzinformationen anreichern, um anschließend die Berechnung von kürzesten Wegen zu beschleunigen.

Diese Vorlesung gibt einen Überblick über aktuelle Algorithmen zur effizienten Routenplanung und vertieft einige von den Algorithmen.

Workload
Vorlesung mit 3 SWS, 5 LP

5 LP entspricht ca. 150 Arbeitsstunden, davon
ca. 45 Std. Vorlesungsbesuch,
ca. 60 Std. Nachbereitung und Bearbeitung der Übungsaufgaben,
ca. 45 Std. Prüfungsvorbereitung

Literature
Weiterführende Literatur
Mehlhorn/Sanders: Algorithms and Data Structures, The Basic Toolbox. Springer, 2008

T Course: Algorithms for Visualization of Graphs [T-INFO-104390]

Responsibility: Dorothea Wagner
Contained in: [M-INFO-101200] Advanced Algorithms: Engineering and Applications
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-102094] Algorithms for Visualization of Graphs
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Unregelmäßig	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24118		Vorlesung / Übung (VÜ)	2+1	Tamara Mtsentlintze, Marcel Radermacher, Dorothea Wagner

V Event excerpt: (WS 18/19)

Aim
Die Studierenden erwerben ein systematisches Verständnis algorithmischer Fragestellungen und Lösungsansätze im Bereich der Visualisierung von Graphen, das auf dem bestehenden Wissen in den Themenbereichen Graphentheorie und Algorithmik aufbaut.
Nach erfolgreicher Teilnahme an der Lehrveranstaltung können die Studierenden
- Begriffe, Strukturen und grundlegende Problemdefinitionen aus der Vorlesung erklären;
- Layoutalgorithmen für verschiedene Graphklassen exemplarisch ausführen, mathematisch präzise analysieren und die algorithmischen Eigenschaften beweisen;
- Komplexitätsresultate aus der Vorlesung erklären und eigenständig ähnliche Reduktionsbeweise für neue Layoutprobleme führen;
- auswählen, welche Algorithmen zur Lösung eines gegebenen Layoutproblems geeignet sind und diese ggf. den Anforderungen einer konkreten Problemstellung anpassen;
- unbekannte Visualisierungsprobleme aus Anwendungen des Graphenzeichnens analysieren, auf den algorithmischen Kern reduzieren und daraus ein abstraktes Modell erstellen; auf Basis der in der Vorlesung erlernten Konzepte und Techniken eigene Lösungen in diesem Modell entwerfen, analysieren und die algorithmischen Eigenschaften beweisen.

Content
Netzwerke sind relational strukturierte Daten, die in zunehmendem Maße und in den unterschiedlichsten Anwendungsbereichen auftreten. Die Beispiele reichen von physischen Netzwerken, wie z.B. Transport- und Versorgungsnetzen, hin zu abstrakten Netzwerken, z.B. sozialen Netzwerken. Für die Untersuchung und das Verständnis von Netzwerken ist die Netzwerkvisualisierung ein grundlegendes Werkzeug.

Mathematisch lassen sich Netzwerke als Graphen modellieren und das Visualisierungsproblem lässt sich auf das algorithmische Kernproblem reduzieren, ein Layout des Graphen, d.h. geeignete Knoten- und Kantenpositionen in der Ebene, zu bestimmen. Dabei werden je nach Anwendung und Graphenklasse unterschiedliche Anforderungen an die Art der Zeichnung und die zu optimierenden Gütekriterien gestellt. Das Forschungsgebiet des Graphenzeichnens greift dabei auf Ansätze aus der klassischen Algorithmik, der Graphentheorie und der algorithmischen Geometrie zurück.

Im Laufe der Veranstaltung wird eine repräsentative Auswahl an Visualisierungsalgorithmen vorgestellt und vertieft.

Workload
Vorlesung und Übung mit 3 SWS, 5 LP

5 LP entspricht ca. 150 Arbeitsstunden, davon
ca. 45 Std. Besuch der Vorlesung und Übung,
ca. 25 Std. Vor- und Nachbereitung,
ca. 40 Std. Bearbeitung der Übungsblätter
ca. 40 Std. Prüfungsvorbereitung

T Course: Algorithms II [T-INFO-102020]

Responsibility: Hartmut Prautzsch, Peter Sanders, Dorothea Wagner
Contained in: [M-INFO-101173] Algorithms II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24079	Algorithms II	Vorlesung (V)	4	Demian Hespe, Sebastian Lamm, Peter Sanders

V Event excerpt: Algorithms II (WS 18/19)

Aim
Der/die Studierende besitzt einen vertieften Einblick in die theoretischen und praktischen Aspekte der Algorithmik und kann algorithmische Probleme in verschiedenen Anwendungsgebieten identifizieren und formal formulieren. Außerdem kennt er/sie weiterführende Algorithmen und Datenstrukturen aus den Bereichen Graphenalgorithmen, Algorithmische Geometrie, String-Matching, Algebraische Algorithmen, Kombinatorische Optimierung und Algorithmen für externen Speicher.
Er/Sie kann unbekannte Algorithmen eigenständig verstehen, sie den genannten Gebieten zuordnen, sie anwenden, ihre Laufzeit bestimmen, sie beurteilen sowie geeignete Algorithmen für gegebene Anwendungen auswählen. Darüber hinaus ist der/die Studierende in der Lage, bestehende Algorithmen auf verwandte Problemstellungen zu übertragen.
Neben Algorithmen für konkrete Problemstellungen kennt der/die Studierende fortgeschrittene Techniken des algorithmischen Entwurfs. Dies umfasst parametrisierte Algorithmen, approximierende Algorithmen, Online-Algorithmen, randomisierte Algorithmen, parallele Algorithmen, lineare Programmierung, sowie Techniken des Algorithm Engenieering. Für gegebene Algorithmen kann der/die Studierende eingesetzte Techniken identifizieren und damit diese Algorithmen besser verstehen. Darüber hinaus kann er/sie für eine gegebene Problemstellung geeignete Techniken auswählen und sie nutzen, um eigene Algorithmen zu entwerfen.

Content
Diese Lehrveranstaltung soll Studierenden die grundlegenden theoretischen und praktischen Aspekte der Algorithmentechnik vermitteln. Es werden generelle Methoden zum Entwurf und der Analyse von Algorithmen für grundlegende algorithmische Probleme vermittelt sowie die Grundzüge allgemeiner algorithmischer Methoden wie Approximationsalgorithmen, Lineare Programmierung, Randomisierte Algorithmen, Parallele Algorithmen und parametrisierte Algorithmen behandelt.

Workload
Vorlesung mit 3 SWS + 1 SWS Übung.
6 LP entspricht ca. 180 Stunden
ca. 45 Std. Vorlesungsbesuch,
ca. 15 Std. Übungsbesuch,
ca. 90 Std. Nachbearbeitung und Bearbeitung der Übungsblätter
ca. 30 Std. Prüfungsvorbereitung

Literature
K. Mehlhorn, P. Sanders: Algorithms and Data Structures - The Basic Toolbox

Mehlhorn, Naeher: The LEDA Platform of Combinatorial and Geometric Computing Topic: Algorithm Engineering, Flows, Geometrie

Ahuja, Magnanti, Orlin: Network Flows

de Berg, Cheong, van Kreveld, Overmars: Computational Geometry: Algorithms and Applications

Gonzalo Navarro: Compact Data Structures “A Practical Approach”, Cambridge University Press

R. Niedermeier: Invitation to Fixed-Parameter Algorithms, Oxford University Press, 2006.

T Course: Algorithms in Cellular Automata [T-INFO-101334]

Responsibility: Thomas Worsch
Contained in: [M-INFO-100797] Algorithms in Cellular Automata
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24622	Algorithms for Cellular Automata	Vorlesung (V)	3	Roland Vollmar, Thomas Worsch

V Event excerpt: Algorithms for Cellular Automata (SS 2018)

Aim
Die Studierenden kennen grundlegende Ansätze und Techniken für die Realisierung feinkörniger paralleler Algorithmen. Sie sind in der Lage, selbst einfache Zellularautomaten-Algorithmen zu entwickeln, die auf solchen Techniken beruhen, und sie zu beurteilen.

Content
Zellularautomaten sind ein wichtiges Modell für feinkörnigen Parallelismus, das ursprünglich von John von Neumann auf Vorschlag S. Ulams entwickelt wurde.
Im Rahmen der Vorlesung werden wichtige Grundalgorithmen (z.B. für Synchronisation) und Techniken für den Entwurf effizienter feinkörniger Algorithmen vorgestellt. Die Anwendung solcher Algorithmen in verschiedenen Problembereichen wird vorgestellt. Dazu gehören neben von Neumanns Motivation "Selbstreproduktion" Mustertransformationen, Problemstellung wie Sortieren, die aus dem Sequenziellen bekannt sind, typisch parallele Aufgabenstellungen wie Anführerauswahl und Modellierung realer Phänomene.
Inhalt:

- Berechnungsmächtigkeit
- Mustererkennung
- Selbstreproduktion
- Sortieren
- Synchronisation
- Anführerauswahl
- Diskretisierung kontinuierlicher Systeme
- Sandhaufenmodell

Workload

- Vorlesung (15 x 2 x 45min) 22 h 30 min
- Uebung (15 x 1 x 45 min) 11 h 15 min
- Vorlesung nacharbeiten (15 x 2h 30min) 37 h 30 min
- Aufgaben loesen (12 x 1 h 30 min) 18 h
- Skript 2x wiederholen (2 x 12h) 24 h
- Prüfungsvorbereitung 36 h
- Summe 149 h 15 min

Literature
Weiterführende Literatur

- M. Delorme, J. Mazoyer: Cellular Automata, Kluwer, 1999
- B. Chopard, M. Droz: Cellular Automata Modeling of Physical Systems, Cambridge Univ. Press, 1998
- J. von Neumann: Theory of Self-Reproducing Automata (ed. A. Burks), Univ. of Illinois Press, 1966
- T. Toffoli, N. Margolus: Cellular Automata Machines, MIT Press, 1987
- R. Vollmar: Algorithmen in Zellularautomaten, Teubner, 1979

T Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]

Responsibility: Daniela Beyer, Marion Weissenberger-Eibl
Contained in: [M-WIWI-101507] Innovation Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	I	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2545108		Seminar (S)	2	Daniela Beyer

Learning Control / Examinations
Non exam assessment (following §4(2) 3 of the examination regulation).
Innovation plan (exposé) (20%), Guided interviews/ quantitative survey (20%), presentation of results (20%), seminar paper (about 5 pages per person) (40%).

Conditions
None

Recommendations
Prior attendance of the course Innovation Management [2545015] is recommended.

T Course: Analyzing Big Data - Laboratory Course [T-INFO-103202]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Studienleistung	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24874	Analyzing Big Data Laboratory Course	Praktikum (P)	2	Klemens Böhm, Georg Steinbuß

V Event excerpt: Analyzing Big Data Laboratory Course (SS 2018)

Aim
Im Praktikum soll das in der Vorlesung "Analysetechniken für große Datenbestände" erlernte Wissen über Data Mining in die Praxis umgesetzt werden. Dabei sollen die Studierenden gängige Softwaretools im Bereich Datenanalyse kennenlernen und diese in einer realen Anwendung einsetzen. Im ersten Teil des Praktikums sollen die Studierenden mit der Vorverarbeitung von Rohdaten sowie mit den Analyseschritten im KDD-Prozess vertraut gemacht werden. Sie sollen lernen wie man mit handelsüblichen Analysetools die bestmöglichen Ergebnisse in einer gegeben Anwendung erzielen kann. Im zweiten Teil des Praktikums sollen die Schwächen eines einzelnen Analyseschrittes näher untersucht werden. Die Studierenden werden mit ungelösten Problemen aus der Fachliteratur konfrontiert und lernen Lösungen dazu selbst zu entwickeln. Darüber hinaus sollen die Studenten lernen, im Team zusammenzuarbeiten, um die einzelnen Aufgaben erfolgreich zu lösen.

Workload
Aktivität Aufwand
Präsenzzeit (8 x 2 x 45 min) & 12h
Einarbeitung 20h
Eigenverantwortliches Arbeiten 80h 30 min
Präsentationsvorbereitung 10h
Summe: 122h 30min

T Course: Anthropomatics: Humanoid Robotics [T-INFO-101391]

Responsibility: Tamim Asfour
Contained in: [M-INFO-101251] Autonomous Robotics
[M-INFO-102233] Further Examinations

ECTS	Language	Exam type	Version
3	deutsch/englisch	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400074	Robotics II: Humanoid Robotics	Vorlesung (V)	2	Tamim Asfour, Peter Kaiser, Christian Mandery, Simon Ottenhaus, Fabian Paus, Mirko Wächter
SS 2018	24644	Robotics II: Humanoid Robotics	Vorlesung (V)	2	Tamim Asfour, Peter Kaiser, Christian Mandery, Simon Ottenhaus, Mirko Wächter

V Event excerpt: Robotics II: Humanoid Robotics (SS 2018)

Content
In dieser Vorlesung werden aktuelle Arbeiten auf dem Gebiet der humanoiden Robotik vorgestellt, die sich mit der Implementierung komplexer sensomotorischer und kognitiver Fähigkeiten in humanoiden Robotern beschäftigen. In den einzelnen Themenkomplexen werden verschiedene Methoden und Algorithmen, deren Vor- und Nachteile, sowie der aktuelle Stand der Forschung diskutiert:

1. Entwurf humanoider Roboter
   - Biomechanische Modelle des menschlichen Körpers
   - Mechatronik humanoider Roboter
2. Aktive Perzeption
   - Aktives Sehen und Abtasten
   - Visuo-haptische Exploration
3. Greifen beim Menschen und bei humanoiden Robotern
   - Greifen beim Menschen
   - Planung ein- und zweihändiger Greifaufgaben
4. Zweibeiniges Laufen
   - Laufen und Balancieren beim Menschen
   - Aktives Balancieren bei humanoiden Robotern
5. Imitationslernen und Programmieren durch Vormachen
   - Erfassung und Analyse menschlicher Bewegungen
   - Aktionsrepräsentationen: DMPs, HMMs, Splines
   - Abbildung und Reproduktion von Bewegungen

6. Von Signalen zu Symbolen

- Von Merkmalen zu Objekten und von Bewegungen zu Aktionen.
- Object-Action Complexes: Semantische sensomotorische Kategorien

7. Modelle zu Planung, autonomem Handeln und Entscheiden

- Symbolische Planung
- Probabilistischen Entscheidungsverfahren

Workload
90 h

Literature
Weiterführende Literatur
Wissenschaftliche Veröffentlichungen zum Thema, werden auf der VL-Website bereitgestellt.

V Event excerpt: Robotics II: Humanoid Robotics (SS 2018)

Aim
The students have received fundamental knowledge of the state-of-the art approaches in the field of autonomous and learning robot systems with focus on humanoid robots. They understand fundamental concepts of autonomous robotics and artificial intelligence and are able to apply them. The students acquire knowledge about the perception-action-loop, the acquisition and modelling of motion and action knowledge, autonomous planning and decision making as well as the semantic gap in cognitive robotics. Among others, the following topics are presented: building humanoid robots, grasping, active perception, programming by demonstration and imitation learning, generation of sematic representations from sensorimotor data. State-of-the-art research examples will be discussed. The participants are able to review, to compare, and analyze the discussed approaches.

Content
In dieser Vorlesung werden aktuelle Arbeiten auf dem Gebiet der humanoiden Robotik vorgestellt, die sich mit der Implementierung komplexer sensomotorischer und kognitiver Fähigkeiten in humanoiden Robotern beschäftigen. In den einzelnen Themenkomplexen werden verschiedene Methoden und Algorithmen, deren Vor- und Nachteile, sowie der aktuelle Stand der Forschung diskutiert:
1. Entwurf humanoider Roboter

- Biomechanische Modelle des menschlichen Körpers
- Mechatronik humanoider Roboter

2. Aktive Perzeption

- Aktives Sehen und Abtasten
- Visuo-haptische Exploration

3. Greifen beim Menschen und bei humanoiden Robotern

- Greifen beim Menschen
- Planung ein- und zweihändiger Greifaufgaben

4. Zweibeiniges Laufen

- Laufen und Balancieren beim Menschen
- Aktives Balancieren bei humanoiden Robotern

5. Imitationslernen und Programmieren durch Vormachen

- Erfassung und Analyse menschlicher Bewegungen
- Aktionsrepräsentationen: DMPs, HMMs, Splines
- Abbildung und Reproduktion von Bewegungen

6. Von Signalen zu Symbolen

- Von Merkmalen zu Objekten und von Bewegungen zu Aktionen.
- Object-Action Complexes: Semantische sensomotorische Kategorien

7. Modelle zu Planung, autonomem Handeln und Entscheiden

- Symbolische Planung
- Probabilistischen Entscheidungsverfahren

Workload
90 h

Literature
Weiterführende Literatur
Wissenschaftliche Veröffentlichungen zum Thema, werden auf der VL-Website bereitgestellt.

T Course: Applied Analytics with Open Source Tools [T-WIWI-108438]

Responsibility: Christof Weinhardt
Contained in: [M-WIWI-103117] Data Science: Data-Driven Information Systems
[M-WIWI-103118] Data Science: Data-Driven User Modeling
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch/englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540466	Applied Analytics with Open Source Tools	Vorlesung (V)	2	Florian Glaser, Christof Weinhardt
SS 2018	2540467	Excercise Applied Analytics with Open Source Tools	Übung (Ü)	1	Florian Glaser, Christof Weinhardt

Learning Control / Examinations
Assessment consists of a written exam ofone hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and the Analytics Challenge (40%). The exam and the Analytics Challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Analytics challenge.

Conditions
None

Recommendations
Knowledge of object-oriented programming and statistics is helpful.
We recommend attending the lecture Information Engineering and Management (M-WIWI-101443).

V Event excerpt: Applied Analytics with Open Source Tools (SS 2018)

Aim
The students

- understand the foundations of key methods, processes and programming languages for data science projects
- explore key capabilities of state-of-the-art open source frameworks and tools
- learn how to successfully manage data, code and analytical models
- learn professional, tool supported communication of analysis results and generated insights
- get hands-on experience by working with real-world data and a selection of frameworks and tools

Content
The aim of this course is to introduce practical foundations, concepts, tools and current practice of Analytics from a data scientist's perspective. The lecture is complemented with an Analytics challenge that is based on real-world data from research projects. The students immediately apply their newly acquired knowledge and learn to use a range of open source tools to solve the challenge.
Content:

- Conceptual and theoretical Foundations
- Programming languages common in data science
- Data acquisition, pre-processing
- Basics of data organization and DevOps
- Tool chain selection and automation
- Open source analytics frameworks and data processing infrastructures

- Applied analytics challenge (based on a current research project or a cooperation with an industry partner)

Workload
The total workload for this course is approximately 135 hours.

T Course: Applied Econometrics [T-WIWI-103125]

Responsibility: Melanie Schienle
Contained in: [M-WIWI-101638] Econometrics and Statistics I

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation.

Conditions
None

Remarks
The course is not offered regularly.

T Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

Responsibility: Gerhard Satzger
Contained in: [M-WIWI-101506] Service Analytics
[M-WIWI-101448] Service Management

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2595650	Artificial Intelligence in Service Systems	Vorlesung (V)	2	Niklas Kühl

Learning Control / Examinations
The assessment consists of a written exam (60 min) according to §4(2), 1 of the examination regulations.

Conditions
None

V Event excerpt: Artificial Intelligence in Service Systems (WS 18/19)

Aim
Students of this course will be able to understand and implement the complete lifecycle of a typical Artificial Intelligence use case with supervised machine learning. Furthermore, they understand the importance and the means of applying AI and Machine Learning within service systems, which allows multiple, independent entities to collaborate and derive insights. Students will be proficient with typical Python code for AI challenges.

Content
Artificial Intelligence and the application of machine learning is becoming more and more popular to solve relevant business challenges. However, it is not only important to be familiar with precise algorithms, but rather a general understanding of the necessary steps with a holistic view—from real-world challenge to successful deployment of an AI. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. We then take this knowledge to the more complex case of service systems with different entities (e.g. companies) who interact with each other and show possibilities on how to derive holistic insights. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.

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

Responsibility: Martin Ruckes, Marliese Uhrig-Homburg
Contained in: [M-WIWI-101482] Finance 1
[M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530555	Asset Pricing	Vorlesung (V)	2	Martin Ruckes, Marliese Uhrig-Homburg
SS 2018	2530556		Übung (Ü)	1	Marcel Müller, Martin Ruckes, Marliese Uhrig-Homburg

Learning Control / Examinations
See German version.

Conditions
None

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

V Event excerpt: Asset Pricing (SS 2018)

Aim
Students are familiar with advanced concepts in asset pricing (in particular the stochastic discount factor model). They are able to apply their acquired skills to solve empirical questions related to securities.

Content
This lecture deals with the valuation of risky cash flows. A stochastic discount model and a central equation will be introduced, which form the basis of nearly every valuation model in finance. That includes the valuation of stocks, bonds and derivatives. The first part of the lecture will present the theory, the second part covers empirical questions related to this approach.

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

Literature
Basic literature

- Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

Elective literature

- Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.
- The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

T Course: Asymmetric Encryption Schemes [T-INFO-101260]

Responsibility: Jörn Müller-Quade
Contained in: [M-INFO-101197] Computer Security
[M-INFO-101198] Advanced Topics in Cryptography
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24115	Asymmetric Encryption Schemes	Vorlesung (V)	2	Jörn Müller-Quade

V Event excerpt: Asymmetric Encryption Schemes (WS 18/19)

Aim
The student

- knows, understands and applies the most popular public-key schemes,
- has an overview of the theoretical and practical aspects of public-key cryptography,
- evaluates cryptographic protocols and identifies vulnerabilities/threats,
- combines basic building blocks to small protocols.

Content
This course presents the theoretical and practical aspects of Public Key Cryptography.

- The most important primitives of cryptography will be covered, as there are: one-way function, hash function, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (e.g. Diffie-Hellman) with their strengths and weaknesses.
- In addition to public-key systems, the lecture provides knowledge about algorithms to solve number-theoretic problems on which the security of the systems is based. Thus the choice of parameters and the related level of security of a cryptographic system can be estimated.
- Furthermore, an introduction to provable security is provided, which presents some of the key security concepts (e.g. IND-CCA).
- The combination of cryptographic primitives will be treated on currently used protocols.

Workload

1. Präsenzzeit in Vorlesungen: 24 h
2. Vor-/Nachbereitung derselbigen: 16 h
3. Prüfungsvorbereitung und Präsenz in selbiger: 50 h

Literature
- Skript zur Vorlesung, http://iks.kit.edu/ (Zugangsdaten werden in der Vorlesung bekanntgegeben)
Weiterführende Literatur
- M. Bishop, Introduction to Computer Security, Addison-Wesley, Boston, 2005.
- J. Buchmann, Introduction to Cryptography, Springer, Heidelberg, 2003.
- J.D. Lipson, Elements of Algebra and Algebraic Computing, Addison-Wesley, 1981.
- A.J. Menezes, P.C. van Oorschot, S.A. Vanstone Handbook of Applied Cryptography CRC Press, 1997.
- W. Stallings, Cryptography and Network Security, Prentice Hall, New Jersey, 1999.
- W. Trappe, L. Washington, Introduction to Cryptography with Coding Theory, Prentice Hall, New Jersey, 2002.

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

Responsibility: Karl-Martin Ehrhart
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101446] Market Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2520408		Vorlesung (V)	2	Karl-Martin Ehrhart
WS 18/19	2520409		Übung (Ü)	1	Karl-Martin Ehrhart

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

Conditions
None

V Event excerpt: (WS 18/19)

Aim
The student

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

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

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

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

Literature

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

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

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103261] Disruptive FinTech Innovations
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530372	Automated Financial Advisory	Seminar (S)	2	Elmar Jakobs, Maxim Ulrich
WS 18/19	2500002	Automated Financial Advisory	Seminar (S)	2	Maxim Ulrich

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

Conditions
There are two conditions for taking this course:

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

Modeled Conditions
The following conditions must be met:

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

V Event excerpt: Automated Financial Advisory (SS 2018)

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

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

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

Literature
Literature will be distributed during the first lecture.

V Event excerpt: Automated Financial Advisory (WS 18/19)

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

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

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

Literature
Literature will be distributed during the first lecture.

T Course: Automated Visual Inspection and Image Processing [T-INFO-101363]

Responsibility: Jürgen Beyerer
Contained in: [M-INFO-101238] Automated visual inspection
[M-INFO-101241] Image-based detection and classification
[M-INFO-101239] Machine Vision
[M-INFO-100826] Automated Visual Inspection and Image Processing
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24169	Automated Visual Inspection and Image Processing	Vorlesung (V)	4	Jürgen Beyerer

V Event excerpt: Automated Visual Inspection and Image Processing (WS 18/19)

Aim

- Students have a sound knowledge regarding the basic concepts and methods of image processing (pre-processing and image enhancement, image restoration, image segmentation, morphological filtering, texture analysis, detection, image pyramids, multi-scale analysis and the wavelet transform)
- Students are in the position to work out and to evaluate solution concepts for problems of automated visual inspection
- Students have a sound knowledge of the different sensors and methods for the acquisition of image data as well as of the relevant optical principles
- Students know different concepts to describe image data and they know the essential system theoretical concepts and interrelations

Content

- sensors and concepts for image acquisition
- light and colour
- image signals (system theory, Fourier transformation, stochastic processes)
- excursion to wave optics
- pre-processing and image enhancement
- image restoration
- segmentation
- morphological image processing
- texture analysis
- detection
- image pyramids, multi scale analysis and wavelet-transform

Workload
Gesamt: ca. 180h, davon
1. Präsenzzeit in Vorlesungen: 46h
2. Vor-/Nachbereitung derselbigen: 44h
3. Klausurvorbereitung und Präsenz in selbiger: 90h

Literature
Weiterführende Literatur
- R. C. Gonzalez und R. E. Woods, Digital Image Processing, Prentice-Hall, Englewood Cliffs, New Jersey, 2002
- B. Jähne, Digitale Bildverarbeitung, Springer, Berlin, 2002

T Course: Bayesian Methods for Financial Economics [T-WIWI-106191]

Responsibility: Maxim Ulrich
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The course has been cancelled.
The grade is based on an exam. The exam covers all the material that is taught in the current semester. The exam takes place in the last week of the lecture-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period).

Conditions
None

Recommendations
None

T Course: Big Data Analytics [T-INFO-101305]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-100768] Big Data Analytics
[M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24114	Big Data Analytics	Vorlesung (V)	3	Klemens Böhm

V Event excerpt: Big Data Analytics (WS 18/19)

Aim
Am Ende der Lehrveranstaltung sollen die Teilnehmer die Notwendigkeit von Konzepten der Datenanalyse gut verstanden haben und erläutern können. Sie sollen unterschiedliche Ansätze zur Verwaltung und Analyse großer Datenbestände hinsichtlich ihrer Wirksamkeit und Anwendbarkeit einschätzen und vergleichen können. Die Teilnehmer sollen verstehen, welche Probleme im Themenbereich der Vorlesung derzeit offen sind, und einen Einblick in den diesbezüglichen Stand der Forschung gewonnen haben.

Content
Techniken zur Analyse großer Datenbestände stoßen bei Anwendern auf großes Interesse. Das Spektrum ist breit und umfasst klassische Branchen wie Banken und Versicherungen, neuere Akteure, insbesondere Internet-Firmen oder Betreiber neuartiger Informationsdienste und sozialer Medien, und Natur- und Ingenieurswissenschaften. In allen Fällen besteht der Wunsch, in sehr großen, z. T. verteilten Datenbeständen die Übersicht zu behalten, mit möglichst geringem Aufwand interessante Zusammenhänge aus dem Datenbestand zu extrahieren und erwartetes Systemverhalten mit dem tatsächlichen systematisch vergleichen zu können. In der Vorlesung geht es sowohl um die Aufbereitung von Daten als Voraussetzung für eine schnelle und leistungsfähige Analyse als auch um moderne Techniken für die Analyse an sich.

Literature

- Data Mining: Practical Machine Learning Tools and Techniques (3rd edition): Ian H. Witten, Eibe Frank, mark A. Hall, Morgan Kaufmann Publishers 2011
- Data Mining: Concepts and Techniques (3rd edition): Jiawei Han, Micheline Kamber, Jian Pei, Morgan Kaufmann Publishers 2011
- Knowledge Discovery in Databases: Martin Ester, Jörg Sander, Springer 2000

T Course: Big Data Analytics 2 [T-INFO-105742]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Unregelmäßig	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400042	Big Data Analytics 2	Vorlesung (V)	2	Klemens Böhm

Conditions
none

V Event excerpt: Big Data Analytics 2 (SS 2018)

Aim
Am Ende der Lehrveranstaltung sollen die Teilnehmer die Notwendigkeit fortgeschrittener Konzepte der Datenanalyse gut verstanden haben und erläutern können. Sie sollen eine große Vielfalt von Ansätzen zur Verwaltung und Analyse großer Datenbestände hinsichtlich ihrer Wirksamkeit und Anwendbarkeit einschätzen und vergleichen können. Die Teilnehmer sollen verstehen, welche Probleme im Themenbereich Datenanalyse derzeit offen sind,
und einen breiten und tiefen Einblick in den diesbezüglichen Stand der Forschung gewonnen haben

T Course: Biologically Inspired Robot [T-INFO-101351]

Responsibility: Rüdiger Dillmann
Contained in: [M-INFO-101251] Autonomous Robotics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24619		Vorlesung (V)	2	Rüdiger Dillmann, Arne Rönnau

V Event excerpt: (SS 2018)

Aim
Studierende wenden die verschiedenen Entwurfsprinzipien der Methode "Bionik" in der Robotik sicher an. Somit können Studierende biologisch inspirierten Roboter entwerfen und Modelle für Kinematik, Mechanik, Regelung und Steuerung, Perzeption und Kognition analysieren, entwickeln, bewerten und auf andere Anwendungen übertragen.
Studierende kennen und verstehen die Leichtbaukonzepte und Materialeigenschaften natürlicher Vorbilder und sind ebenso mit den Konzepten und Methoden der Leichtbaurobotik vertraut sowie die resultierenden Auswirkungen auf die Energieeffizienz mobiler Robotersysteme.
Studierende können die verschiedenen natürlichen Muskeltypen und ihre Funktionsweise unterscheiden. Außerdem kennen sie die korrespondierenden, künstlichen Muskelsysteme und können das zugrundeliegende Muskelmodell ableiten. Dies versetzt sie in die Lage, antagonistische Regelungssysteme mit künstlichen Muskeln zu entwerfen.
Studierende kennen die wichtigsten Sinne des Menschen, sowie die dazugehörige Reizverarbeitung und Informationskodierung. Studierende können für diese Sinne technologische Sensoren ableiten, die die gleiche Funktion in der Robotik übernehmen.
Studierende können die Funktionsweise eines Zentralen Mustergenerators (CPG) gegenüber einem Reflex abgrenzen. Sie können Neuro-Oszillatoren theoretisch herleiten und einsetzen, um die Laufbewegung eines Roboters zu steuern. Weiterhin können sie basierend auf den "Cruse Regeln" Laufmuster für sechsbeinige Roboter erzeugen.
Studierende können die verschiedenen Lokomotionsarten sowie die dazu passenden Stabilitätskriterien für Laufbewegungen unterscheiden. Weiterhin kennen sie die wichtigsten Laufmuster für mehrbeinige Laufroboter und können eine Systemarchitektur für mobile Laufroboter konzipieren.
Studierende können Lernverfahren wie das Reinforcement Learning für das Parametrieren komplexer Parametersätze einsetzen. Insbesondere kennen sie die wichtigsten Algorithmen zum Online Lernen und können diese in der Robotik-Domäne anwenden.
Studierende kennen die Subsumption System-Architektur und können die Vorteile einer reaktiven Systemarchitektur bewerten. Sie können neue "Verhalten" für biologisch inspirierte Roboter entwickeln und zu einem komplexen Verhaltensnetzwerk zusammenfügen.
Studierende können die mendlschen Gesetze anwenden und die Unterschiede zwischen Meitose und Mitose erklären. Weiterhin können sie genetische Algorithmen entwerfen und einsetzen, um komplexe Planungs- oder Perzeptionsprobleme in der Robotik zu lösen.
Studierende können die größten Herausforderungen bei der Entwicklung innovativer, humanoider Robotersysteme identifizieren und kennen Lösungsansätze sowie erfolgreiche Umsetzungen.

Content
Die Vorlesung biologisch motivierte Roboter beschäftigt sich intensiv mit Robotern, deren mechanische Konstruktion, Sensorkonzepte oder Steuerungsarchitektur von der Natur inspiriert wurden. Im Einzelnen wird jeweils auf Lösungsansätze aus der Natur geschaut (z.B. Leichtbaukonzepte durch Wabenstrukturen, menschliche Muskeln) und dann auf Robotertechnologien, die sich diese Prinzipien zunutze machen um ähnliche Aufgaben zu lösen (leichte 3D Druckteile oder künstliche Muskeln in der Robotik). Nachdem diese biologisch inspirierten Technologien diskutiert wurden, werden konkrete Robotersysteme und Anwendungen aus der aktuellen Forschung präsentiert, die diese Technologien erfolgreich

einsetzen. Dabei werden vor allem mehrbeinige Laufroboter, schlangenartige und humanoide Roboter vorgestellt, und deren Sensor- und Antriebskonzepte diskutiert. Der Schwerpunkt der Vorlesung behandelt die Konzepte der Steuerung und Systemarchitekturen (z.B. verhaltensbasierte Systeme) dieser Robotersysteme, wobei die Lokomotion im Mittelpunkt steht. Die Vorlesung endet mit einem Ausblick auf zukünftige Entwicklungen und dem Aufbau von kommerziellen Anwendungen für diese Roboter.

Workload
3 LP entspricht ca. 90 Arbeitsstunden, davon
ca. 30h für Präsenzzeit in Vorlesungen
ca. 30h für Vor- und Nachbereitungszeiten
ca. 30h für Prüfungsvorbereitung und Teilnahme an der mündlichen Prüfung

T Course: Biometric Systems for Person Identification [T-INFO-101297]

Responsibility: Rainer Stiefelhagen
Contained in: [M-INFO-101239] Machine Vision
[M-INFO-102233] Further Examinations

ECTS	Language	Exam type	Version
3	englisch	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2403011	Biometric Systems for Person Identification	Vorlesung (V)	2	Muhammad Saquib Sarfraz

V Event excerpt: Biometric Systems for Person Identification (SS 2018)

Aim

Content
The student will acquire the basic theoretical and practical understanding of various technologies used in biometrics, the state-of-the-art algorithms used and their analysis. Student will be able to take advance courses in the field of computer vision/pattern recognition on the completion of this course.

Workload
Besuch der Vorlesungen: ca. 20 Stunden
Vor- und Nachbereitung der Vorlesung: ca. 30 Stunden
Klausurvorbereitung: ca. 40 h
Summe: ca. 90 Stunden

Literature
-Tutorials and related scientific papers will be put on the web
-Online material on the topics discussed in the lectures

T Course: Blockchains & Cryptofinance [T-WIWI-108880]

Responsibility: Philipp Schuster, Marliese Uhrig-Homburg
Contained in: [M-WIWI-101409] Electronic Markets
[M-WIWI-101483] Finance 2
[M-WIWI-101446] Market Engineering

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2530567	Blockchains & Cryptofinance	Vorlesung (V)	2	Philipp Schuster, Marliese Uhrig-Homburg
WS 18/19	2530568		Übung (Ü)	1	Marcel Müller

Learning Control / Examinations
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations).

Conditions
None

Recommendations
None

Remarks
New course starting winter term 2018/2019.

V Event excerpt: Blockchains & Cryptofinance (WS 18/19)

Aim
Ziel der Veranstaltung ist es, die Studierenden mit den Grundlagen zu Blochchains und Kryptowährungen vertraut zu machen. Studierende werden in die Lage versetzt, eine einfache Blockchain selbst zu implementieren, Handelsstrategien mit Kryptowährungen umzusetzen und strategische Entscheidungen zur Einführung disruptiver Plattformtechnologien wie der Blockchain im Unternehmenskontext zu treffen.

Content
Nach einer Einführung in die krytografischen Grundlagen der Blockchain-Technologie behandelt die Vorlesung die verschiedenen Eigenschaften des Bitcoin-Netzwerkes. Hierbei wird auch auf die unterschiedlichen Akteure (Anwender, Miner, ...) und ihre ökonomischen Anreize eingegangen. Im zweiten Teil der Vorlesung wird dann zunächst der Einsatz von Krytowährungen als Geldeinheiten diskutiert, bevor dann auf den Handel mit Kryptowährungen an Börsen sowie auf Bitcoin-Derivate eingegangen wird. Der dritte Teil soll potentielle Anwendungen der Blockchain-Technologie in einem Finanzsystem der Zukunft aufdecken. Zunächst werden dazu die Potentiale von Smart-Contracts diskutiert. Anschließend werden exemplarisch die Abwicklung von Wertpapiertransaktionen über dezentrale Systeme wie die Blockchain sowie Unternehmensfinanzierung über Kryptoassets (Inital Coin Offerings) besprochen.
In der begleitend zur Vorlesung angebotenen Übung werden u.a. eine eigene Blockchain implementiert, Arbitrage-Strategien mit Kryptowährungen analysiert sowie die Einführung disruptiver Plattformtechnologien wie der Blockchain im Unternehmenskontext diskutiert.

Workload
Gesamtaufwand bei 4,5 Leistungspunkten: ca. 135.0 Stunden
Präsenzzeit: 30 Stunden
Vor – und Nachbereitung der LV: 45.0 Stunden
Prüfung und Prüfungsvorbereitung: 60.0 Stunden

Literature

Narayanan, A.; J. Bonneau; E. Felten; A. Miller; S. Goldfeder (2016): Bitcoin and Crytocurrency Technologies – A Comprehensive Introduction, Princeton University Press.

Schär, F., A. Berentsen (2017): Bitcoin, Blockchain und Kryptoassets: Eine umfassende Einführung, Books on Demand, 1. Auflage.

T Course: Building Intelligent and Robo-Adviced Portfolios [T-WIWI-106442]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103247] Intelligent Risk and Investment Advisory
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
9	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
No exam in winter semester 2018/2019.
There are two grading schemes. The student will be graded with the scheme that gives him the highest score. Grading Scheme A: 70% of the grade is based on the exam, 30% is based on problem sets and quizzes. Grading Scheme B: 100% of the grade is based on the exam.
The exam tests the material of the current semester and takes place during the lecture-free period. Students who don't pass the exam are allowed to re-take the exam.

Conditions
None.

Recommendations
Good skills in applied math modeling (differential equations).

Remarks
The course is not offered regularly.

T Course: Business Administration in Information Engineering and Management [T-WIWI-102886]

Responsibility: Andreas Geyer-Schulz
Contained in: [M-WIWI-101409] Electronic Markets
[M-WIWI-101443] Information Engineering and Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540500	Business Administration in Information Engineering and Management	Vorlesung (V)	2	Andreas Geyer-Schulz
SS 2018	2540501		Übung (Ü)	1	Fabian Ball

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively.
The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

Conditions
None

Recommendations
Basic knowledge from Operations Research (linear programming) and from decision theory are expected.

V Event excerpt: Business Administration in Information Engineering and Management (SS 2018)

Aim
The student is able to

- transfer models from Business Administration to situations in business whose basic conditions are changed due to the implementation of information and communication technology,

- apply methods from Business Administration (Decision theory, game theory, operations research, etc.) to questions of Information Engineering and Management,
- analyze the potential to automize the decision making process in businesses by data bases,
- describe the process to extract relevant data for decision making from operational accounting systems.

Content
In this lecture, classical Business Administration is applied to businesses in an information- and communicationtechnological environment. The process to extract relevant data for decision making from operational accounting systems receives special attention. In order to do so, topics such as activity-based costing and transaction costs models are addressed. The automization of the decision making process in businesses by data bases is another focus of the module. To solve such issues within a company, relevant methods such as decision theory and game theory are lectured. Finally, complex business relevant questions in a dynamically changing environment are adressed by presenting models and methods from system dynamics.

Workload
The total workload for this course is approximately 150 hours (5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 40h 00m
- Preparation of the examination: 31h 00m

Sum: 150h 00m

Literature

- G. Bamberg und A. G. Coenenberg (2006). Betriebswirtschaftliche Entscheidungslehre. (13. edition), chapter 1 - 8, pages 1 - 270.
- Russell, S. and Norvig, P. (1995). Artificial Intelligence: A Modern Approach The Intelligent Agent Book. Prentice-Hall, Upper Saddle River. chapter 2, pages 31 - 37.
- Porter, M. E. (1998a). Competitive Advantage: Creating and Sustaining Superior Performance. The Free Press, New York, 2 edition. chapter 1, pages 1 - 30
- Porter, M. E. (1998b). Competitive Strategy: Techniques for Analyzing Industries and Competitors. The Free Press, New York, 2 edition. chapters 1+2, pages 1 - 46
- Horngren, C. T., Datar, S. M., and Foster, G. (2003). Cost Accounting: A Managerial Emphasis. Prentice-Hall, Upper Saddle River, 11 edition. chapter 13, pages 446 - 460
- Cooper,W.W., Seiford, L. M., and Tone, K. (2000). Data Envelopment Analysis. Kluwer Academic Publishers, Boston. chapter 2, pages 21- 25
- Copeland, T. and Weston, F. (1988). Financial Theory and Corporate Policy. Addison-Wesley, Reading, 3 edition. pages 18 - 41 and chapter 4.E, pages 92 - 95].
- Myerson, R. B. (1997). Game Theory. Harvard University Press, London, 3 edition. pages 99-105.
- Milgrom, P. and Roberts, J. (1992). Economics, Organization and Management. Prentice Hill [Chapter 2, pp. 25-39].

T Course: Business and IT Service Management [T-WIWI-102881]

Responsibility: Gerhard Satzger
Contained in: [M-WIWI-102754] Service Economics and Management
[M-WIWI-101448] Service Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2595484	Business and IT Service Management	Vorlesung (V)	2	Gerhard Satzger
WS 18/19	2595485		Übung (Ü)	1	Tobias Enders, Stefan Seebacher

Learning Control / Examinations
The assessment of this course is a written examination (60 min.) (following §4(2), 1 SPOs) and by submitting written papers as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Conditions
None

Recommendations
None

V Event excerpt: Business and IT Service Management (WS 18/19)

Aim
Students understand the importance of "servitization" for organizations, the challenges for the management of service-oriented enterprises and the interdependence of business and IT concepts and practices.
Students learn standard concepts and methods of service-oriented management and are able to apply them in practical case studies.
Student get familiar with current research and tools and are able to critically evaluate them.
Students practice to communicate in English and to work on solutions in teams.

Content
The rapid development of information and communication technology transforms many enterprises towards service-oriented structures, comprising new digital services, new business models and SOA-based process structures within larger service networks. Thus, strategic and operative management of service-oriented enterprises increasingly gains importance. In this course, we want to systematically acquire relevant know-how and apply this to real word examples. Focus will be placed on the interdependencies of business, IT aspects and concepts.

The course will be taught in English. It should provide ample opportunity for active participation of students. The course will integrate presentations of experts from business practice as well as a comprehensive case study ('en bloc' for 1-2 days) in which students will actively work on the strategic service-oriented shift of an enterprise.

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

Literature
Fitzsimmons J./Fitzsimmons, M., Service Management, Operations, Strategy and Information Technology, 6. ed., 2007
Maister, David H., Managing The Professional Service Firm, 1997
Teboul, J. , Service is Front Stage: Positioning services for value advantage, 2006
Grönroos, Service Management and Marketing, 2007

Cardoso et al. (Hrsg.) (2015), Fundamentalson Service Systems
Böhmann et al. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79
Vargo, S./Lusch, R. (2004) Evolving to a New Dominant Logic for Marketing, in: JoM68 (1),1–17
Schüritz et al., (2017):Datatizationas the Next Frontier of Servitization,ICIS Proceedings

T Course: Business Data Strategy [T-WIWI-106187]

Responsibility: Christof Weinhardt
Contained in: [M-WIWI-103117] Data Science: Data-Driven Information Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540484		Vorlesung (V)	2	Christof Weinhardt
WS 18/19	2540485		Übung (Ü)	1	Michael Knierim, Christof Weinhardt

Learning Control / Examinations
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulationand an alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. The grade isdetermined by 2/3 through the written exam and by 1/3 through the alternative exam assessment (e.g., presentation).

Conditions
None

Recommendations
Students should be familiar with basic concepts of business organisations, information systems, and programming. However, all material will be introduced, so no formal pre-conditions are applied.

Remarks
Limited number of participants.

V Event excerpt: (WS 18/19)

Aim

- Digitalization: Drivers and dynamics
- Identification of the strategic potentials of intensified data use in organization units and networks
- Requirements of organizational data management
- Key performance indicators and monitoring
- Software based modeling and processing of data streams and automated reporting

Content
With new methods for capturing and using different types of data and industry's recognition that society's use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making all add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense–making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications.

Literature

- Fleckenstein & Fellows (2017) – Modern Data Strategy
- Leimeister (2015) – Einführung in die Wirtschaftsinformatik

- Urbach & Ahlemann (2016) – IT-Management im Zeitalter der Digitalisierung
- DAMA International (2009) – The DAMA Guide to the Data Management Body of Knowledge (DAMA-DMBOK)

T Course: Business Dynamics [T-WIWI-102762]

Responsibility: Andreas Geyer-Schulz
Contained in: [M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101409] Electronic Markets
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540531	Business Dynamics	Vorlesung (V)	2	Andreas Geyer-Schulz, Paul Glenn
WS 18/19	2540532	Exercise Business Dynamics	Übung (Ü)	1	Andreas Geyer-Schulz, Paul Glenn

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively.
The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

Conditions
None

Recommendations
None

V Event excerpt: Business Dynamics (WS 18/19)

Aim
Students

- aquire the system thinking worldview for economics
- utilize different methods and tools to map the structure of complex economic systems
- are able to relate dynamic effects to these structures

- learn how to simulate systems within the computer for testing purposes
- use simulation results to improve models
- can independently as well as in teams model, analyze, and optimize business processes and applications
- know how to offer business dynamics as a consulting service and work together with client teams

Content
Corporate growth, the diffusion of new technologies, business processes, project management, product development, service quality management – all these are examples for application areas of business dynamics. They all are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics such systems can be modelled. Simulations of complex systems allow the analysis, the goal centered design, as well as the optimization of markets, business processes, policies, and organizations.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
John D. Sterman. Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, 2000.

T Course: Business Intelligence Systems [T-WIWI-105777]

Responsibility: Alexander Mädche, Mario Nadj, Peyman Toreini
Contained in: [M-WIWI-103117] Data Science: Data-Driven Information Systems
[M-WIWI-101506] Service Analytics
[M-WIWI-104068] Information Systems in Organizations
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540422	Business Intelligence Systems	Vorlesung (V)	2 + 1	Alexander Mädche, Mario Nadj

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and the Business Intelligence System challenge (40%). The exam and the Business Intelligence System challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Business Intelligence System challenge.

Conditions
None

Recommendations
Basic knowledge on database systems is helpful.

V Event excerpt: Business Intelligence Systems (WS 18/19)

Aim
The students
- understand the theoretical foundations of key Business Intelligence concepts supporting decision making
- explore key capabilities of state-of-the-art Business Intelligence systems
- learn how to successfully implement and run Business Intelligence systems from multiple perspectives, e.g. architecture, governance, implementation projects, post-implementation management
- get hands-on experience by working with commercial Business Intelligence systems (SAP HANA and reporting clients) with real-world data

Content
· Conceptual Foundations
· Provisioning: ETL Process, Metadata, Data Warehouse & Data Marts and Big Data Technologies
· Consumption: Reporting, Dashboards and its relation to (Big Data) Analytics
· BI Strategy & Governance
· BI Implementation & Post-Implementation Management
· Business Intelligence System Challenge (in cooperation with industry partner)

Literature
Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. "Decision Support and Business Intelligence Systems". Pearson.
Watson, H. J. 2014. "Tutorial: Big Data Analytics: Concepts, Technologies, and Applications," Communications of the Association for Information Systems (34), p. 24.
Arnott, D., and Pervan, G. 2014. "A critical analysis of decision support systems research revisited: The rise of design science," Journal of Information Technology (29:4), Nature Publishing Group, pp. 269–293 (doi: 10.1057/jit.2014.16).

Carlo, V. (2009). "Business intelligence: data mining and optimization for decision making". Editorial John Wiley and Sons, 308-317.
Chen, H., Chiang, R. H. L, and Storey, V. C. 2012. „Business Intelligence and Analytics: From Big Data to Big Impact," MIS Quarterly (36:4), pp. 1165-1188.
Davenport, T. 2014. Big Data @ Work, Boston, MA: Harvard Business Review.
Economist Intelligence Unit. 2015 "Big data evolution: Forging new corporate capabilities for the long term"
Power, D. J. 2008. "Decision Support Systems: A Historical Overview," Handbook on Decision Support Systems, pp. 121–140 (doi: 10.1007/978-3-540-48713-5_7).
Sharma, R., Mithras, S., and Kankanhalli, A. 2014. „Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations," European Journal of Information Systems (23:4), pp. 433-441.
Silver, M. S. 1991. "Decisional Guidance for Computer-Based Decision Support," MIS Quarterly (15:1), pp. 105-122.

T Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

Responsibility: Timm Teubner
Contained in: [M-WIWI-102806] Service Innovation, Design & Engineering
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-WIWI-101410] Business & Service Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540456	Internet Business Models	Vorlesung (V)	2	Florian Hawlitschek, Christof Weinhardt
SS 2018	2540457		Übung (Ü)	1	Florian Hawlitschek

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015). 50% of the final grade is based on the written exam and 50% is based on assignments from the exercises. Successful completion of the exercises is a prerequisite for admission to the written exam. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Conditions
None

Recommendations
None

V Event excerpt: Internet Business Models (SS 2018)

Aim
The student

- is able to list the most important features of web application lifecycles,
- analyses, designs and implements web applications,
- evaluates and argues internet business models with special requirements and features,
- is able to estimate the practicability of business models.

Content
The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.

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

Literature
Will be announced within the course.

T Course: Business Planning [T-WIWI-102865]

Responsibility: Orestis Terzidis
Contained in: [M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2545005		Seminar (S)	2	Ralph Henn, Orestis Terzidis

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
None

Recommendations
None

V Event excerpt: (SS 2018)

Aim
Students will learn methods on how to turn patents as well as business ideas into a solid business model and furthermore to develop them into a concrete Business Plan.

Literature
Osterwalter, Alexander, Pigneur, Yves (2010): Business Model Generation
McKinsey & Company (2010): Planen, gründen, wachsen.

T Course: Business Strategies of Banks [T-WIWI-102626]

Responsibility: Wolfgang Müller
Contained in: [M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2530299	Business Strategies of Banks	Vorlesung (V)	2	Wolfgang Müller

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

V Event excerpt: Business Strategies of Banks (WS 18/19)

Aim
Students are are in a position to discuss the principles of commercial banking. They are familiar with fundamental concepts of bank management and are able to apply them.

Content
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer

T Course: Case Studies in Sales and Pricing [T-WIWI-102834]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101487] Sales Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	deutsch/englisch	Jedes Wintersemester	Prüfungsleistung anderer Art	3

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2572182	Case Studies in Sales and Pricing	Block (B)	1	Assistenten, Martin Klarmann

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a group presentation with a subsequent round of questions totalling 30 minutes.

Conditions
None

Recommendations
None

Remarks
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu).
Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).
Please note that only one of the 1.5-ECTS courses can be attended in this module.

V Event excerpt: Case Studies in Sales and Pricing (WS 18/19)

Aim
Students

- are able to work on a case study in the field of sales and pricing on their own
- are able to apply quantitative calculations on a case study in the field of sales and pricing
- are able to collect information and data beyond the case study description and make use of them for solving their tasks
- are able to apply theories from related lectures to a practical example
- are able to present their results in a a structured and concise manner
- are able to organize their teamwork and collaborate in teams

Content
Students work in groups on case studies from the field of sales and pricing. The case studies contain quantitative calculations in the context of sales and pricing as well as tasks which are to be solved by logical reasoning. When solving the case studies, theoretical sales and pricing content is applied to practical problems. Finally, the results are presented by the group and discussed.

Workload
Total work load for 1.5 ECTS: ca. 45 hours

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T Course: Case Studies Seminar: Innovation Management [T-WIWI-102852]

Responsibility: Marion Weissenberger-Eibl
Contained in: [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2545105	Case studies seminar: Innovation management	Seminar (S)	2	Marion Weissenberger-Eibl

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
None

Recommendations
Prior attendance of the course *Innovation Management* [2545015] is recommended.

V Event excerpt: Case studies seminar: Innovation management (WS 18/19)

Aim
The students

- look critically into current research topics in the field of Innovation Managament
- do literature search based on a given topic, identify relevant literature and evaluate this literature,
- give presentations in a scientific context in front of an auditorium to present the results of the research,
- train their presentation skills,
- present results of the research in a seminar thesis as a scientific publication.

Content
The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the automotive industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course.
A short introduction to presentation techniques is planned to help students prepare the seminar papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

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

Responsibility: Esther Mohr
Contained in: [M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-102805] Service Operations
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550494	Challenges in Supply Chain Management	Vorlesung (V)	3	Esther Mohr

Learning Control / Examinations
The assessment consists of a written paper and an oral exam of ca. 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

Conditions
None

Recommendations
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Remarks
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course. The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

V Event excerpt: Challenges in Supply Chain Management (SS 2018)

Aim
The student

- analyzes and evaluates current developments and approaches in the design and planning of supply chain strategis, especially with respect to future challenges in this area,
- explains and utilizes theoretical concepts and methods for the design and strategy of supply chains,
- - classifies and accounts for trend-setting theories in the SCM context such as Behavioral Supply Chain Management or Supply Chain Analytics.

Content
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).
The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.
This course will include working on cutting edge supply chain topics like Industry 4.0 / "Internet of Everything in production", supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

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

Literature
To be defined depending on the topic.

T Course: Cognitive Systems [T-INFO-101356]

Responsibility: Rüdiger Dillmann, Alexander Waibel
Contained in: [M-INFO-100819] Cognitive Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24572		Vorlesung / Übung (VÜ)	4	Rüdiger Dillmann, Thai Son Nguyen, Sebastian Stüker, Alexander Waibel

V Event excerpt: (SS 2018)

Aim
Studierende beherrschen

- Die relevanten Elemente eines technischen kognitiven Systems und deren Aufgaben.
- Die Problemstellungen dieser verschiedenen Bereiche können erkannt und bearbeitet werden.
- Weiterführende Verfahren können selbständig erschlossen und erfolgreich bearbeitet werden.
- Variationen der Problemstellung können erfolgreich gelöst werden.
- Die Lernziele sollen mit dem Besuch der zugehörigen Übung erreicht sein.

Die Studierenden beherrschen insbesondere die grundlegenden Konzepte und Methoden der Bildrepräsentation und Bildverarbeitung wie homogene Punktoperatoren, Histogrammauswertung sowie Filter im Orts- und Frequenzbereich. Sie beherrschen Methoden zur Segmentierung von 2D-Bildaten anhand von Schwellwerten, Farben, Kanten und Punktmerkmalen. Weiterhin können die Studenten mit Stereokamerasystemen und deren bekannten Eigenschaften, wie z.B. Epipolargeometrie und Triangulation, aus gefundenen 2D Objekten, die 3D Repräsentationen rekonstruieren. Studenten kennen den Begriff der Logik und können mit Aussagenlogik, Prädikatenlogik und Planungssprachen umgehen. Insbesondere können sie verschiedene Algorithmen zur Bahnplanung verstehen und anwenden. Ihnen sind die wichtigsten Modelle zur Darstellung von Objekten und der Umwelt bekannt sowie numerische Darstellungsmöglichkeiten eines Roboters.
Die Studierenden beherrschen die grundlegenden Methoden zur automatischen Signalvorverarbeitung und können deren Vor- und Nachteile benennen. Für ein gegebenes Problem sollen sie die geeigneten Vorverarbeitungsschritte auswählen können. Die Studierenden sollen mit der Taxonomie der Klassifikationssysteme arbeiten können und Verfahren in das Schema einordnen können. Studierende sollen zu jeder Klasse Beispielverfahren benennen können. Studierende sollen in der Lage sein, einfache Bayesklassifikatoren bauen und hinsichtlich der Fehlerwahrscheinlichkeit analysieren können. Studierende sollen die Grundbegriffe des maschinellen Lernens anwenden können, sowie vertraut sein mit Grundlegenden Verfahren des maschinellen Lernens. Die Studierenden sind vertraut mit den Grundzügen eines Multilayer-Perzeptrons und sie beherrschen die Grundzüge des Backpropagation Trainings. Ferner sollen sie weitere Typen von neuronalen Netzen benennen und beschreiben können. Die Studierenden können den grundlegenden Aufbau eines statistischen Spracherkennungssystems für Sprache mit großem Vokabular beschreiben. Sie sollen einfache Modelle für die Spracherkennung entwerfen und berechnen können, sowie eine einfache Vorverarbeitung durchführen können. Ferner sollen die Studierenden grundlegende Fehlermaße für Spracherkennungssysteme beherrschen und berechnen können.

Content
Kognitive Systeme handeln aus der Erkenntnis heraus. Nach der Reizaufnahme durch Perzeptoren werden die Signale verarbeitet und aufgrund einer hinterlegten Wissensbasis gehandelt. In der Vorlesung werden die einzelnen Module eines kognitiven Systems vorgestellt. Hierzu gehören neben der Aufnahme und Verarbeitung von Umweltinformationen (z. B. Bilder, Sprache), die Repräsentation des Wissens sowie die Zuordnung einzelner Merkmale mit Hilfe von Klassifikatoren. Weitere Schwerpunkte der Vorlesung sind Lern- und Planungsmethoden und deren Umsetzung. In den Übungen werden die vorgestellten Methoden durch Aufgaben vertieft.

Workload
154h
1. Präsenzzeit in Vorlesungen/Übungen: 30 + 9
2. Vor-/Nachbereitung derselbigen: 20 + 24
3. Klausurvorbereitung/Präsenz in selbiger: 70 + 1

T Course: Computational FinTech with Python and C++ [T-WIWI-106496]

Responsibility:
Contained in: [M-WIWI-103261] Disruptive FinTech Innovations
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	englisch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530373	Computational FinTech with Python and C++	Praktikum (P)	1,5	Elmar Jakobs, Maxim Ulrich
WS 18/19	2500003	Computational FinTech with Python and C++	Praktikum (P)	1,5	Maxim Ulrich

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

Conditions
There are two conditions for taking this course:

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

Modeled Conditions
The following conditions must be met:

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

V Event excerpt: Computational FinTech with Python and C++ (WS 18/19)

Aim
Implementation of different programming specific concepts and skills.

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

Workload
Roughly 45 hours.

V Event excerpt: Computational FinTech with Python and C++ (SS 2018)

Aim
Implementation of different programming specific concepts and skills.

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

Workload
Roughly 45 hours.

T Course: Computational Geometry [T-INFO-104429]

Responsibility: Dorothea Wagner
Contained in: [M-INFO-101214] Algorithms in Computer Graphics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Unregelmäßig	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400058	Computational Geometry	Vorlesung / Übung (VÜ)	3	Guido Brückner, Tamara Mtsentlintze
WS 18/19	2400032	Computational Geometry	Vorlesung / Übung (VÜ)	3	Tamara Mtsentlintze, Darren Strash

V Event excerpt: Computational Geometry (SS 2018)

Aim
After successful participation in this module students shall be able to
- explain concepts, structures and problem definitions that were presented in class
- execute algorithms on example instances, analyze them and explain their properties
- select which algorithms and data structures are suitable for solving a given geometric problem and adapt them appropriately
- analyze new geometric problems and design own solutions based on the concepts and techniques presented in this lecture

Workload
150 h

Literature
Mark de Berg, Otfried Cheong, Marc van Kreveld, Mark Overmars: Computational Geometry Algorithms and Applications, Springer Verlag 2008
Rolf Klein: Algorithmische Geometrie, Springer Verlag 2005

V Event excerpt: Computational Geometry (WS 18/19)

Aim
After successful participation in this module students shall be able to
- explain concepts, structures and problem definitions that were presented in class
- execute algorithms on example instances, analyze them and explain their properties
- select which algorithms and data structures are suitable for solving a given geometric problem and adapt them appropriately
- analyze new geometric problems and design own solutions based on the concepts and techniques presented in this lecture

Workload
150 h

Literature
Mark de Berg, Otfried Cheong, Marc van Kreveld, Mark Overmars: Computational Geometry Algorithms and Applications, Springer Verlag 2008
Rolf Klein: Algorithmische Geometrie, Springer Verlag 2005

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

Responsibility: Maxim Ulrich
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Learning Control / Examinations
The grade consists of an exam and seven problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

Conditions
None.

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-107032] *Computational Risk and Asset Management I* must not have been started.

Recommendations
None

T Course: Computational Risk and Asset Management I [T-WIWI-107032]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103247] Intelligent Risk and Investment Advisory
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
No exam in winter semester 2018/2019.
The grade consists of an exam and seven problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

Conditions
None.

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-102878] *Computational Risk and Asset Management* must not have been started.

Recommendations
None

T Course: Computational Risk and Asset Management II [T-WIWI-106494]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-103247] Intelligent Risk and Investment Advisory
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
No exam in winter term 2018/2019.
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and 6 problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

Conditions
None.

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

Remarks
New course starting winter term 2017/2018.

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

Responsibility: Thomas Dreier
Contained in: [M-INFO-101215] Intellectual Property Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2411604	Computer Contract Law	Vorlesung (V)	2	Michael Bartsch, Philipp Harnischmacher

V Event excerpt: Computer Contract Law (WS 18/19)

Aim
Ziel der Vorlesung ist es, den Studenten aufbauend auf bereits vorhandenen Kenntnissen zum Schutz von Software als Immaterialgut vertiefte Einblicke in die Vertragsgestaltung in der Praxis zu verschaffen. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den technischen Merkmalen des Vertragsgegenstandes und dem rechtlichen Regelungsrahmen erkennen. Die Entwurfsarbeiten sollen aufbauend auf Vorbereitungen seitens der Studenten in den Vorlesungsstunden gemeinsam erfolgen. Lernziel ist es, später selbst Verträge erstellen zu können.

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

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

Literature

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

Elective Literature
tba in the transparencies

T Course: Computer Vision for Human-Computer Interaction [T-INFO-101347]

Responsibility: Rainer Stiefelhagen
Contained in: [M-INFO-101239] Machine Vision
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24180	Computer Vision for Human-Computer Interaction	Vorlesung (V)	4	Muhammad Saquib Sarfraz, Rainer Stiefelhagen

V Event excerpt: Computer Vision for Human-Computer Interaction (WS 18/19)

Aim

- Die Studierenden bekommen einen Überblick über grundlegende und aktuelle Bildverarbeitungsverfahren zur Erfassung von Menschen in Bildern und Bildfolgen sowie deren verschiedene Anwendungen im Bereich der Mensch-Maschine-Interaktion.
- Die Studierenden verstehen grundlegende Konzepte und aktuelle Verfahren zur Erfassung von Menschen in Bildern und Bildfolgen, deren Möglichkeiten und Grenzen und kann diese anwenden

Content
The student acquires a basic understanding of computer vision topics within the context of human-computer interaction and learns how to apply them.

Workload
Besuch der Vorlesungen: ca. 40 Stunden
Vor- und Nachbereitung der Vorlesung: ca. 40 Stunden
Durchführung der Programmierprojekte: ca. 30 Stunden
Klausurvorbereitung: ca. 70 h
Summe: ca. 180 Stunden

Literature
Weiterführende Literatur
Wissenschaftliche Veröffentlichungen zum Thema, werden auf der VL-Website bereitgestellt.

T Course: Consulting in Practice [T-INFO-101975]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
1.5	Unregelmäßig	Studienleistung	1

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

Responsibility: Sven Feurer
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Einmalig	Prüfungsleistung schriftlich	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: Content-based Image and Video Retrieval [T-INFO-101389]

Responsibility: Rainer Stiefelhagen
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24628	Deep Learning for Computer Vision	Vorlesung (V)	2	Muhammad Saquib Sarfraz, Rainer Stiefelhagen

V Event excerpt: Deep Learning for Computer Vision (SS 2018)

Aim
Students should be able to grasp the underlying concepts in the field of deep learning and its various applications.

- Understand the theoretical basis of deep learning
- Understand the Convolutional Neural Networks (CNN)
- Develop basis for the concepts and algorithms used in building and training the CNNs.
- Able to apply deep learning in different computer vision applications

Content
The lecture introduces the basics, as well as advanced aspects of deep learning methods and their application for a number of computer vision tasks. The following topics will be addressed in the lecture:
- Introduction to Deep Learning
- Convolutional Neural Networks (CNN): Background
- CNNs: basic architectures and learning algorithms
- Object Recognition with CNN
- Image Segmentation with CNN
- Recurrent Neural Networks
- Generating image descriptions (Image Captioning)
- Automatic question answering (Visual Question Answering)
- Generative Adversarial Networks (GAN) and their applications
- Deep Learning platforms and tools

Workload
90 Stunden

T Course: Context Sensitive Systems [T-INFO-107499]

Responsibility: Michael Beigl
Contained in: [M-INFO-100728] Context Sensitive Systems

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400099	Context Sensitive Systems	Übung (Ü)	1	Till Riedel
SS 2018	24658	Context Sensitive Systems	Vorlesung (V)	2	Michael Beigl, Till Riedel

V Event excerpt: Context Sensitive Systems (SS 2018)

Aim
Ziel der Vorlesung ist es, Kenntnisse über Grundlagen und weitergehende Methoden und Techniken zu kontextsensitiven Systemen in vermitteln.
Nach Abschluss der Vorlesung können die Studierenden

- das Konzept von Kontext erörtern und verschiedene für die Informationsverarbeitung durch Menschen und Computer relevante Kontexte aufzählen
- kontextsensitive Systemen anhand verschiedener Kriterien kategorisieren und unterscheiden
- Aus Methoden zur Erfassung, Vernetzung, Merkmalsextraktion, Klassifikation und Adaption sinnvoll zu Kontextanhand einer Referenzarchitektur konkrete technische Implementierungen durch existierende Komponenten ableiten
- die Leistungsfähigkeit konkreter kontextsensitiver Systemen anhand von experimentell ermittelter Metriken bewerten und vergleichen
- Probleme der Skalierung von Datenanalysemethoden im praktischen Anwendungsfall durch Einsatz von Big Data Architekturen addressieren
- Selbst für anhand gegebener Anforderungen neue kontextsensitive Systeme unter Einsatz existierender "Sensor", "Machine Learning" und "Big Data"-Komponenten entwerfen.

Content
Kontextsensitivität (englisch: Context-Awareness) ist die Eigenschaft einer Anwendung sich situationsgemäß zu verhalten. Beispiele für aktuelle kontextsensitive Systeme sind mobile Apps, die ihrer Ausgabe anhand der Nutzungshistorie, der Lokation und mit Hilfe der eingebauten Sensorik auf die Umgebungsbedingungen anpassen.
Kontext (wie auch in der zwischenmenschlichen Kommunikation) ist Grundlage einer effizienteren Interaktion zwischen Rechnersystemen und ihren Nutzern, idealerweise ohne explizite Eingaben. Kontexterkennung unterstützt außerdem in verschiedensten Systemen komplexe Entscheidungen durch Vorhersagen auf Basis großer Datenmengen. Die verschiedenen Facetten des Kontextbegriffes, die für das Verständnis kontextsensitiver Systeme gebraucht werden wie sensorischer, Anwendungs-, und Nutzerkontext, werden in der Vorlesung erläutert und ein allgemeiner Entwurfsansatz für Kontextverarbeitung abgeleitet.
Wissen über den aktuellen und voraussichtlichen Kontext erhält ein System, indem es Zeitserien und Sensordatenströme kontinuierlich vorverarbeitet und über prädiktive Analysen klassifiziert. Zur Erstellung geeigneter Modelle werden verschiedenste Methoden des maschinellen Lernens in der Vorlesung vorgestellt. Im Fokus der Vorlesung steht der Entwurf, Implementierung und Integration einer vollständigen, effizienten und verteilten Verarbeitungskette auf der Basis geeigneter "Big Data"-Ansätze. Geeignete technische Lösungsansätze für große Datenbestände, zeitnahe Verarbeitung, verschiedene Datentypen, schützenswerten Daten und Datenqualität werden mit Bezug auf das Anwendungsfeld diskutiert. Die Vorlesung vermittelt weiterhin Wissen und Methoden in den Bereichen Sensorik, sensorbasierte Informationsverarbeitung, wissensbasierte Systeme und Mustererkennung, intelligente, reaktive Systeme.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).

Aktivität
Arbeitsaufwand
Präsenzzeit: Besuch der Vorlesung
15 x 90 min
22 h 30 min
Vor- / Nachbereitung der Vorlesung
15 x 90 min
22 h 30 min
Literatur erarbeiten
14 x 45 min
10 h 30 min
Selbständige Übungen
14 x 45 min
10 h 30 min
Foliensatz 2x durchgehen
2 x 12 h
24 h 00 min
Prüfung vorbereiten
30 h 00 min
SUMME
120 h 00 min
Arbeitsaufwand für die Lerneinheit " Kontextsensitive Systeme"

Literature
Earley, Seth. "Analytics, Machine Learning, and the Internet of Things." *IT Professional* 1 (2015): 10-13. (
Schilit, Bill, Norman Adams, and Roy Want. "Context-aware computing applications." *Mobile Computing Systems and Applications, 1994. WMCSA 1994. First Workshop on*. IEEE, 1994.
Abowd, Gregory D., et al. "Towards a better understanding of context and context-awareness." *Handheld and ubiquitous computing*. Karlsruhe, 1999.

T Course: Convex Analysis [T-WIWI-102856]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

Conditions
None

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Remarks
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T Course: Copyright [T-INFO-101308]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101215] Intellectual Property Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24121	Copyright	Vorlesung (V)	2	Thomas Dreier

V Event excerpt: Copyright (WS 18/19)

Aim
Der/die Studierende hat vertiefte Kenntnisse auf dem Gebiet des Urheberrechts. Er/sie erkennt die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen, den informations- und kommunikationstechnischen Rahmenbedingungen und dem rechtlichen Regelungsrahmen. Er/sie kennt die Regelungen des nationalen, europäischen und internationalen Urheberrechts und kann sie auf praktische Sachverhalte anwenden.

Content
Die Vorlesung befasst sich mit den urheberrechtlich geschützten Werken, den Rechten der Urheber, dem Rechtsverkehr, den urheberrechtlichen Schrankenbestimmungen, der Dauer, den verwandten Schutzrechten, der Rechtsdurchsetzung und der kollektiven Rechtewahrnehmung. Gegenstand der Vorlesung ist nicht allein das deutsche, sondern auch das europäische und das internationale Urheberrecht. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen, den informations- und kommunikationstechnischen Rahmenbedingungen und dem rechtlichen Regelungsrahmen erkennen. Sie sollen die Regelungen des nationalen, europäischen und internationalen Urheberrechts kennen lernen und auf praktische Sachverhalte anwenden können.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt 90 h, davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

Literature
Schulze, Gernot: "Meine Rechte als Urheber", Verlag C.H.Beck, aktuelle Auflage
Weiterführende Literatur
Ergänzende Literatur wird in den Vorlesungsfolien angegeben.

T Course: Corporate Compliance [T-INFO-101288]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400087	Corporate Compliance	Vorlesung (V)	2	Andreas Herzig

V Event excerpt: Corporate Compliance (WS 18/19)

Aim
Der/die Studierende hat vertiefte Kenntnisse hinsichtlich der Thematik "Governance, Risk & Compliance" sowohl im Hinblick auf die regulatorischen als auch im Hinblick auf die betriebswirtschaftlichen Rahmenbedingungen sowie ein profundes Verständnis für die Notwendigkeit dieser Systeme. Er/sie kennt die nationalen, europäischen und internationalen Regularien und kann sie anwenden. Der/die Studierende ist in der Lage, praxisrelevante Sachverhalte selbstständig zu analysieren, zu bewerten und in den Kontext einzuordnen.

Content
Die Vorlesung beinhaltet die theoretische wie anwendungsorientierte Einbettung der Thematik in den Kontext der regulatorischen Rahmenbedingungen auf nationaler, internationaler sowie auf EU-Ebene. Ein umfassender Überblick wird durch die Betrachtung der Haftungsaspekte, der Prüfungsstandards, des Compliance-Management-Systems, des Risikomanagementsystems, Assessment-Methodiken, des Umgangs mit Verstößen sowie der Berücksichtigung der Thematik bei Vorstand und Aufsichtsratssitzungen erzielt. Zusätzlich werden praxisrelevante Ansätze und "Best-Practice"-Leitfäden vorgestellt, sowie Beispiele der Wirtschafts- und Unternehmenskriminalität erläutert. Die Studenten sollen die genannten GRC-Systeme modellieren, bewerten und auf ihre Wirksamkeit hin prüfen können.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden, davon 30 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie15 h für die Klausurvorbereitung

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

Responsibility: Martin Ruckes
Contained in: [M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101483] Finance 2
[M-WIWI-101453] Applied Strategic Decisions
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530214	Corporate Financial Policy	Vorlesung (V)	2	Martin Ruckes
SS 2018	2530215		Übung (Ü)	2	Daniel Hoang, Martin Ruckes

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

Conditions
None

V Event excerpt: Corporate Financial Policy (SS 2018)

Aim
Students

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

Content
Topics:

- Corporate financing: Some stylized facts
- Financing capacity
- Determination of outside financing
- Liquidity management: Maturity choice
- Cash flows with hidden characteristics
- Cash flows and product markets: Strategic financial structure choice
- Investor activism
- Takeovers

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

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

T Course: Corporate Risk Management [T-WIWI-109050]

Responsibility: Martin Ruckes
Contained in: [M-WIWI-101483] Finance 2

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2530214	Corporate Risk Management	Vorlesung / Übung (VÜ)	2	Daniel Hoang, Martin Ruckes

Learning Control / Examinations
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

Conditions
None

Recommendations
None

Remarks
The course is offered as a block course in the winter term.

V Event excerpt: Corporate Risk Management (WS 18/19)

Aim
Students

- are able to explain the importance of risk management for the success of firms,
- are able to identify suitable risk measures for companies,
- can derive measures for the risk reduction of firms
- and are able to develop suitable concepts for the organizational structure of risk management in firms.

Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload
The total workload of this course is approximately 90.0 hours. For further information, see German version.

Literature

- Friberg, Richard. *Managing Risk and Uncertainty: A Strategic Approach*. Cambridge, MA: Managing Risk and Uncertainty, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The New Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006

T Course: Country Manager Simulation [T-WIWI-106137]

Responsibility: Sven Feurer
Contained in: [M-WIWI-101487] Sales Management
[M-WIWI-101490] Marketing Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	englisch	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2572172	Country Manager Simulation	Block (B)		Sven Feurer

Learning Control / Examinations
Alternative exam assessment (30 minutes presentation) according to § 4 paragraph 2 Nr. 3 of the examination regulation SPO 2015.

Remarks
The course language is English. In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
Please note that only one of the 1.5-ECTS courses can be chosen in this Module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

V Event excerpt: Country Manager Simulation (WS 18/19)

Aim
Students...

- ... understand what makes marketing and sales special in an international context (role of culture, international buyer behavior, strategic market entry decisions, international marketing mix management)
- ... are able to analyze relevant country, customer and competitor information and derive a suitable market entry strategy
- ... understand important concepts of international sales and are able to apply these in the realm of the simulation
- ... are capable of re-evaluating and adapting their strategy on the basis of changes in the market environment
- ... are able to critically evaluate the success of the chosen strategy and present the results in front of the class

Content
Understanding Culture
Understanding International Buyer Behavior
Market Entry Decisions
International Marketing and Sales Management (adaptation vs. differentiation)

Workload
Total workload for 1.5 ECTS: ca. 45 hours

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T Course: Credit Risk [T-WIWI-102645]

Responsibility: Marliese Uhrig-Homburg
Contained in: [M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2530565	Credit Risk	Vorlesung / Übung (VÜ)	3	Michael Hofmann, Marliese Uhrig-Homburg

Learning Control / Examinations
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date.

Conditions
None

Recommendations
See German version.

Remarks
See German version.

V Event excerpt: Credit Risk (WS 18/19)

Aim
The objective of this course is to become familiar with the credit markets and the credit risk indicators like ratings, default probabilities and credit spreads. The students learn about the components of credit risk (e.g. default time and default rate) and quantify these in different theoretical models to price credit derivatives.

Content
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

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

Literature

- Lando, D., Credit risk modeling: Theory and Applications, Princeton Univ. Press, (2004).
- Uhrig-Homburg, M., Fremdkapitalkosten, Bonitätsrisiken und optimale Kapitalstruktur, Beiträge zur betriebswirtschaftlichen Forschung 92, Gabler Verlag, (2001).

Elective literature:

- Bluhm, C., Overbeck, L., Wagner, C. , Introduction to Credit Risk Modelling, 2nd Edition, Chapman & Hall, CRC Financial Mathematics Series, (2010).
- Duffie, D., Singleton, K.J., Credit Risk: Pricing, Measurement and Management, Princeton Series of Finance, Prentice Hall, (2003).

T Course: Critical Information Infrastructures [T-WIWI-109248]

Responsibility: Ali Sunyaev
Contained in: [M-WIWI-104403] Critical Digital Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch/englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511400		Vorlesung (V)	2	Ali Sunyaev
WS 18/19	2511401		Übung (Ü)	1	Ali Sunyaev

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None.

Remarks
New lecture from winter semester 2018/2019.

V Event excerpt: (WS 18/19)

Aim
Students know concepts and technologies relevant for the design and reliable operation of critical information infrastructures and can leverage them to develop solutions for real-world challenges.

T Course: Cryptographic Voting Schemes [T-INFO-101279]

Responsibility: Jörn Müller-Quade
Contained in: [M-INFO-101197] Computer Security
[M-INFO-101198] Advanced Topics in Cryptography
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung mündlich	1

T Course: Current Issues in Innovation Management [T-WIWI-102873]

Responsibility: Marion Weissenberger-Eibl
Contained in: [M-WIWI-101507] Innovation Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Unregelmäßig	Prüfungsleistung anderer Art	1

Learning Control / Examinations
Non exam assessment (following §4(2) 3 of the examination regulation).

Conditions
None

Recommendations
None

Remarks
Please note that the seminars we offer vary from semester to semester. Information about the currently offered seminars can be found in the Wiwi-Portal and on the iTM Website.

T Course: Current Issues in the Insurance Industry [T-WIWI-102637]

Responsibility: Wolf-Rüdiger Heilmann
Contained in: [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
2	Jedes Sommersemester	Prüfungsleistung schriftlich	1

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

Conditions
None

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

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

T Course: Data and Storage Management [T-INFO-101276]

Responsibility: Bernhard Neumair
Contained in: [M-INFO-101210] Dynamic IT-Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24074		Vorlesung (V)	2	Bernhard Neumair

V Event excerpt: (WS 18/19)

Aim

- Die Studierenden verstehen die grundlegenden Modelle, Verfahren und Technologien für die Verwaltung von Daten in Massenspeicherarchitekturen
- Die Studierenden beurteilen die unterschiedlichen Speicherarchitekturen und Konzepte für die Speichervirtualisierung
- Die Studierenden analysieren Storage Area Networks (SAN) und Network Attached Storage (NAS)
- Die Studierenden verstehen Speichernetze und Speicherschnittstellen wie z.B. Fiber Channel und iSCSI
- Die Studierenden verstehen virtuelle sowie globale Filesysteme (z.B. CIFS, NFS)
- Die Studierenden verstehen RAID-Technologien und beurteilen die verschiedenen RAID-Klassen
- Die Studierenden verstehen die Technologie und Architektur von Speichermedien und analysieren ihre Performanz

Content
Ausgehend von den aktuellen Anforderungen an die Massendatenspeicherung in Rechenzentren werden unterschiedliche Speicherarchitekturen und Konzepte für die Speichervirtualisierung erläutert. Diskutiert werden dabei u.a. eine Taxonomie der Speichervirtualisierung, Storage Area Networks (SAN), Network Attached Storage (NAS), Fiber Channel, iSCSI und virtuelle sowie globale Filesysteme (z.B. CIFS, NFS). Darüber hinaus werden Verfahren für die Gewährleistung einer hohen und langfristigen Verfügbarkeit der Daten (vgl. Backup, Replikation und Langzeitarchivierung) vermittelt. Zusätzlich werden zukünftige Anforderungen, die aus der Verarbeitung großskaliger Daten sowie dem Verbund von räumlich verteilten Speicherinfrastrukturen (vgl. Cloud Storage) resultieren, diskutiert. Aktuelle Herausforderungen bei der Planung und dem Betrieb von Speicherinfrastrukturen werden erläutert und Plattformen sowie Werkzeuge für deren Verwaltung vorgestellt. Den Abschluss der Vorlesung bildet die Betrachtung von externen Anforderungen an den Betrieb von Speicherinfrastrukturen beispielsweise durch den Datenschutz sowie der IT-Sicherheit.

Workload
90 h
Präsenzzeit Vorlesung 22,5 h (15 x 1,5 h)
Vor- und Nachbereitung Vorlesung 45 h (15 x 3 h)
Vorbereitung Prüfung 22,5 h

Literature
Literatur
▪ G. Somasundaram [Hrsg.], Information Storage and Management, Wiley, ISBN 978-0-470-29421-5, 2009. ▪ U. Troppens, R. Erkens, W. Müller, Speichernetze: Grundlagen und Einsatz von Fibre Channel SAN, NAS, iSCSI und InfiniBand, dpunkt, 2. Auflage, ISBN 978-3-89864-393-1, 2008.
Weiterführende Literatur:
▪ R. Döllinger, R. Legler, D. T. Bui, Praxishandbuch Speicherlösungen, dpunkt, ISBN 978-3-89864-588-1, 2010. ▪ A. J. G. Hey [Hrsg.], The fourth paradigm: data-intensive scientific discovery, Microsoft Research, ISBN 978-0-9825442-0-4, 2009.

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
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2520375		Vorlesung (V)	2/4	Rheza Nakhaeizadeh

Learning Control / Examinations

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

Conditions
None

V Event excerpt: (SS 2018)

Aim
After completing of the course the students:

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

Content
Part one: Data Mining
Why Data Mining?

- What is Data Mining?
- History of Data Mining
- Conferences and Journals on Data Mining
- Potential Applications
- Data Mining Process:
- Business Understanding
- Data Understanding
- Data Preparation
- Modeling
- Evaluation
- Deployment
- Interdisciplinary aspects of Data Mining

- Data Mining tasks
- Data Mining Algorithms (Decision Trees, Association Rules,
- Regression, Clustering, Neural Networks)
- Fuzzy Mining
- OLAP and Data Warehouse
- Data Mining Tools
- Trends in Data Mining

Part two: Examples of application of Data Mining

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

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

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

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

T Course: Data Privacy: From Anonymization to Access Control [T-INFO-108377]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-101256] Theory and Practice of Data Warehousing and Mining

ECTS	Recurrence	Exam type	Version
3	Unregelmäßig	Prüfungsleistung schriftlich	1

T Course: Data Protection by Design [T-INFO-108405]

Responsibility: Oliver Raabe
Contained in: [M-INFO-101242] Governance, Risk & Compliance

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400065	Data protection by design	Vorlesung (V)	2	Oliver Raabe
WS 18/19	2400052	Data protection by design	Vorlesung (V)	2	Oliver Raabe

V Event excerpt: Data protection by design (SS 2018)

Aim
Die Studierenden sollen nach der Vorlesung insbesondere die Inhalte und Systematik der technikrechtlichen Regelungen der DSGVO verstehen und auf neue Fallgestaltungen in IKT-Systemen anwenden können.

Content
Ab 2018 gilt in der EU einheitlich die Datenschutzgrundverordnung (DSGVO). Diese Regelungen wird für den Bereich der elektronischen Kommunikation durch eine ePrivacy-Verordnung (Regulation on Privacy and Electronic Communications) ergänzt. Im Rahmen der Vorlesung soll das grundrechtlichen Herkommen der Regelungen und das Verständnis für die Systematik der Verordnungen erabreitet werden. Im Mittelpunkt steht aus der Perpsektive von neuen Sachgestaltungen der IKT in verteilten Systemen insbesondere der technikrechtliche Datenschutz und der Risikobegriff der DSGVO. Die Studierenden werden zudem vertieft mit der Methodik rechtswissenschaftlicher Argumentation im Technikrecht vertraut.

Workload
ca. 90 h, davon 22,5 h Präsenzzeit

V Event excerpt: Data protection by design (WS 18/19)

Aim
Die Studierenden sollen nach der Vorlesung insbesondere die Inhalte und Systematik der technikrechtlichen Regelungen der DSGVO verstehen und auf neue Fallgestaltungen in IKT-Systemen anwenden können.

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Workload
ca. 90 h, davon 22,5 h Präsenzzeit

T Course: Data Protection Law [T-INFO-101303]

Responsibility: Nikolaus Marsch
Contained in: [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-101217] Public Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24018		Vorlesung (V)	2	Nikolaus Marsch

V Event excerpt: (WS 18/19)

Aim
Die Studierenden sollen nach der Vorlesung die unions- und verfassungsrechtlichen Hintergründe, die grundlegenden Strukturprinzipien des Datenschutzrechts und die diese Prinzipien konkretisierenden Regelungen des BDSG, des TKG und des TMG kennen. Sie sollen in der Lage sein, einfache Fälle aus dem Datenschutzrecht zu lösen.

Content
Auf der Grundlage der verfassungs- und unionsrechtlichen Hintergründe wird primär das Bundesdatenschutzgesetz behandet. Hier werden die Regelungsgrundsätze (wie Verbotsprinzip, Erforderlichkeit und Zweckbindung), die personenbezogenenen Daten als Regelungsobjekt, die Rechte der Betroffenen sowie die Zulässigkeit der verschiedenen Datenbearbeitungsvorgänge dargelegt. Auch organisatorische Vorschriften, insb. der Datenschutzbeauftragte, werden angesprochen. Zudem befasst sich die Vorlesung mit den bereichsspezifischen Regelungen zum Telekommunikationsdatenschutz sowie zum Datenschutz bei Telemediendiensten.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden (3.0 Credits).

- Präsenzzeit: Besuch der Vorlesung 15 x 90 min = 22 h 30 min
- Vor-/Nachbereitung der Vorlesung 15 x 120 min = 30 h 00 min
- Skript 2 x wiederholen & 2 x 10 h = 20 h 00 min
- Prüfung vorbereiten = 17 h 30 min
- Summe 90 h 00 min

Literature
Wird in der Veranstaltung bekannt gegeben.
Weiterführende Literatur
Wird in der Veranstaltung bekannt gegeben.

T Course: Database Systems [T-INFO-101497]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101178] Communication and Database Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24516		Vorlesung (V)	2	Klemens Böhm, Jutta Mülle

V Event excerpt: (SS 2018)

Aim
Der/die Studierende

- ist in der Lage den Nutzen von Datenbank-Technologie darzustellen,
- kennt die Modelle und Methoden bei der Entwicklung von funktionalen Datenbank-Anwendungen,
- ist in der Lage selbstständig einfache Datenbanken anzulegen und Zugriffe auf diese zu tätigen,
- kennt und versteht die entsprechenden Begrifflichkeiten und die Grundlagen der zugrundeliegenden Theorie

Content
Datenbanksysteme gehören zu den entscheidenden Softwarebausteinen in modernen Informationssystemen und sind ein zentrales Thema der Universitätsstudiengänge im Gebiet der Informatik. Ziel der Vorlesung ist die Vermittlung von Grundkenntnissen zur Arbeit mit Datenbanken. Die wichtigen Themen der Vorlesung sind guter Datenbankentwurf, der Zugriff auf Datenbanken und die Anbindung an Anwendungen, Mehrbenutzerbetrieb und eine Übersicht über unterschiedliche Datenbanktypen (relational vs. NoSQL insbesondere).

Literature

- Andreas Heuer, Kai-Uwe Sattler, Gunther Saake: Datenbanken - Konzepte und Sprachen, 4. Aufl., mitp-Verlag, 2010
- Alfons Kemper, André Eickler: Datenbanksysteme. Eine Einführung, 8. Aufl., Oldenbourg Verlag, 2011

Weiterführende Literatur

- Gerhard Weikum, Gottfried Vossen: Transactional Information Systems, Morgan Kaufmann, 2002.
- Eric Redmond, Jim R. Wilson: Seven Datebases in Seven Weeks

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

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101477] Development of Business Information Systems
[M-WIWI-101456] Intelligent Systems and Services
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511202	Database Systems and XML	Vorlesung (V)	2	Andreas Oberweis, Gunther Schiefer
WS 18/19	2511203		Übung (Ü)	1	Andreas Fritsch, Andreas Oberweis, Gunther Schiefer

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

Conditions
None

V Event excerpt: Database Systems and XML (WS 18/19)

Aim
Students

- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

Content
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

Literature

- M. Klettke, H. Meyer: XML & Datenbanken: Konzepte, Sprachen und Systeme. dpunkt.verlag 2003
- H. Schöning: XML und Datenbanken: Konzepte und Systeme. Carl Hanser Verlag 2003
- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- R. Elmasri, S. B. Navathe: Grundlagen der Datenbanksysteme. 2009
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Further literature will be given individually.

T Course: Datamanagement in the Cloud [T-INFO-101306]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Unregelmäßig	Prüfungsleistung mündlich	1

T Course: Deep Learning for Computer Vision [T-INFO-108484]

Responsibility: Rainer Stiefelhagen
Contained in: [M-INFO-101239] Machine Vision

ECTS	Language	Recurrence	Version
3	deutsch	Jedes Sommersemester	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24628	Deep Learning for Computer Vision	Vorlesung (V)	2	Muhammad Saquib Sarfraz, Rainer Stiefelhagen

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-101389] *Content-based Image and Video Retrieval* must not have been started.

Recommendations
Basic knowledge of pattern recognition as taught in the module Cognitive Systems, is expected.

Remarks
The course is partially given in German and English.

V Event excerpt: Deep Learning for Computer Vision (SS 2018)

Aim
Students should be able to grasp the underlying concepts in the field of deep learning and its various applications.

- Understand the theoretical basis of deep learning
- Understand the Convolutional Neural Networks (CNN)
- Develop basis for the concepts and algorithms used in building and training the CNNs.
- Able to apply deep learning in different computer vision applications

Content
The lecture introduces the basics, as well as advanced aspects of deep learning methods and their application for a number of computer vision tasks. The following topics will be addressed in the lecture:
- Introduction to Deep Learning
- Convolutional Neural Networks (CNN): Background
- CNNs: basic architectures and learning algorithms
- Object Recognition with CNN
- Image Segmentation with CNN
- Recurrent Neural Networks
- Generating image descriptions (Image Captioning)
- Automatic question answering (Visual Question Answering)
- Generative Adversarial Networks (GAN) and their applications
- Deep Learning platforms and tools

Workload
90 Stunden

T Course: Deep Learning und Neural Networks [T-INFO-109124]

Responsibility: Alexander Waibel
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Version
6	Jedes Sommersemester	1

Replaces
T-INFO-101383 Neuronale Netze

T Course: Deployment of Database Systems [T-INFO-101317]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400020		Vorlesung (V)	3	Martin Schäler

V Event excerpt: (WS 18/19)

Aim
Am Ende der Lehrveranstaltung sollen die Teilnehmer Datenbank-Konzepte (insbesondere Datenmodelle, Anfragesprachen) – breiter, als es in einführenden Datenbank-Veranstaltungen vermittelt wurde – erläutern und miteinander vergleichen können. Sie sollten Alternativen bezüglich der Verwaltung komplexer Anwendungsdaten mit Datenbank-Technologie kennen und bewerten können.

Content
Diese Vorlesung soll Studierende an den Einsatz moderner Datenbanksysteme heranführen, in Breite und Tiefe. 'Breite' erreichen wir durch die ausführliche Betrachtung unterschiedlicher Philosophien und unterschiedlicher Datenmodelle mit entsprechenden Anfragesprachen. Wir gehen beispielsweise sowohl auf sogenannte NoSQL-Datenbanktechnologie ein als auch auf semistrukturierte Datenbanken (vulgo XML-Datenbanken, mit XQuery als Anfragesprache) und Graph-Datenbanken. 'Tiefe' erreichen wir durch die Betrachtung mehrerer nichttrivialer Anwendungen. Dazu gehören beispielhaft die Verwaltung von XML-Datenbeständen oder E-Commerce Daten mit SQL-Datenbanken. Diese Anwendungen sind von allgemeiner Natur und daher auch isoliert betrachtet bereits interessant.

T Course: Derivatives [T-WIWI-102643]

Responsibility: Marliese Uhrig-Homburg
Contained in: [M-WIWI-101482] Finance 1
[M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530550	Derivatives	Vorlesung (V)	2	Marliese Uhrig-Homburg
SS 2018	2530551		Übung (Ü)	1	Stefan Fiesel, Marliese Uhrig-Homburg

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

V Event excerpt: Derivatives (SS 2018)

Aim
The objective of the Derivatives lecture is to become familiar with financial markets, especially derivatives markets. Traded securities and frequently used trading strategies will be introduced. Furthermore the pricing of derivatives will be derived and their use in risk management will be discussed.

Content
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

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

Literature

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

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

T Course: Design Thinking [T-WIWI-102866]

Responsibility: Orestis Terzidis
Contained in: [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2545008	Design Thinking (Track 1)	Seminar (S)	2	Heiko Haller, Julia Jochem, Orestis Terzidis

Learning Control / Examinations
Alternative exam assessments (§4(2), 3 SPO).

Conditions
None

Recommendations
None

Remarks
The seminar content will be published on the website of the institute.

T Course: Developing Business Models for the Semantic Web [T-WIWI-102851]

Responsibility: Rudi Studer
Contained in: [M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
None

Recommendations
As a recommendation to attending the seminar, basic knowledge about semantic technologies and concepts should be available. This may be acquired by attending one of the following lectures – Wissensmanagement, Semantic Web Technologies 1, Semantic Web Technologies 2 or by studying related literature. Furthermore the topic entrepreneurship should be of interest.

T Course: Digital Circuits Design [T-INFO-103469]

Responsibility: Wolfgang Karl
Contained in: [M-INFO-102978] Digital Circuits Design
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24007		Vorlesung (V)	3	Mehdi Baradaran Tahoori

V Event excerpt: (SS 2018)

Aim
Studierende sollen durch diese Lehrveranstaltung folgende Kompetenzen erwerben:

- Verständnis der verschiedenen Darstellungsformen von Zahlen und Alphabeten in Rechnern,
- Fähigkeiten der formalen und programmiersprachlichen Schaltungsbeschreibung,
- Kenntnisse der technischen Realisierungsformen von Schaltungen,
- basierend auf dem Verständnis für Aufbau und Funktion aller wichtigen Grundschaltungen und Rechenwerke die Fähigkeit, unbekannte Schaltungen zu analysieren und zu verstehen, sowie eigene Schaltungen zu entwickeln,
- Kenntnisse der relevanten Speichertechnologien,
- Kenntnisse verschiedener Realisierungsformen komplexer Schaltungen.

Content
Der Inhalt der Lehrveranstaltung umfasst die Grundlagen der Informationsdarstellung, Zahlensysteme, Binärdarstellungen negativer Zahlen, Gleitkomma-Zahlen, Alphabete, Codes; Rechnertechnologie: MOS-Transistoren, CMOS-Schaltungen; formale Schaltungsbeschreibungen, boolesche Algebra, Normalformen, Schaltungsoptimierung; Realisierungsformen von digitalen Schaltungen: Gatter, PLDs, FPGAs, ASICs; einfache Grundschaltungen: FlipFlop-Typen, Multiplexer, Halb/Voll-Addierer; Rechenwerke: Addierer-Varianten, Multiplizier-Schaltungen, Divisionsschaltungen; Mikroprogrammierung.

Workload
1. Präsenzzeit in Vorlesungen, Übungen: 120 h
2. Vor-/Nachbereitung derselbigen: 30 h
3. Klausurvorbereitung und Präsenz in selbiger: 30 h

T Course: Digital Health [T-WIWI-109246]

Responsibility: Ali Sunyaev
Contained in: [M-WIWI-104403] Critical Digital Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch/englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511402		Vorlesung (V)	2	Ali Sunyaev

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None.

Remarks
New lecture from winter semester 2018/2019.

V Event excerpt: (WS 18/19)

Aim
Students are able to: (1) know theoretical foundations of various topics in digital health; (2) know current topics in research on digital health; (3) combine theoretical and practical contents of this lecture.

Workload
4 ECTS = approx. 120 h.

T Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsibility: Anja Konhäuser
Contained in: [M-WIWI-101487] Sales Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	englisch	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2572176	Digital Marketing and Sales in B2B	Sonstige (sonst.)	1	Anja Konhäuser

Learning Control / Examinations
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

Conditions
None.

Remarks
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu).
Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).
Please note that only one of the 1.5-ECTS courses can be attended in this module.

V Event excerpt: Digital Marketing and Sales in B2B (WS 18/19)

Aim

- Understand digital marketing and sales approaches for the B2B sector
- Recognise important elements and understand how-to-setup of digital strategies
- Become familiar with the effectiveness and usage of different digital marketing channels
- Understand the effect of digital sales on sales management, customer support and value chain
- Be able to measure and interpret digital KPIs
- Calculate the Return on Investment (RoI) for digital marketing by combining online data with company performance data

Content
Learning Sessions:
The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.
Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g. product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:
After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

Workload
time of presentness = 15 hrs.
private study = 30 hrs.

Literature
-

T Course: Digital Service Design [T-WIWI-105773]

Responsibility: Alexander Mädche
Contained in: [M-WIWI-104080] Designing Interactive Information Systems
[M-WIWI-102806] Service Innovation, Design & Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540420	Digital Service Design	Vorlesung (V)	2	Xuanhui Liu, Alexander Mädche

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and the Digital Service Design challenge (40%). The exam and the Digital Service Design challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Digital Service Design challenge.

Conditions
None

Recommendations
None

Remarks
The course is held in English.

V Event excerpt: Digital Service Design (WS 18/19)

Aim
The students

- get a deeper understanding of design in general and specifically understand what digital service design comprises
- can conceptualize and operationalize usability, user experience, service experience, and customer experience
- understand the underlying mechanisms for a successful interplay between individuals, teams, and the organization within the entire digital service lifecycle
- learn the most important digital service design practices & tools
- apply digital service design practices & tools in a real-world scenario

Content

- Definition and key concepts of digital service design and related terms
- Introduction to the business and design perspective of a service design project
- The digital service design process from strategy through planning and prototyping to launching the digital service.
- Practice-oriented capstone project focusing on the design of a real-world digital service

Literature
Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.
Williams, Kevin, Samir Chatterjee, and Matti Rossi. 2008. "Design of Emerging Digital Services: A Taxonomy." European Journal of Information Systems 17(5): 505–17

Hill, T.P. 1977. “On Goods and Services.” The review of income and wealth 23(4): 315–38.
Werder K, Zobel B, Maedche A (2016) PDISC – Towards a Method for Software Product DISCovery. In: Maglyas A, Lamprecht A-L (eds) Softw. Bus. 7th Int. Conf. ICSOB 2016, Ljubljana, Slov. June 13-14, 2016, Proc. Springer International Publishing, Cham, pp 47–62
Pichler R (2016) Strategize: Product Strategy and Product Roadmap Practices for the Digital Age. Pichler Consulting
Liu, X., Werder, K., & Maedche, A. (2016). A Taxonomy of Digital Service Design Techniques. In *Proceedings of the 2016 International Conference on Information Systems*

T Course: Digital Signatures [T-INFO-101280]

Responsibility: Dennis Hofheinz
Contained in: [M-INFO-101198] Advanced Topics in Cryptography
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24654	Digital Signatures	Vorlesung (V)	2	Dennis Hofheinz, Jiaxin Pan

V Event excerpt: Digital Signatures (WS 18/19)

Aim
The student

- knows important signature schemes that are relevant in theory and practice (such as DSA and tree-based signatures),
- understands basic security notions and their relation (such as existential unforgeability under chosen-message attacks),
- is able to understand and apply basic proof techniques (such as reductions and hybrid arguments)

Content
Digital signatures are a fundamental primitive of modern cryptography. Their practical applications include, for instance, authenticated e-mail or certificate hierarchies on the internet.
This lecture will give an overview of important signature schemes with theoretical or practical relevance. This includes:

- One-time signatures, tree-based signatures, and chameleon hash functions
- RSA-based signatures
- Signatures in bilinear groups

Goal of this lecture is not only to describe these schemes, but also to discuss their security. Therefore we will introduce various security notions for digital signatures, and analyze whether the presented schemes provably meet these notions (under certain hardness assumptions).
Depending on the student's preferences, the remaining time will be used to discuss advanced topics, such as:

- Schnorr signatures
- Programmable hash functions
- Tightness of reductions
- Analysis of hardness assumptions in the generic group model

Workload

- Präsenzzeit in Vorlesungen, Übungen: 22,5 h
- Vor-/Nachbereitung derselbigen: 40 h
- Prüfungsvorbereitung und Präsenz in selbiger: 27 h

T Course: Digital Transformation and Business Models [T-WIWI-108875]

Responsibility: Daniel Jeffrey Koch
Contained in: [M-WIWI-101507] Innovation Management

ECTS	Recurrence	Exam type	Version
3	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
Non exam assessment (following §4(2) 3 of the examination regulation).
The final grade is composed 75% of the grade of the written paper and 25% of the presentation.

Conditions
None

Recommendations
Prior attendance of the course Innovation Management [2545015] is recommended.

T Course: Digital Transformation of Organizations [T-WIWI-106201]

Responsibility: Alexander Mädche
Contained in: [M-WIWI-102754] Service Economics and Management
[M-WIWI-104068] Information Systems in Organizations
[M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-101410] Business & Service Engineering
[M-WIWI-101448] Service Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540556		Vorlesung (V)	2	Dominik Augenstein, Alexander Mädche

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and case study deliverable (40%). The exam and the case study need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the case study.

Conditions
None

Remarks
The course will be held in English.

V Event excerpt: (SS 2018)

Aim
The students will:

- Get an overview on basic concepts and definitions of information systems and understand key characteristics of IS as a foundation for digitization of business processes, products and services
- Understand important characteristics of software products on which IS are built on
- Learn important concepts and theories in order to successfully execute a digital transformation process

Content

- Definition and key concepts of Information Systems
- Introduction of different types of application systems (organizational process & information-centric systems, customer-centric systems, supplier-centric systems and people-centric systems) and their characteristics
- The digital transformation process: The pre-implementation, implementation and post-implementation phase covering facets such as business/IT alignment, packaged software selection, IS implementation projects, as well as adoption & use of IS
- Practice-oriented case study focusing on real-world IS scenarios

Literature

Daft, R. L. (2009). Organization theory and design. Cengage learning.
Laudon, K. C. and Laudon, J. P. (2014). Management Information Systems: Managing the Digital Firm, 13th Edition, Pearson.
Sambamurthy, V and Zmud, R. Z. (2012). Guiding the Digital Transformation of Organizations. Legerity Digital Press, ISBN 978-0-9857955-0-4.

T Course: 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
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550488		Vorlesung (V)	3	Sven Spieckermann

Learning Control / Examinations
The assessment consists of a written paper and an oral exam of about 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

Conditions
None

Recommendations
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Remarks
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The course is planned to be held every summer term.
The planned lectures and courses for the next three years are announced online.

V Event excerpt: (SS 2018)

Aim
The student

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

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

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

Literature

- Banks J., Carson II J. S., Nelson B. L., Nicol D. M. (2010) Discrete-event system simulation, 5.Aufl., Pearson, Upper Saddle River.

- Eley, M. (2012): Simulation in der Logistik - Einführung in die Erstellung ereignisdiskreter Modelle unter Verwendung des Werkzeuges "Plant Simulation“, Springer, Berlin und Heidelberg
- Kosturiak, J. und M. Gregor (1995): Simulation von Produktionssystemen. Springer, Wien und New York.
- Law, A. M. (2015): Simulation Modeling and Analysis. 5th Edition, McGraw-Hill, New York usw.
- Liebl, F. (1995): Simulation. 2. Auflage, Oldenbourg, München.
- Noche, B. und S. Wenzel (1991): Marktspiegel Simulationstechnik. In: Produktion und Logistik. TÜV Rheinland, Köln.
- Pidd, M. (2004): Computer Simulation in Management Science. 5th Edition, Wiley, Chichester.
- Robinson S (2004) Simulation: the practice of model development and use. John Wiley & Sons, Chichester
- VDI (2014): Simulation von Logistik-, Materialfluß- und Produktionssystemen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

T Course: Distributed Computing [T-INFO-101298]

Responsibility: Achim Streit
Contained in: [M-INFO-101210] Dynamic IT-Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400050	Distributed Computing	Vorlesung (V)	2	Peter Krauß, Achim Streit

V Event excerpt: Distributed Computing (WS 18/19)

Aim
Studierende verstehen die Grundbegriffe verteilter Systeme, im Speziellen in den aktuellen Techniken des Grid und Cloud Computing sowie des Management großer bzw. verteilter Daten. Sie wenden zugrundeliegenden Paradigmen und Services auf gegebene Beispiel an.
Studierende analysieren Methoden und Technologien des Grid und Cloud Computing sowie verteilten Daten-Managements, die für den Einsatz in alltags- und industriellen Anwendungsgebieten geeignet sind bzw. welche heute von Google, Facebook, Amazon, etc. eingesetzt werden. Hierfür vergleichen die Studierenden Web/Grid Services, elementare Grid Funktionalitäten, Datenlebenszyklen, Metadaten, Archivierung, Cloud Service Typen (IaaS, SaaS, PaaS) und Public/Private Clouds anhand von Beispielen aus der Praxis.

Content
Die Vorlesung "Verteiltes Rechnen" gibt eine Einführung in die Welt des verteilten Rechnens mit einem Fokus auf Grundlagen, Technologien und Beispielen aus Grid, Cloud und dem Umgang mit Big Data.
Zuerst wird eine Einführung in die Hauptcharakteristika verteilter Systeme gegeben. Danach wird auf die Thematik Grid näher eingegangen und es werden Architektur, Grid Services, Sicherheit und Job Ausführung vorgestellt. Am Beispiel des WLCG (der Grid Infrastruktur zur Verteilung, Speicherung und Analyse der Daten des LHC-Beschleunigers am CERN) wird die enge Verwandtschaft zwischen Grid Computing und verteiltem Daten-Management dargestellt.
Im zweiten Teil werden Prinzipien und Werkzeuge zum Management großer bzw. verteilter Daten vorgestellt - dies schließt Datenlebenszyklus, Metadaten und Archivierung ein. Beispiele aus Wissenschaft und Industrie dienen zur Veranschaulichung. Moderne Speichersysteme wie z.B. dCache, xrootd, Ceph und HadoopFS werden als praktische Beispiele vorgestellt.
Der dritte Teil der Vorlesung geht auf das Thema Cloud ein. Nach der Definition grundlegender Begriffe und Prinzipien (Iaas, PaaS, SaaS, public vs. private Clouds), auch mittels Beispielen, wird das Thema Virtualisierung als grundlegende Technik des Cloud Computing vorgestellt. Den Abschluss bildet MapReduce als Mechanismus zur Verarbeitung und Analyse großer, verteilter Datenbestände wie es auch von Google eingesetzt wird.

Workload
120 h / Semester, davon 30 h Präsenzzeit und 90 h Selbstlernen aufgrund der Komplexität des Stoffs

Literature

1. Andrew Tanenbaum, Maarten van Steen: "Distributed systems: principles and paradigms", Prentice Hall, 2007, ISBN 0-13-613553-6
2. Ian Foster, Carl Kesselmann: "The Grid. Blueprint for a New Computing Infrastructure (2nd Edition)", Morgan Kaufmann, 2004, ISBN 1-55860-933-4
3. Fran Berman, Geoffrey Fox, Anthony J.G. Hey: "Grid Computing: Making the Global Infrastructure a Reality", Wiley, 2003, ISBN 0-470-85319-0
4. Tony Hey: "The Fourth Paradigm: Data-intensive Scientific Discovery", Microsoft Research, 2009, ISBN 978-0-9825442-0-4

5. Rajkumar Buyya, James Broberg und Andrzej M. Goscinski: “Cloud Computing: Principles and Paradigms”, Wiley, 2011, ISBN 978-0-470-88799-8

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
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581006	Efficient Energy Systems and Electric Mobility	Vorlesung (V)	2	Patrick Jochem, Russell McKenna

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

V Event excerpt: Efficient Energy Systems and Electric Mobility (SS 2018)

Aim

- Understand the concept of energy efficiency as applied to specific systems
- Obtain an overview of the current trends in energy efficiency
- Be able to determine and evaluate alternative methods of energy efficiency improvement
- Overview of technical and economical stylized facts on electric mobility
- Judging economical, ecological and social impacts through electric mobility

Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.
The energy efficiency part of the lecture provides an introduction to the concept of energy efficiency, the means of affecting it and the relevant framework conditions. Further insights into economy-wide measurements of energy efficiency, and associated difficulties, are given with recourse to several practical examples. The problems associated with market failures in this area are also highlighted, including the Rebound Effect. Finally and by way of an outlook, perspectives for energy efficiency in diverse economic sectors are examined.
The electric mobility part of the lecture examines all relevant issues associated with an increased penetration of electric vehicles including their technology, their impact on the electricity system (power plants and grid), their environmental impact as well as their optimal integration in the future private electricity demand (i.e. smart grids and V2G). Besides technical aspects the user acceptance and behavioral aspects are also discussed.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be anounced in the lecture.

T Course: eFinance: Information Engineering and Management for Securities Trading [T-WIWI-102600]

Responsibility: Christof Weinhardt
Contained in: [M-WIWI-101483] Finance 2
[M-WIWI-101446] Market Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540454	eFinance: Information Engineering and Management for Securities Trading	Vorlesung (V)	2	Florian Glaser, Benedikt Notheisen, Christof Weinhardt
WS 18/19	2540455		Übung (Ü)	1	Florian Glaser, Benedikt Notheisen

Learning Control / Examinations
The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4(2), 3 SPO 2007 respectively §4(3) SPO 2015). 70% of the final grade is based on the written exam and 30% is based on assignments from the exercises. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Conditions
None

Recommendations
None

V Event excerpt: eFinance: Information Engineering and Management for Securities Trading (WS 18/19)

Aim
The students

- are able to understand the theoretical and pracitical aspects of securitites trading,
- are able to handle the relevant electronic tools for the evaluation of financial data,
- are able to identify the incentives of the traders for participation in different market plattforms,
- are able to analyse capital marketplaces concerning their efficiency, weaknesses and technical configuration,
- are able to apply theoretical methods of econometrics,
- are able to understand, criticize and present articles with a finance-scientific background,
- learn to elaborate solutions in a team.

Content
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

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

Literature

- Picot, Arnold, Christine 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: Emerging Trends in Criticial Information Infrastructures [T-WIWI-109250]

Responsibility: Ali Sunyaev
Contained in: [M-WIWI-104403] Critical Digital Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2513400		Seminar (S)	2	Sebastian Lins, Ali Sunyaev, Scott Thiebes

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of a final thesis.

Conditions
None.

Remarks
The course is usually held as a block course.

V Event excerpt: (WS 18/19)

Aim
Students (1) independently analyze current questions in the field of information systems; (2) work on the respective scientific question with recognized scientific methods and write a seminar thesis on it; (3) can combine already learned theoretical and practical lecture contents of the respective question.

T Course: Emissions into the Environment [T-WIWI-102634]

Responsibility: Ute Karl
Contained in: [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581962	Emissions into the Environment	Vorlesung (V)	2	Ute Karl

Recommendations
None

V Event excerpt: Emissions into the Environment (WS 18/19)

Aim
The student should identify problems of industrial pollution control.
The student knows solutions to these problems and their ways of application.

Content
The course will provide an overview of sources of air pollution, waste and municipal waste; methods to monitor and to reduce/manage pollutant flows; regulatory framework on national and international level.
A Air pollution control

- Indtroduction and definitions
- Sources an dpoluutants
- Regulatory framework
- Emission monitoring
- Air pollution control measures

B Waste management and Recycling

- Introduction and regulatory framework
- Statistics and logistics
- Recycling and disposal
- Waste treatment

C Waste water treatment

- Municipal waste water treatment systems
- Sewage sludge disposal

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
Will be announced in thecourse.

T Course: Empirical Software Engineering [T-INFO-101335]

Responsibility: Walter Tichy
Contained in: [M-INFO-101202] Software Methods
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24156		Vorlesung (V)	2	Walter Tichy

V Event excerpt: (WS 18/19)

Aim

- Empirische Methodik in der Softwaretechnik beschreiben, Fehlerquellen und Vermeidungsstrategien angeben können;
- statistische Analysemethoden erläutern und anwenden können;
- empirische Studien analysieren und bewerten können;
- Beispiele empirischer Studien aus der Softwaretechnik nennen und erläutern können;
- empirische Studien planen und durchführen können.

Content
Die Vorlesung befasst sich mit der Rolle der Empirie in der Softwaretechnik. Sie stellt die gängigsten empirischen Methoden vor und weist auf gängige Fehlerquellen in empirischen Studien hin. Die dazugehörigen statistischen Methoden zur Analyse und Darstellung der Daten werden vermittelt. Die Vorlesung verwendet eine Reihe wissenschaftlicher Veröffentlichungen, um die Konzepte zu illustrieren und mit Leben zu füllen.

Workload
Informatiionswirtschaft: Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).
Informatik: ca. 75 h
\begin{tabular}{|l|c|r|}
\hline
Aktivität & & Arbeitsaufwand \\
\hline
\itshape Präsenzzeit & & \\
Besuch der Vorlesung & 15 x 90min & 22h 30m \\
\hline
Vorbereitung der Vorlesung & & 22h 30m \\
Nachbereitung der Vorlesung & & 22h 30m \\
Vorbereitung der Prüfung & & 51h 30m \\
\hline
Prüfung & & 1h 00m \\
\hline
Summe & & 120h 00m \\
\hline
\end{tabular}
\caption{Arbeitsaufwand für die Lerneinheit Empirische Softwaretechnik}

T Course: Employment Law I [T-INFO-101329]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101216] Private Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24167	Employment Law I	Vorlesung (V)	2	Alexander Hoff

V Event excerpt: Employment Law I (WS 18/19)

Aim
Ziel der Vorlesung ist eine vertiefte Einführung in das Individualarbeitsrecht. Die Studenten sollen die Bedeutung des Arbeitsrechts als Teil der Rechtsordnung in einer sozialen Marktwirtschaft erkennen. Sie sollen in die Lage versetzt werden, arbeitsvertragliche Regelungen einzuordnen und bewerten zu können. Sie sollen arbeitsrechtliche Konflikte beurteilen und Fälle lösen können.

Content
Ziel der Vorlesung ist eine vertiefte Einführung in das Individualarbeitsrecht. Die Studenten sollen die Bedeutung des Arbeitsrechts als Teil der Rechtsordnung in einer sozialen Marktwirtschaft erkennen. Sie sollen in die Lage versetzt werden, arbeitsvertragliche Regelungen einzuordnen und bewerten zu können. Sie sollen arbeitsrechtliche Konflikte beurteilen und Fälle lösen können.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

T Course: Employment Law II [T-INFO-101330]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101216] Private Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24668	Employment Law II	Vorlesung (V)	2	Alexander Hoff

V Event excerpt: Employment Law II (SS 2018)

Aim
Aufbauend auf den in *Arbeitsrecht I* erworbenen Kenntnissen sollen die Studenten einen vertieften Einblick in das Arbeitsrecht erhalten.

Content
Aufbauend auf den in *Arbeitsrecht I* erworbenen Kenntnissen sollen die Studenten einen vertieften Einblick in das Arbeitsrecht erhalten.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

Literature
Literaturempfehlung wird in der Vorlesung bekanntgegeben.

T Course: Energy and Environment [T-WIWI-102650]

Responsibility: Ute Karl
Contained in: [M-WIWI-101452] Energy Economics and Technology
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581003	Energy and Environment	Vorlesung (V)	2	Ute Karl
SS 2018	2581004		Übung (Ü)	1	Katrin Seddig

Learning Control / Examinations
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Conditions
None.

V Event excerpt: Energy and Environment (SS 2018)

Aim
The student should identify environmental problems of energy from fossil fuels. The student can identify appropriate technologies for pollution control. The student knows methods for assessing environmental problems and their ways of application.

Content
The focus of the lecture is put on environmental impacts of fossil fuel conversion and related assessment methods. The list of topics is given below.

- Fundamentals of energy conversion
- Air pollutant formation from fossil fuel combustion
- Control of air pollutant emissions from fossil-fuelled power plants.
- Measures to improve conversion efficiency of fossil fuelled power plants.
- External effects of energy supply (Life Cycle Assessment of selected energy systems)
- Integrated Assessment models supporting the European Thematic Strategy on Air
- Cost-effectiveness analyses and cost-benefit analyses of air pollution control measures
- Monetary evaluation of external effects of energy supply (external costs)

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

Literature
Thr references for further reading are included in the lecture documents (see ILIAS)

T Course: Energy Market Engineering [T-WIWI-107501]

Responsibility: Christof Weinhardt
Contained in: [M-WIWI-101451] Energy Economics and Energy Markets
[M-WIWI-101446] Market Engineering
[M-WIWI-103720] eEnergy: Markets, Services and Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540464	Energy Market Engineering	Vorlesung (V)	2	Philipp Staudt, Christof Weinhardt
SS 2018	2540465		Übung (Ü)	1	Esther Marie Mengelkamp, Philipp Staudt

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

Recommendations
None

Remarks
Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".
The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

V Event excerpt: Energy Market Engineering (SS 2018)

Aim
The student

- know the scientifically discussed design options for energy markets.
- can evaluate and discuss advantages and disadvantages of different energy market design options.
- can jusge which design is ideal in which environment.
- is able to understand and employscientific methods to evaluate energy market designs

Content
This lecture discusses different design options for electricity markets. We will focus on different approaches of nodal and zonal pricing as well as single price mechanisms and capacity markets. After a short recap of German and European market designs, the different design options will be discussed scientifically and with the help of examples. Furthermore, we will evaluate alternative market design options like microgrids. Besides the fundamental functioning of those markets, we will introduce and discuss methodological knowledge to evaluate market design options.

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

Literature

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.

- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

T Course: Energy Networks and Regulation [T-WIWI-107503]

Responsibility: Christof Weinhardt
Contained in: [M-WIWI-101446] Market Engineering
[M-WIWI-103720] eEnergy: Markets, Services and Systems
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540494	Energy Networks and Regulation	Vorlesung (V)	2	Stefan Rogat
WS 18/19	2540495		Übung (Ü)	1	Stefan Rogat

Learning Control / Examinations
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation.
The exam is offered every semester. Re-examinations are offered on every ordinary examination date.

Conditions
None

Recommendations
None

Remarks
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

V Event excerpt: Energy Networks and Regulation (WS 18/19)

Aim
The student,

- understands the business model of a network operator and knows its central tasks in the energy supply system,
- provides a holistic overview of the interrelationships in the network economy,
- understands the regulatory and business interactions,
- is particularly familiar with the current model of incentive regulation with its essential components and understands its implications for the decisions of a network operator
- is able to analyse and assess controversial issues from the perspective of different stakeholders.

Content
The lecture "Energy Networks and Regulation" provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator's abilities to deal with the massive challenges lying ahead ("Energiewende", redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO.
- Objectives of regulation: Fair price calculation and high standard access conditions.
- The functioning of incentive regulation
- Amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?

- Exogenous costs shifted (arbitrarily) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

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

Literature
Averch, H.; Johnson, L.L (1962). Behavior of the firm under regulatory constraint, in: American Economic Review, 52 (5), S. 1052 – 1069.
Bundesnetzagentur (2006): Bericht der Bundesnetzagentur nach § 112a EnWG zur Einführung der Anreizregulierung nach § 21a EnWG, http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/Netzentgelte/Anreizregulierung/BerichtEinfuehrgAnreizregulierung.pdf?__blob=publicationFile&v=3.
Bundesnetzagentur (2015): Evaluierungsbericht nach § 33 Anreizregulierungsverordnung, https://www.bmwi.de/Redaktion/DE/Downloads/A/anreizregulierungsverordnung-evaluierungsbericht.pdf?__blob=publicationFile&v=1.
Filippini, M.; Wild, J.; Luchsinger, C. (2001) : Regulierung der Verteilnetzpreise zu Beginn der Marktöffnung. Erfahrungen in Norwegen und Schweden, Bundesamt für Energie, Bern, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/34/066/34066585.pdf.
Gómez, T. (2013): Monopoly Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 151 – 198, Springer-Verlag, London.
Gómez, T. (2013): Electricity Distribution, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 199 – 250, Springer- Verlag, London.
Pérez-Arriaga, I.J. (2013): Challenges in Power Sector Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 647 – 678, Springer-Verlag, London.
Rivier, M.; Pérez-Arriaga, I.J.; Olmos, L. (2013): Electricity Transmission, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 251 – 340, Springer-Verlag, London.

T Course: Energy Systems Analysis [T-WIWI-102830]

Responsibility: Valentin Bertsch
Contained in: [M-WIWI-101452] Energy Economics and Technology
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581002	Energy Systems Analysis	Vorlesung (V)	2	Armin Ardone

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Conditions
None

Recommendations
None

Remarks
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

V Event excerpt: Energy Systems Analysis (WS 18/19)

Aim
The student
- has the ability to understand and critically reflect the methods of energy system analysis, the possibilities of its application in the energy industry and the limits and weaknesses of this approach
- can use select methods of the energy system analysis by her-/himself

Content
1. Overview and classification of energy systems modelling approaches
2. Usage of scenario techniques for energy systems analysis
3. Unit commitment of power plants
4. Interdependencies in energy economics
5. Scenario-based decision making in the energy sector
6. Visualisation and GIS techniques for decision support in the energy sector

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Weiterführende Literatur:

- Möst, D. und Fichtner, W.: **Einführung zur Energiesystemanalyse**, in: Möst, D., Fichtner, W. und Grunwald, A. (Hrsg.): Energiesystemanalyse, Universitätsverlag Karlsruhe, 2009
- Möst, D.; Fichtner, W.; Grunwald, A. (Hrsg.): **Energiesystemanalyse** - Tagungsband des Workshops "Energiesystemanalyse" vom 27. November 2008 am KIT Zentrum Energie, Karlsruhe, Universitätsverlag Karlsruhe, 2009 [PDF: http://digbib.ubka.uni-karlsruhe.de/volltexte/documents/928852]

T Course: Energy Trade and Risk Management [T-WIWI-102691]

Responsibility: Clemens Cremer, Wolf Fichtner, Dogan Keles
Contained in: [M-WIWI-101451] Energy Economics and Energy Markets
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581020	Energy Trade and Risk Management	Vorlesung (V)	3	Clemens Cremer, Dogan Keles

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

Conditions
None

Recommendations
None

V Event excerpt: Energy Trade and Risk Management (SS 2018)

Aim
The student

- has acquired a broad understanding of the different energy commodity markets (power, emissions, gas, oil, hard coal)
- knows the major products traded on the relevant energy commodity markets
- has a deep understanding of pricing mechanisms on these markets
- knows the major evaluation methods from financial mathematics being able to be used for evaluating energy commodity products
- knows the key risk evaluation methods of energy commodity trading (VaR, CVaR, . . .).

Content

1. Introduction to Markets, Mechanisms, Interactions
2. Basics of Risk Management
3. Oil Markets
4. Gas Markets
5. Coal Markets
6. Emission Markets
7. Simulation Game
8. Power Markets
9. Risk Management in Utilities

Workload
The total workload for this course is approximately 120.0 hours. For further information see German version.

Literature
Elective literature:
Burger, M., Graeber, B., Schindlmayr, G. (2007): *Managing energy risk: An integrated view on power and other energy markets*, Wiley&Sons, Chichester, England
EEX (2010): *Einführung in den Börsenhandel an der EEX auf Xetra und Eurex*, www.eex.de

Erdmann, G., Zweifel, P. (2008), Energieökonomik, Theorie und Anwendungen, Springer, ISBN: 978-3-540-71698-3
Hull, J.C. (2006): *Options, Futures and other Derivatives*, 6. Edition, Pearson Prentice Hall, New Jersey, USA
Borchert, J., Schlemm, R., Korth, S. (2006): *Stromhandel: Institutionen, Marktmodelle, Pricing und Risikomanagement (Gebundene Ausgabe)*, Schäffer-Poeschel Verlag
www.riskglossary.com

T Course: 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
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530357	Engineering FinTech Solutions	Vorlesung (V)	2	Maxim Ulrich
WS 18/19	2530357	Engineering FinTech Solutions	Vorlesung (V)	2	Maxim Ulrich

Learning Control / Examinations
The grade consists of a written part and an oral exam. In the written part, students solve an academic problem from the field of risk and asset management. This part counts for 30% of the grade. An oral exam at the end of the semester accounts for 70% of the final grade and gives the student a chance to present and defend his solution.

Conditions
There are two conditions for taking this course:

1. This course is only open for registered students of the module "Intelligent Risk and Investment Advisory" and "Disruptive FinTech Solutions".
2. Registered students have completed a Bachelor thesis with a grade of 1.3 or better on a topic that has had a significant exposure to IT- or software engineering content. Alternatively, students who completed at least one of the following lectures with a grade of 1.7 or better are also eligible to participate: Computational Risk and Asset Management, Bayesian Risk Analytics and Machine Learning.

Recommendations
None

Remarks
New course starting summer term 2017.

V Event excerpt: Engineering FinTech Solutions (WS 18/19)

Aim
Students develop modern IT-technologies to solve financial problems.

Content
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students

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

Literature
Literature will be distributed during the first lecture.

T Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

Responsibility: Carsten Linz, Orestis Terzidis
Contained in: [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
None

Recommendations
None

T Course: Entrepreneurship [T-WIWI-102864]

Responsibility: Orestis Terzidis
Contained in: [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2545001	Entrepreneurship	Vorlesung (V)	2	Mitarbeiter, Orestis Terzidis

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
None

V Event excerpt: Entrepreneurship (SS 2018)

Aim
Students are generally introduced to the topic of entrepreneurship. After successful completion of the lecture they should have an overview of the sub-areas of entrepreneurship and have to be able to understand basic concepts of entrepreneurship.

Content
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of financial planning.
Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship
Ries, Eric (2011): The Lean Startup
Osterwalder, Alexander (2010): Business Model Generation

T Course: Entrepreneurship Research [T-WIWI-102894]

Responsibility: Orestis Terzidis
Contained in: [M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2545002	Entrepreneurship Research	Seminar (S)	2	Abilio Avila Albez, Benedict Heblich , Orestis Terzidis

Learning Control / Examinations
The performance review is done via a so called other methods of performance review (term paper) (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

Conditions
None

Recommendations
None

Remarks
The topics will be prepared in groups. The presentation of the results is done during a a block period seminar at the end of the semester. Students have to be present all day long during the seminar.

V Event excerpt: Entrepreneurship Research (SS 2018)

Aim
The students will work on a specific topic of Entrepreneurship Research. In their term paper, the chosen topic needs to be presented to scientific standards in written format on 15-20 pages. The results of the term paper will be presented during a block period seminar at the end of the semester (20 min presentation, 10 min discussion).
By writing the term paper, basic skills of autonomous scientific work, such as looking for literature, argumentation + discussion, citation and using qualitative, quantitative and simulative methods get trained. The term paper is therefore a preparation for the master thesis. For this reason the seminar is mainly for students that intend to write their master thesis at the Chair of Entrepreneurship and Technology Management.

Content
Content of the seminar is most recently discussed topics in the field of entrepreneurship. Topics and dates will be communicated online via the seminar portal.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced during/prior to the seminar as this varies from topic to topic.

T Course: Environmental Law [T-INFO-101348]

Responsibility: Matthias Bäcker
Contained in: [M-INFO-101217] Public Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24140		Vorlesung (V)	2	Nikolaus Marsch

V Event excerpt: (WS 18/19)

Aim
Das Umweltrecht ist eine vielseitige Materie, die Unternehmensführung vielseitig beeinflusst. Studenten sollen ein Gespür für die vielen Facetten des Umweltrechts und seiner Instrumente erhalten. Neben klassischen rechtlichen Instrumenten wie Genehmigung sollen sie daher auch ökonomisch geprägte Instrumente wie Informationsgewinnung und -verbreitung oder Handel mit Zertifikaten kennenlernen.
Vor diesem Hintergrund liegt der Schwerpunkt der Veranstaltung im Immissionsschutz- und Abfallrecht. Des weiteren wird das Wasserrecht, das Bodenschutzrecht und das Naturschutzrecht behandelt. Studenten sollen in der Lage sein, einfache Fälle mit Bezug zum Umweltrecht zu behandeln.

Content
Die Vorlesung beginnt mit einer Einführung in die besondere Problematik, der das Umweltrecht gerecht zu werden versucht. Es werden verschiedene Instrumente, abgeleitet aus der Lehre von den Gemeinschaftsgütern, vorgestellt. Daran schließen sich Einheiten zum Immissionsschutz-, Abfall-, Wasser-, Bodenschutz- und Naturschutzrecht an.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).

Literature
Wird in der Veranstaltung bekannt gegeben.
Weiterführende Literatur
Wird in der Veranstaltung bekannt gegeben.

T Course: European and International Law [T-INFO-101312]

Responsibility: Ulf Brühann
Contained in: [M-INFO-101217] Public Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24666		Vorlesung (V)	2	Ulf Brühann

V Event excerpt: (SS 2018)

Aim
Die Europäisierung des nationalen Rechts macht eine Auseinandersetzung mit dem Europarecht für jeden, der juristische Grundkenntnisse erwerben will, unabdingbar. Kaum eine nationale Handlung ist ohne die Berücksichtigung gemeinschaftsrechtliche Vorgaben denkbar. Der Einfluss des internationalen Rechts ist dagegen von noch geringerer Bedeutung. Vor diesem Hintergrund setzt sich die Vorlesung vorrangig mit dem Europarecht auseinander und vermittelt dem Studenten die notwendigen europarechtlichen Kenntnisse, um die Überformung des nationalen Rechts durch gemeinschaftsrechtliche Vorgaben zu verstehen. Der Student soll anschließend in der Lage sein, europarechtliche Fragestellungen problemorientiert zu lösen. Da der Rechtsstoff teilweise im Diskurs mit den Studierenden erarbeitet werden soll, ist die Anschaffung einer Gesetzessammlung unabdingbar (z.B. Beck-Texte "Europarecht").

Content
Die Vorlesung setzt sich vorrangig mit dem Europarecht auseinander: Dazu gehört im Ausgangspunkt eine Analyse der Geschichte von der EWG zur EG und EU, der Akteure (Parlament, Kommission, Rat, Gerichtshof der Europäischen Gemeinschaften), der Rechtsquellen (Verordnung, Richtlinie, Entscheidung, Stellungnahme, Empfehlung) und des Gesetzgebungsverfahrens. Einen weiteren Schwerpunkt der Vorlesung bilden sodann die Grundfreiheiten, die einen freien innergemeinschaftlichen Fluss der Waren (etwa von Bier, das nicht dem deutschen Reinheitsgebot entspricht), Personen (wie dem Fußballspieler Bosman), Dienstleistungen (wie unternehmerischen Tätigkeiten) sowie von Zahlungsmitteln ermöglichen. Zudem werden auch die Grundrechte der EG und die Wettbewerbsregeln behandelt. Dies geschieht jeweils vor dem Hintergrund konkreter Rechtsfälle. Ferner werden die Grundrechte der Europäischen Menschenrechtskonvention (EMRK) vorgestellt. Abschließend wird ein knapper Überblick über das Völkerrecht
insbesondere der Welthandelsorganisation (WTO) gegeben.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

Literature
Literatur wird in der Vorlesung angegeben.
Weiterführende Literatur
Erweiterte Literaturangaben werden in der Vorlesung bekannt gegeben.

T Course: Exchanges [T-WIWI-102625]

Responsibility: Jörg Franke
Contained in: [M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530296	Exchanges	Vorlesung (V)	1	Jörg Franke

Learning Control / Examinations
The examination will be offered latest until winter term 2018/2019 (repeaters only).

Conditions
None

Recommendations
None

V Event excerpt: Exchanges (SS 2018)

Aim
Students are in a position to discuss and evaluate current developments regarding the organisation of exchanges and securities trading.

Content

- Organisation of exchanges: Changing Zeitgeist - Corporates instead of cooparative structures
- Market models: order driven vs. market maker - Liquidity provision for less frequently traded securities
- Trading systems: The end of an era? - No more need for running traders?
- Clearing: Diversity instead of uniformity - Safety for all?
- Settlement: Increasing importance - Does efficient settlement assure the "value added" of exchanges in the long run?

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
Elective literature:
Educational material will be offered within the lecture.

T Course: Experimental Economics [T-WIWI-102614]

Responsibility: Jella Pfeiffer, Christof Weinhardt
Contained in: [M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101446] Market Engineering
[M-WIWI-101505] Experimental Economics
[M-WIWI-103118] Data Science: Data-Driven User Modeling
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540489	Experimental Economics	Vorlesung (V)	2	Verena Dorner, Michael Knierim, Christian Peukert, Jella Pfeiffer
WS 18/19	2540493		Übung (Ü)	1	Michael Knierim

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

V Event excerpt: Experimental Economics (WS 18/19)

Aim
The students should learn

- how to gain scientific experience and knowledge (philosophy of science),
- how Game Theory and Experimental Economics influenced each other in scientific research,
- about the methods as well as the strengths and weaknesses of Experimental Economics,
- some examples of experimental research, such as markets and auctions, coordination games, bargaining, decision making under risk,
- how to evaluate data.

Content
Experimental Economics have become a separate field in Economics. Nearly all fields of the economic discipline use economic experiments to verify theoretical results. Besides being used for empricial validation, this method is applied in political and strategic consulting. The lecture gives an introduction to experimental methods in economics and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

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

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2nd ed., 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

T Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102832] Operations Research in Supply Chain Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2550486	Facility Location and Strategic Supply Chain Management	Vorlesung (V)	2	Stefan Nickel
WS 18/19	2550487		Übung (Ü)	1	Hannah Bakker

Learning Control / Examinations
The assessment consists of a written exam (120 min) according to Section 4 (2), 1 of the examination regulation.
The exam takes place in every semester.
Prerequisite for admission to examination is the succesful completion of the online assessments.

Conditions
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendations
None

Remarks
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

V Event excerpt: Facility Location and Strategic Supply Chain Management (WS 18/19)

Aim
The student

- knows and describes basic quantitative methods in location planning in the context of strategic Supply Chain Planning,
- applies several criteria for the evaluation of the locations of facilities in the context of classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models),
- implements the considered models in practical problems.

Content
Since the classical work "Theory of the Location of Industries" of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.
Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

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

Literature
Elective literature:

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T Course: Financial Analysis [T-WIWI-102900]

Responsibility: Torsten Luedecke
Contained in: [M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch/englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530205		Vorlesung (V)	2	Torsten Luedecke
SS 2018	2530206		Übung (Ü)	2	Torsten Luedecke

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
Basic knowledge in corporate finance, accounting, and valuation is required.

V Event excerpt: (SS 2018)

Aim
Students are able to

- understand the key financial statements according to international standards,
- use financial ratios and financial analysis for different purposes,
- evaluate the financial performance of the firm,
- determine the value of the firm by using residual income and cash flow figures, respectively,
- assess the quality of financial statements.

Content
Topics:

- Introduction to Financial Analysis
- Financial Reporting Standards
- Major Financial Statements and Other Information
- Recognition and Measurement Issues
- Analysis of Financial Statements
- Financial Reporting Quality

Literature

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

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

Responsibility: Melanie Schienle
Contained in: [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2520022		Vorlesung (V)	2	Melanie Schienle
SS 2018	2520023		Übung (Ü)	2	Chong Liang, Melanie Schienle

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Remarks
The course takes place each second summer term: 2018/2020....

V Event excerpt: (SS 2018)

Aim
The student

- shows a broad knowledge of fincancial econometric estimation and testing techniques
- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

Content
ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

Workload
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours

T Course: Financial Intermediation [T-WIWI-102623]

Responsibility: Martin Ruckes
Contained in: [M-WIWI-101502] Economic Theory and its Application in Finance
[M-WIWI-101483] Finance 2
[M-WIWI-101453] Applied Strategic Decisions
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2530232	Financial Intermediation	Vorlesung (V)	2	Martin Ruckes
WS 18/19	2530233		Übung (Ü)	1	Andreas Benz, Daniel Hoang, Martin Ruckes

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

Conditions
None

Recommendations
None

V Event excerpt: Financial Intermediation (WS 18/19)

Aim
Students

- are in a position to describe the arguments for the existence of financial intermediaries,
- are able of discuss and analyze both static and dynamic aspects of contractual relationships between banks and borrowers,
- are able to discuss the macroeconomic role of the banking system,
- are in a position to explain the fundamental principles of the prudential regulation of banks and are able to recognize and evaluate the implications of specific regulations.

Content

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Stability of the financial system
- The macroeconomic role of financial intermediation
- Principles of the prudential regulation of banks

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

Literature
Elective literature:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6th edition, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2nd edition, MIT Press.

T Course: Fixed Income Securities [T-WIWI-102644]

Responsibility: Marliese Uhrig-Homburg
Contained in: [M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
Please note that the lecture is not held in winter semester 18/19.
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO2015 and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3.The examination is offered every semester and can be repeated at every regular examination date.

Conditions
None

Recommendations
Knowledge from the course "Derivatives" is very helpful.

Remarks
See German version.

T Course: Formal Systems [T-INFO-101336]

Responsibility: Bernhard Beckert
Contained in: [M-INFO-100799] Formal Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24086		Vorlesung / Übung (VÜ)	4	Bernhard Beckert, Mattias Ulbrich

V Event excerpt: (WS 18/19)

Aim
Der Studierende soll in die Grundbegriffe der formalen Modellierung und Verifikation von Informatiksystemen eingeführt werden.
Der Studierende soll die grundlegende Definitionen und ihre wechselseitigen Abhängigkeiten verstehen und anwenden lernen.
Der Studierende soll für kleine Beispiele eigenständige Lösungen von Spezifikationsaufgaben finden können, gegebenfalls mit Unterstützung entsprechender Softwarewerkzeuge.
Der Studierende soll für kleine Beispiele selbständig Verifikationsaufgaben lösen können, gegebenfalls mit Unterstützung entsprechender Softwarewerkzeuge.

Content
Diese Vorlesung soll die Studierenden einerseits in die Grundlagen der formalen Modellierung und Verifikation einführen und andererseits vermitteln, wie der Transfer von der Theorie zu einer praktisch einsetzbaren Methode betrieben werden kann.
Es wird unterschieden zwischen der Behandlung statischer und dynamischer Aspekte von Informatiksystemen.

- **Statische Modellierung und Verifikation**
  Anknüpfend an Vorkenntnisse der Studierenden in der Aussagenlogik, werden Kalküle für die aussagenlogische Deduktion vorgestellt und Beweise für deren Korrektheit und Vollständigkeit besprochen. Es soll den Studierenden vermittelt werden, dass solche Kalküle zwar alle dasselbe Problem lösen, aber unterschiedliche Charakteristiken haben können. Beispiele solcher Kalküle können sein: der Resolutionskalkül. Tableaukalkül, Sequenzen- oder Hilbertkalkül. Weiterhin sollen Kalküle für Teilklassen der Aussagenlogik vorgestellt werden, z.B. für universelle Hornformeln.
  Die Brücke zwischen Theorie und Praxis soll geschlagen werden durch die Behandlung von Programmen zur Lösung aussagenlogischer Erfüllbarkeitsprobleme (SAT-solver).

  Aufbauend auf den aussagenlogischen Fall werden Syntax, Semantik der Prädikatenlogik eingeführt. Es werden zwei Kalküle behandelt, z.B. Resolutions-, Sequenzen-, Tableau- oder Hilbertkalkül. Wobei in einem Fall ein Beweis der Korrektheit und Vollständigkeit geführt wird.
  Die Brücke zwischen Theorie und Praxis soll geschlagen werden durch die Behandlung einer gängigen auf der Prädikatenlogik fußenden Spezifikationssprache, wie z.B. OCL, JML oder ähnliche. Zusätzlich kann auf automatische oder interaktive Beweise eingegangen werden.

- **Dynamische Modellierung und Verifikation**
  Als Einstieg in Logiken zur Formalisierung von Eigenschaften dynamischer Systeme werden aussagenlogische Modallogiken betrachtet in Syntax und Semantik (Kripke Strukturen) jedoch ohne Berücksichtigung der Beweistheorie.
  Aufbauend auf dem den Studenten vertrauten Konzept endlicher Automaten werden omega-Automaten zur Modellierung nicht terminierender Prozesse eingeführt, z.B. Büchi Automaten oder Müller Automaten. Zu den dabei

behandelten Themen gehören insbesondere die Abschlusseigenschaften von Büchi Automaten.
Als Spezialisierung der modalen Logiken wird eine temporale modale Logik in Syntax und Semantik eingeführt, z.B. LTL oder CTL.
Es wird der Zusammenhang hergestellt zwischen Verhaltensbeschreibungen durch omega-Automaten und durch Formeln temporalen Logiken.
Die Brücke zwischen Theorie und Praxis soll geschlagen werden durch die Behandlung eines Modellprüfungsverfahrens (model checking).

Literature
Vorlesungsskriptum 'Formale Systeme',
User manuals oder Bedienungsanleitungen der benutzten Werkzeuge (SAT-solver, Theorembeweiser, Modellprüfungsverfahren (model checker)).
Weiterführende Literatur
Wird in der Vorlesung bekannt gegeben.

T Course: Formal Systems II: Application [T-INFO-101281]

Responsibility: Bernhard Beckert
Contained in: [M-INFO-100744] Formal Systems II: Application
[M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Sommersemester	Prüfungsleistung mündlich	1

T Course: Formal Systems II: Theory [T-INFO-101378]

Responsibility: Bernhard Beckert
Contained in: [M-INFO-100841] Formal Systems II: Theory
[M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24608		Vorlesung (V)	3	Bernhard Beckert, Mattias Ulbrich

V Event excerpt: (SS 2018)

Content
Der/Die Studierende soll

- das grundlegendene methodische Vorgehen der Theorie Formaler Systeme erlernen.
- anhand einiger ausgewählter Beispiele logische Theorien im Detail kennenlernen.
- einfache Aufgabenstellungen eigenständig bearbeiten und lösen können.

T Course: Gas-Markets [T-WIWI-102692]

Responsibility: Andrej Marko Pustisek
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The examination will be offered latest until summer term 2018 (repeaters only)..
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Conditions
None

Recommendations
None

T Course: Geometric Optimzation [T-INFO-101267]

Responsibility: Hartmut Prautzsch
Contained in: [M-INFO-101214] Algorithms in Computer Graphics
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Unregelmäßig	Prüfungsleistung mündlich	1

T Course: Global Optimization I [T-WIWI-102726]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550134		Vorlesung (V)	2	Oliver Stein
SS 2018	2550135		Übung (Ü)	1	Robert Mohr, Christoph Neumann, Oliver Stein

Learning Control / Examinations
Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO) and possibly of a compulsory prerequisite.
The exam is offered in the lecture of semester and the following semester.
The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-103638] *Global optimization I and II* must not have been started.

Recommendations
None

Remarks
Part I and II of the lecture are held consecutively in the *same*semester.

V Event excerpt: (SS 2018)

Aim
The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results

- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T Course: Global optimization I and II [T-WIWI-103638]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
9	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550134		Vorlesung (V)	2	Oliver Stein
SS 2018	2550136		Vorlesung (V)	2	Oliver Stein

Learning Control / Examinations
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The examination is held in the semester of the lecture and in the following semester.

Conditions
None

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-102726] *Global Optimization I* must not have been started.
2. The course [T-WIWI-102727] *Global Optimization II* must not have been started.

Recommendations
None

Remarks
Part I and II of the lecture are held consecutively in the *same* semester.

V Event excerpt: (SS 2018)

Aim
The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications

- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

V Event excerpt: (SS 2018)

Aim
The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
The global solution of convex optimization problems is subject of part I of the lecture.
Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via αBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T Course: Global Optimization II [T-WIWI-102727]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550135		Übung (Ü)	1	Robert Mohr, Christoph Neumann, Oliver Stein
SS 2018	2550136		Vorlesung (V)	2	Oliver Stein

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The examination is held in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-103638] *Global optimization I and II* must not have been started.

Remarks
Part I and II of the lecture are held consecutively in the *same*semester.

V Event excerpt: (SS 2018)

Aim
The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.
The global solution of convex optimization problems is subject of part I of the lecture.
Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic

- Convex relaxation via αBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T Course: 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
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the lecture and the following lecture.

Conditions
None

Recommendations
Basic knowledge as conveyed in the module*Introduction toOperations Research*[WI1OR] is assumed.

Remarks
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T Course: Heat Economy [T-WIWI-102695]

Responsibility: Wolf Fichtner
Contained in: [M-WIWI-101452] Energy Economics and Technology
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581001	Heat Economy	Vorlesung (V)	2	Wolf Fichtner

Learning Control / Examinations
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Conditions
None.

Recommendations
None

Remarks
See German version.

V Event excerpt: Heat Economy (SS 2018)

Aim
The student gains detailed knowledge about heat generating technologies and their areas of application, in particular in the area of combined heat and power. The student is able to deal with technical and economic questions in this field.

Content
1. Introduction: Heat economy
2. CHP technologies (incl. calculation of profitability)
3. Heat systems (incl. calculation of profitability)
4. Distribution of heat
5. Demand for space heating and thermal insulation measures
6. Heat storage
7. Legal framework conditions
8. Laboratory experiment: compression heat pump

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

T Course: Human Brain and Central Nervous System: Anatomy, Information Transfer, Signal Processing, Neurophysiology and Therapy [T-INFO-101262]

Responsibility: Rüdiger Dillmann, Uwe Spetzger
Contained in: [M-INFO-101250] Medical Simulation and Neural Medicine
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24678		Vorlesung (V)	2	Uwe Spetzger
WS 18/19	24139		Vorlesung (V)	2	Uwe Spetzger

V Event excerpt: (WS 18/19)

Aim
Nach erfolgreichem Besuch der Lehrveranstaltung sollten die Studenten ein Grundverständnis und Basisinformationen über den Aufbau und die komplexe Funktionsweise des Gehirns und des zentralen Nervensystems haben. Ziel ist die Vermittlung von Grundlagen der Neurophysiologie mit Darstellung von Sinnesfehlfunktionen sowie Ursachen und Mechanismen von Krankheiten des Gehirns und des Nervensystems. Zudem werden unterschiedliche diagnostischen Maßnahmen sowie Therapiemodalitäten dargestellt, wobei hier der Fokus auf die bildgeführte, computerassistierte und roboterassistierte operative Behandlung fällt. Die Vorlesung bietet den Studenten einen Einblick in die moderne Neuromedizin und stellt somit eine Schnittstelle zur Neuroinformatik her.

Content
Die Lehrveranstaltung vermittelt einen Überblick über die Neuromedizin und bewirkt ein grundsätzliches Verständnis für die Sinnes- und Neurophysiologie, was eine wichtige Schnittstelle zu den innovativen Forschungsgebieten der Neuroprothetik (optische, akustische Prothesen) darstellt. Zudem besteht hier ebenso eine enge Anbindung zu den motorischen Systemen in der Robotik. Weitere Verknüpfungen bestehen zu den Bereichen der Bildgebung und Bildverarbeitung, der intraoperativen Unterstützungssysteme. Es wird ein Praxisbezug hergestellt sowie konkrete Anwendungsbeispiele in der medizinischen Diagnostik und Therapie dargestellt.

Workload
ca. 40 h

V Event excerpt: (SS 2018)

Aim
Nach erfolgreichem Besuch der Lehrveranstaltung sollten die Studenten ein Grundverständnis und Basisinformationen über den Aufbau und die komplexe Funktionsweise des Gehirns und des zentralen Nervensystems haben. Ziel ist die Vermittlung von Grundlagen der Neurophysiologie mit Darstellung von Sinnesfehlfunktionen sowie Ursachen und Mechanismen von Krankheiten des Gehirns und des Nervensystems. Zudem werden unterschiedliche diagnostischen Maßnahmen sowie Therapiemodalitäten dargestellt, wobei hier der Fokus auf die bildgeführte, computerassistierte und roboterassistierte operative Behandlung fällt. Die Vorlesung bietet den Studenten einen Einblick in die moderne Neuromedizin und stellt somit eine Schnittstelle zur Neuroinformatik her.

Content
Die Lehrveranstaltung vermittelt einen Überblick über die Neuromedizin und bewirkt ein grundsätzliches Verständnis für die Sinnes- und Neurophysiologie, was eine wichtige Schnittstelle zu den innovativen Forschungsgebieten der Neuroprothetik (optische, akustische Prothesen) darstellt. Zudem besteht hier ebenso eine enge Anbindung zu den motorischen Systemen in der Robotik. Weitere Verknüpfungen bestehen zu den Bereichen der Bildgebung und Bildverarbeitung, der intraoperativen Unterstützungssysteme. Es wird ein Praxisbezug hergestellt sowie konkrete Anwendungsbeispiele in der medizinischen Diagnostik und Therapie dargestellt.

Workload
ca. 40 h

T Course: Human Factors in Security and Privacy [T-WIWI-109270]

Responsibility: Melanie Volkamer
Contained in: [M-WIWI-104520] Human Factors in Security and Privacy
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511554		Vorlesung (V)	2	Melanie Volkamer
WS 18/19	2511555		Übung (Ü)	1	Melanie Volkamer

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
Successful participation in the exercises.

Remarks
New course starting winter term 2018/2019.

V Event excerpt: (WS 18/19)

Aim
Students ...

- know why many existing security and privacy mechanisms are not usable and why many awareness/education/training approaches are not effective
- can explain for concrete examples why these are not usable / not effective including why people are likely to face problems with these
- can explain what mental models are, why they are important and how they can be identified
- know how to conduct a cognitive walkthrough to identify problems with existing mechanisms and approaches
- know how to conduct semi-structured interviews
- know how user studies in the security context differ from those conducted in other contexts
- can explain the process of human centered security / privacy by design
- know the advantages and disadvantages of various graphical password schemes
- know concepts such as just in time and place security interventions

Content
This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. This includes the importance of mental models. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is also applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study.

Literature

- Usable Security: History, Themes, and Challenges (Synthesis Lectures on Information Security, Privacy, and Trust): Simson Garfinkel und Heather Richter Lipford. 2014

- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
- Melanie Volkamer, Karen Renaud: Mental Models - General Introduction and Review of Their Application to Human-Centred Security. In Number Theory and Cryptography (2013): 255-280: https://link.springer.com/chapter/10.1007/978-3-642-42001-6_18
- Paul Gerber, Marco Ghiglierie, Birgit Henhapl, Oksana Kulyk, Karola Marky, Peter Mayer, Benjamin Reinheimer, Melanie Volkamer: Human Factors in Security. In: Reuter C. (eds) Sicherheitskritische Mensch-Computer-Interaktion. Springer (2018) https://link.springer.com/chapter/10.1007/978-3-658-19523-6_5
- Bruce Schneier: Psychology of Security (2018): https://www.schneier.com/essays/archives/2008/01/the_psychology_of_se.html
- Ross Anderson: security /usability and psychology. In Security Engineering. http://www.cl.cam.ac.uk/~rja14/Papers/SEv2-c02.pdf
- Andrew Odlyzko: Economics, Psychology and Sociology of Security: http://www.dtc.umn.edu/~odlyzko/doc/econ.psych.security.pdf

T Course: Human-Machine-Interaction [T-INFO-101266]

Responsibility: Michael Beigl
Contained in: [M-INFO-100729] Human Computer Interaction
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24659	Human-Computer-Interaction	Vorlesung (V)	2	Michael Beigl, Andrea Schankin

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-106257] *Human-Machine-Interaction* must have been passed.

V Event excerpt: Human-Computer-Interaction (SS 2018)

Aim
Die Vorlesung führt in Grundlagen der Mensch-Maschine Kommunikation ein. Nach Abschluss der Veranstaltung können die Studierenden

- grundlegende Kenntnisse über das Gebiet Mensch-Maschine Interaktion wiedergeben
- grundlegende Techniken zur Analyse von Benutzerschnittstellen nennen und anwenden
- grundlegende Regeln und Techniken zur Gestaltung von Benutzerschnittstellen anwenden
- existierende Benutzerschnittstellen und deren Funktion analysieren und bewerten

Content
Themenbereiche sind:

1. Informationsverarbeitung des Menschen (Modelle, physiologische und psychologische Grundlagen, menschliche Sinne, Handlungsprozesse),
2. Designgrundlagen und Designmethoden, Ein- und Ausgabeeinheiten für Computer, eingebettete Systeme und mobile Geräte,
3. Prinzipien, Richtlinien und Standards für den Entwurf von Benutzerschnittstellen
4. Technische Grundlagen und Beispiele für den Entwurf von Benutzungsschnittstellen (Textdialoge und Formulare, Menüsysteme, graphische Schnittstellen, Schnittstellen im WWW, Audio-Dialogsysteme, haptische Interaktion, Gesten),
5. Methoden zur Modellierung von Benutzungsschnittstellen (abstrakte Beschreibung der Interaktion, Einbettung in die Anforderungsanalyse und den Softwareentwurfsprozess),
6. Evaluierung von Systemen zur Mensch-Maschine-Interaktion (Werkzeuge, Bewertungsmethoden, Leistungsmessung, Checklisten).
7. Übung der oben genannten Grundlagen anhand praktischer Beispiele und Entwicklung eigenständiger, neuer und alternativer Benutzungsschnittstellen.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 180 Stunden (6.0 Credits).
Aktivität
Arbeitsaufwand
Präsenzzeit: Besuch der Vorlesung
15 x 90 min

22 h 30 min
Präsenzzeit: Besuch derÜbung
8x 90 min
12 h 00 min
Vor- / Nachbereitung der Vorlesung
15 x 150 min
37 h 30 min
Vor- / Nachbereitung derÜbung
8x 360min
48h 00min
Foliensatz/Skriptum 2x durchgehen
2 x 12 h
24 h 00 min
Prüfung vorbereiten
36 h 00 min
SUMME
180h 00 min
Arbeitsaufwand für die Lerneinheit "Mensch-Maschine-Interaktion"

Literature
David Benyon: Designing Interactive Systems: A Comprehensive Guide to HCI and Interaction Design. Addison-Wesley Educational Publishers Inc; 2nd Revised edition; ISBN-13: 978-0321435330
Steven Heim: The Resonant Interface: HCI Foundations for Interaction Design. Addison Wesley; ISBN-13: 978-0321375964

T Course: Human-Machine-Interaction [T-INFO-106257]

Responsibility: Michael Beigl
Contained in: [M-INFO-100729] Human Computer Interaction
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
0	deutsch	Jedes Sommersemester	Studienleistung	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400095	Human-Computer-Interaction	Übung (Ü)	1	Michael Beigl, Andrea Schankin
SS 2018	24659	Human-Computer-Interaction	Vorlesung (V)	2	Michael Beigl, Andrea Schankin

V Event excerpt: Human-Computer-Interaction (SS 2018)

Aim
Die Vorlesung führt in Grundlagen der Mensch-Maschine Kommunikation ein. Nach Abschluss der Veranstaltung können die Studierenden

- grundlegende Kenntnisse über das Gebiet Mensch-Maschine Interaktion wiedergeben
- grundlegende Techniken zur Analyse von Benutzerschnittstellen nennen und anwenden
- grundlegende Regeln und Techniken zur Gestaltung von Benutzerschnittstellen anwenden
- existierende Benutzerschnittstellen und deren Funktion analysieren und bewerten

Content
Themenbereiche sind:

1. Informationsverarbeitung des Menschen (Modelle, physiologische und psychologische Grundlagen, menschliche Sinne, Handlungsprozesse),
2. Designgrundlagen und Designmethoden, Ein- und Ausgabeeinheiten für Computer, eingebettete Systeme und mobile Geräte,
3. Prinzipien, Richtlinien und Standards für den Entwurf von Benutzerschnittstellen
4. Technische Grundlagen und Beispiele für den Entwurf von Benutzungsschnittstellen (Textdialoge und Formulare, Menüsysteme, graphische Schnittstellen, Schnittstellen im WWW, Audio-Dialogsysteme, haptische Interaktion, Gesten),
5. Methoden zur Modellierung von Benutzungsschnittstellen (abstrakte Beschreibung der Interaktion, Einbettung in die Anforderungsanalyse und den Softwareentwurfsprozess),
6. Evaluierung von Systemen zur Mensch-Maschine-Interaktion (Werkzeuge, Bewertungsmethoden, Leistungsmessung, Checklisten).
7. Übung der oben genannten Grundlagen anhand praktischer Beispiele und Entwicklung eigenständiger, neuer und alternativer Benutzungsschnittstellen.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 180 Stunden (6.0 Credits).
Aktivität
Arbeitsaufwand
Präsenzzeit: Besuch der Vorlesung
15 x 90 min
22 h 30 min
Präsenzzeit: Besuch derÜbung

8x 90 min
12 h 00 min
Vor- / Nachbereitung der Vorlesung
15 x 150 min
37 h 30 min
Vor- / Nachbereitung derÜbung
8x 360min
48h 00min
Foliensatz/Skriptum 2x durchgehen
2 x 12 h
24 h 00 min
Prüfung vorbereiten
36 h 00 min
SUMME
180h 00 min
Arbeitsaufwand für die Lerneinheit "Mensch-Maschine-Interaktion"

Literature
David Benyon: Designing Interactive Systems: A Comprehensive Guide to HCI and Interaction Design. Addison-Wesley Educational Publishers Inc; 2nd Revised edition; ISBN-13: 978-0321435330
Steven Heim: The Resonant Interface: HCI Foundations for Interaction Design. Addison Wesley; ISBN-13: 978-0321375964

T Course: Image Data Compression [T-INFO-101292]

Responsibility: Jürgen Beyerer, Alexey Pak
Contained in: [M-INFO-101238] Automated visual inspection
[M-INFO-101241] Image-based detection and classification
[M-INFO-101239] Machine Vision
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400112	Image Data Compression	Vorlesung (V)	2	Jürgen Beyerer, Alexey Pak

V Event excerpt: Image Data Compression (WS 18/19)

Aim
The students will learn various kinds, sources, and uses of image-type data, and the forms of their compression. Students master the basic concepts of information theory, related to data communication and coding. Based on these concepts and general principles and characterization criteria, students are able to compare various schemes of image data representation and coding. Students have in-depth knowledge of a few selected algorithms of entropy coding, pre-coding, and 1D-signal de-correlation.
Students know 2D transform-based de-correlation methods, including Discrete Fourier Transform, Discrete Cosine Transform, Walsh-Hadamard Transform, and the Discrete Wavelet Transform and know how to use them in video coding by exploitation of temporal correlations.
Students understand the human visual system and the statistics of natural images. In addition, the students know two non-standard applications of image data coding: digital watermarking and steganography. As an exercise, students analyze several simple steganographic schemes.

Content
This module conveys to the students the theoretical and practical aspects of the principal stages in image data acquisition and compression. The discussion progresses from the coding of un-correlated sequential data streams to de-correlation of natural 2D images and to exploitation of temporal correlations in video data coding. Each considered technique is provided with a statistical justification and characterised with basic information-theoretic metrics.
In the end of the class, an outlook is given to non-conventional image-based information coding schemes (watermarking and steganography).

Workload
Gesamt: ca. 90h, davon
1. Präsenzzeit in Vorlesungen: 23h
2. Vor-/Nachbereitung derselbigen: 23h
3. Klausurvorbereitung und Präsenz in selbiger: 44h

T Course: Incentives in Organizations [T-WIWI-105781]

Responsibility: Petra Nieken
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101505] Experimental Economics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2573003	Incentives in Organizations	Vorlesung (V)	2	Petra Nieken
SS 2018	2573004	Übung zu Incentives in Organizations	Übung (Ü)	1	Mitarbeiter, Petra Nieken

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Conditions
None

Recommendations
Knowledge of microeconomics, game theory, and statistics is assumed.

Remarks
The course is carried out routinely in summer.

V Event excerpt: Incentives in Organizations (SS 2018)

Aim
The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics. He / she is able to use both, standard economic models and behavioral models.
- understands how econometric methods can be used to analyze performance and compensation data. Is able to read and interpret results from regressions and derive economic relevance from those results.
- knows incentives schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical datafor companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Content
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Workload
The total workload for this course is approximately 135 hours.
Lecture 32h

Preparation of lecture 52h
Exam preparation 51h

Literature
Literature (mandatory): Slides, case studies, and selected research papers annolunced in the lecture
Literature (additional):
Brickley / Smith / Zimmerman: Managerial Economics and Organizantional Architecture
Camerer: Behavioral Game Theory
Lazear / Gibbs: Personnel Economics in Practice
Wooldridge: Introduction to Econometrics
Wooldridge: Econometric Analysis of Cross Section and Panel Data

T Course: Industrial Services [T-WIWI-102822]

Responsibility: Hansjörg Fromm
Contained in: [M-WIWI-101506] Service Analytics
[M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-101448] Service Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2595505	Industrial Services	Vorlesung (V)	2	Hansjörg Fromm
WS 18/19	2595506		Übung (Ü)	1	Jannis Walk

Learning Control / Examinations
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Conditions
None

Recommendations
None

V Event excerpt: Industrial Services (WS 18/19)

Aim
Participants understand the interrelation between Front-Office (Customer view, e.g. material availability, technician skills, maintenance quality, repair time) and Back-Office (Provider view, e.g. distribution planning, inventory optimization, technician work schedule, call center). They learn about forecasting algorithms for sporadic demands, which are typical in spare part supply, and they apply common inventory optimization models for stock planning. They also become familiar with full-cost service contracts, as well as with the latest product related services that have been enabled only in recent years by modern IT and mobile technology.

Content
Services are becoming ever more important in business. Today, the gross income share of services in Germany exceeds 70%. Following this trend, many companies that previously focused solely on the sale of goods, strive to an extension of their business model: In order to realize new competitive advantages in domestic and international markets, they enrich their material goods with customer-specific services. This transformation to a provider of integrated solutions is called "Servitization" (Neely 2009). For this reason, so-called industrial services to companies of increasing importance. They benefit from the increasingly detailed data collected (on "Big Data"), e.g. concerning user profiles, failure statistics, usage history, accrued expenses, etc. Only these data allow in principle to end products and spare parts are delivered faster, cheaper and more targeted and technicians can be used more efficiently with the correct skills. This requires, however, also suitable methods of optimization, prognosis or predictive modeling. When used properly, such methods can minimize logistics costs, increase availability, prevent potential failures and improve repair planning. This is also enabled by latest "Technology Enabled Services" along with corresponding data transfer and analysis ("Internet of Things", automatic error detection, remote diagnostics, centralized collection of consumption data, etc.). The change from goods manufacturer to a provider of integrated solutions requires new services, transformation of business models as well as intelligent new contract types, which are addressed in the course as well.
More specifically, the lessons of this lecture will include:

- Servitization – The Manufacturer's Transformationto Integrated Solution Provider
- Service Levels – Definitions, Agreements, Measurements and Service Level Engineering
- The "Services Supply Chain"
- Spare Parts Planning – Forecasting, Assortment Planning, Order Quantities and Safety Stocks

- Distribution Network Planning – Network Types, Models, Optimization
- Service Technician Planning
- Condition Monitoring, Predictive Maintenance, Diagnose Systems
- Call Center Services
- Full Service Contracts
- IT-enabled Value-Add Services – Industrial Service Innovation

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

Literature
Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (Vol. 3, p. 30). New York: Wiley.
Pintelon, L., & Van Puyvelde, F. (2013). *Asset Management. The Maintenance Perspective*. Acco.
Chopra, S., & Meindl, P. (2007). Supply chain management. Strategy, planning & operation. In *Das summa summarum des management* (pp. 265-275). Gabler.
Koole, G. (2007). Call Center Mathematics: A scientific method for understanding and improving contact centers. *Departement of Mathematics, Vrije Universiteit, Amsterdam*.
Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services. *International journal of service industry management*, *14*(2), 160-172.

T Course: Information Service Engineering [T-WIWI-106423]

Responsibility: Harald Sack
Contained in: [M-WIWI-101456] Intelligent Systems and Services
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2511606		Vorlesung (V)	2	Harald Sack
SS 2018	2511607		Übung (Ü)	1	Harald Sack

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None

Remarks
New course starting summer term 2017.

V Event excerpt: (SS 2018)

Aim

- The students know the fundamentals and measures of information theory and are able to apply those in the context of Information Service Engineering.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students have fundamental skills of information retrieval and are enabled to conduct and to evaluate simple information retrieval tasks.
- The students apply their skills of natural language processing, Linked Data engineering, and Information Retrieval to conduct and evaluate simple knowledge mining tasks.
- The students know the fundamentals of recommender systems as well as of semantic and exploratory search.

Content
- Information, Natural Language and the Web
- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques & Challenges
- Evaluation, Precision and Recall
- Regular Expressions and Automata
- Tokenization
- Language Model and N-Grams
- Part-of-Speech Tagging

- Linked Data Engineering

- Knowledge Representations and Ontologies
- What's in an URI?
- Resource Description Framework (RDF)
- Creating new Models with RDFS
- Querying RDF(S) with SPARQL
- More Expressivity with Web Ontology Language (OWL)
- The Web of Data
- Vocabularies and Ontologies in the Web of Data
- Wikipedia, DBpedia, and Wikidata

- Information Retrieval

- Information Retrieval Models
- Retrieval Evaluation
- Web Information Retrieval
- Document Crawling, Text Processing, and Indexing
- Query Processing and Result Representation
- Question Answering

- Knowledge Mining

- From Data to Knowledge
- Data Mining
- Machine Learning Basics for Knowledge Mining
- Mining Knowledge from Wikipedia
- Named Entity Resolution

- Exploratory Search and Recommender Systems

- Semantic Search and Entity Centric Search
- Collaborative Filtering and Content Based Recommendations
- From Search to Intelligent Browsing
- Linked Data Based Exploratory Search
- Fact Ranking

Literature

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- S. Hitzler, S. Rudolph, Foundations of Semantic Web Technologies, Chapman / Hall, 2009.
- R. Baeza-Yates, B. Ribeiro-Neto, Modern Information Retrieval, 2nd ed., Addison Wesley, 2010.#

T Course: Innovation Management: Concepts, Strategies and Methods [T-WIWI-102893]

Responsibility: Marion Weissenberger-Eibl
Contained in: [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2545100	Innovation Management: Concepts, Strategies and Methods	Vorlesung (V)	2	Marion Weissenberger-Eibl

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

Conditions
None

Recommendations
None

V Event excerpt: Innovation Management: Concepts, Strategies and Methods (SS 2018)

Aim
Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

Content
The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the un-derstanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application.
The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particu-larly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addi-tion to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of inte-grated knowledge.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
A detailed bibliography is provided with the lecture notes.

T Course: Insurance Marketing [T-WIWI-102601]

Responsibility: Edmund Schwake
Contained in: [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung mündlich	1

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

Conditions
None

Recommendations
None

T Course: Insurance Production [T-WIWI-102648]

Responsibility: Ute Werner
Contained in: [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung mündlich	1

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).
T-WIWI-102648 Insurance Production will be offered latest until summer term 2017 (beginners only).

Conditions
None

Recommendations
None

Remarks
This course is offered on demand. For further information, see: http://insurance.fbv.kit.edu

T Course: Insurance Risk Management [T-WIWI-102636]

Responsibility: Harald Maser
Contained in: [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
2.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment consists of a written or an oral exam (according to Section 4 (2), 1 or 2 of the examination regulation). T-WIWI-102636 Insurance Risk Management will be offered as a seminar starting summer term 2017. The examination will be offered latest until summer term 2017 (beginners only).

Conditions
None

Recommendations
None

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

T Course: Integrated Network and Systems Management [T-INFO-101284]

Responsibility: Bernhard Neumair
Contained in: [M-INFO-101210] Dynamic IT-Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400004	Integrated Network and Systems Management	Vorlesung (V)	2	Bernhard Neumair

V Event excerpt: Integrated Network and Systems Management (SS 2018)

Aim

- Die Studierenden verstehen Management moderner, verteilter IT-Systeme und –Dienste
- Die Studierenden verstehen Konzepte und Modelle in den Bereichen Netzwerkmanagement, Systemmanagement, Anwendungsmanagement und IT-Servicemanagement
- Die Studierenden analysieren die verschiedenen Managementfunktionsbereiche, Managementmodelle und –Architekturen
- Die Studierenden beurteilen Internet-Management (SNMP) und OSI/TMN-Management
- Die Studierenden analysieren den Einsatz der Modelle und Architekturen in Management-Werkzeugen
- Die Studierenden verstehen Management-Plattformen für integriertes IT-Management
- Die Studierenden verstehen Managementwerkzeuge wie Trouble-Ticket-Systeme, SLA-Werkzeuge und Enterprise Management Systeme
- Die Studierenden verstehen Best-Practice-Ansätze und Strukturierungsvorgaben wie z.B. ITILv3

Content
Die Vorlesung behandelt das Management moderner, verteilter IT-Systeme und -Dienste. Hierfür werden tragende Konzepte und Modelle in den Bereichen Netzwerkmanagement, Systemmanagement, Anwendungsmanagement und IT-Servicemanagement vorgestellt und diskutiert. Ausgehend von einer Vorstellung der Komplexität aktueller Netze anhand praktischer Szenarien wird die Brücke zwischen Konzepten der Grundvorlesungen und deren industriellem Einsatz geschlagen. Anhand dessen werden die Anforderungen an das Netz- und Systemmanagement motiviert. Anschließend werden die verschiedenen Managementfunktionsbereiche, Managementmodelle und –Architekturen vorgestellt, u.a. Internet-Management (SNMP) und OSI/TMN-Management. Darauf aufbauend wird der Einsatz der Modelle in Architekturen in Management-Werkzeugen dargestellt. Weiterhin werden Management-Plattformen beschrieben, die die Basis für die Realisierung eines integrierten Managements bilden. Die Vorlesung setzt fort mit einem Überblick über Managementwerkzeuge wie Trouble-Ticket-Systeme und SLA-Werkzeuge und über Enterprise Management Systems. Abschließend werden Best-Practice-Ansätze und Strukturierungsvorgaben wie z.B. ITILv3 vorgestellt.

Workload
90 h
Präsenzzeit Vorlesung 22,5 h (15 x 1,5 h)
Vor- und Nachbereitung Vorlesung 45 h (15 x 3 h)
Vorbereitung Prüfung 22,5 h

T Course: Intelligent CRM Architectures [T-WIWI-103549]

Responsibility: Andreas Geyer-Schulz
Contained in: [M-WIWI-101470] Data Science: Advanced CRM
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540525	Intelligent CRM Architectures	Vorlesung (V)	2	Andreas Geyer-Schulz
WS 18/19	2540526	Übung zu Intelligent CRM Architectures	Übung (Ü)	1	Fabian Ball

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

Conditions
None

Recommendations
It is recommended to additionally review the Bachelor-level lecture "Customer Relationship Management" from the module "CRM and Servicemanagement".

V Event excerpt: Intelligent CRM Architectures (WS 18/19)

Aim
Students have special knowledge of software architectures and of the methods which are used in their development (Systems analysis, formal methods for the specification of interfaces and algebraic semantic, UML, and, last but not least, the mapping of conceptual architectures to IT architectures.
Students know important architectural patterns and they can – based on their CRM knowledge – combine these patterns for innovative CRM applications.

Content
The lecture is structured in three parts:
In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature

- P. Clements *et al.*, *Documenting Software Architectures. Views and Beyond*. Upper Saddle River: Addison-Wesley, 2011.
- M. Fowler, *Patterns of Enterprise Application Architecture*. Amsterdam: Addison-Wesley Longman, 2002.
- S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 3rd ed. Harlow Essex England: Pearson New International Edition, 2014.
- V. N. Vapnik, *The Nature of Statistical Learning Theory*. New York: Springer, 1995.

T Course: Interactive Information Systems [T-WIWI-108461]

Responsibility: Alexander Mädche, Stefan Morana
Contained in: [M-WIWI-104080] Designing Interactive Information Systems
[M-WIWI-104068] Information Systems in Organizations
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung anderer Art	3

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540558	Interactive Information Systems	Vorlesung (V)	2	Alexander Mädche, Stefan Morana

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (70%) and research paper (30%). The exam and the research paper need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the research paper.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-106342] *Interactive Systems* must not have been started.

Remarks
This course replaces T-WIWI-106342 "Interactive Systems" starting summer term 2018.
The course is held in english.

V Event excerpt: Interactive Information Systems (SS 2018)

Aim
The students
· know what interactive systems are and how they can be conceptualized
· explore the theoretical grounding of interactive systems leveraging theories from reference disciplines such as psychology
· know key concepts and design principles of specific classes of interactive systems (e.g. assistance, behavior change systems)
· get hands-on experience by analyzing existing interactive systems and suggesting enrichments based on the lecture contents.

Content
· Basics
· Theoretical foundations
· Key concepts and design principles for specific interactive systems classes
· Capstone project

Literature
The lecture bases to a large extend on
· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.
Additional literature will be provided in the lecture.

T Course: Interactive Systems [T-WIWI-106342]

Responsibility: Alexander Mädche, Stefan Morana
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung anderer Art	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540558	Interactive Information Systems	Vorlesung (V)	2	Alexander Mädche, Stefan Morana

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (70%) and research paper (30%). The exam and the research paper need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the research paper.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-108461] *Interactive Information Systems* must not have been started.

Remarks
The course T-WIWI-108461 "Interactive Information Systems" replaces this course starting summer term 2018.
The course is held in english.

V Event excerpt: Interactive Information Systems (SS 2018)

Aim
The students
· know what interactive systems are and how they can be conceptualized
· explore the theoretical grounding of interactive systems leveraging theories from reference disciplines such as psychology
· know key concepts and design principles of specific classes of interactive systems (e.g. assistance, behavior change systems)
· get hands-on experience by analyzing existing interactive systems and suggesting enrichments based on the lecture contents.

Content
· Basics
· Theoretical foundations
· Key concepts and design principles for specific interactive systems classes
· Capstone project

Literature
The lecture bases to a large extend on
· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.
Additional literature will be provided in the lecture.

T Course: International Finance [T-WIWI-102646]

Responsibility: Marliese Uhrig-Homburg
Contained in: [M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2530570	International Finance	Vorlesung (V)	2	Marliese Uhrig-Homburg, Ulrich Walter

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

Remarks
See German version.

V Event excerpt: International Finance (SS 2018)

Aim
The objective of this course is to become familiar with the basics of investment decisions on international markets and to manage foreign exchange risks.

Content
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor second that, of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore current exchange rate theories are discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:

- Eiteman, D. et al., Multinational Business Finance, 13. edition, 2012.
- Solnik, B. and D. McLeavey, Global Investments, 6. edition, 2008.

T Course: International Management in Engineering and Production [T-WIWI-102882]

Responsibility: Henning Sasse
Contained in: [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581956	International Management in Engineering and Production	Vorlesung (V)	2	Henning Sasse

Learning Control / Examinations
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: International Management in Engineering and Production (WS 18/19)

Aim
Students are taught advanced knowledge in the field of international production and the internationalization strategies of manufacturing companies. They acquire a basic understanding of international production companies and learn about the relevant business and economic models and schools of thought on the subject. Different approaches of the design of internationalization strategies and production networks are presented and relevant location factors for their particular design are investigated. Students learn about the risks of internationalization and methods of risk minimization. Issues of supply chain management are discussed in the context of different approaches to the discrete manufacturing and the process industry. The course concludes with selected case studies from the process and discrete manufacturing industry.

Content

- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
Will be announced in the course.

T Course: Internet Law [T-INFO-101307]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101215] Intellectual Property Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24354	Internet Law	Vorlesung (V)	2	Thomas Dreier

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-108462] *Selected legal issues of Internet law* must not have been started.

V Event excerpt: Internet Law (WS 18/19)

Aim
Die Studierenden erhalten anhand praktischer relevanter Fragestellungen und Einzelfällen eine Orientierung für die Rechtsfragen, die sich durch den Einsatz von Digitalisierung und Vernetzung stellen.

Content
Jeder der teilnehmenden Praxisvertreter erhält die Möglichkeit, ein praktisch relevantes Thema eigener Wahl je nach Umfang in ein bis drei Doppelstunden vorzustellen und mit den Studenten zu erarbeiten. Über die didaktische Vorgehensweise (Vortrag, Diskussion, Case study, Studentenreferat o.Ä.) entscheidet jeder Praxisteilnehmer selbst, damit eine möglichst themenadäquate Behandlung gewährleistet ist.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden, davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

T Course: Internet of Everything [T-INFO-101337]

Responsibility: Martina Zitterbart
Contained in: [M-INFO-101205] Future Networking
[M-INFO-101203] Wireless Networking
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24104		Vorlesung (V)	2	Sebastian Friebe, Tim Gerhard, Markus Jung, Martina Zitterbart

V Event excerpt: (WS 18/19)

Aim
Studierende

- kennen die Herausforderungen des Internet of Everything (IoE) sowohl aus technischer wie auch aus rechtlicher Sicht
- kennen und verstehen die Gefahren für die Privatsphäre der Nutzer im IoE sowie grundlegende Mechanismen und Protokolle um diese zu schützen
- beherrschen die grundlegenden Architekturen und Protokolle aus dem Bereich drahtlose Sensornetze und Internet der Dinge.

Studierende kennen die Plattformen und Anwendungen des Internet of Everything. Studierende haben ein Verständnisses für Herausforderungen beim Entwurf von Protokollen und Anwendungen für das IoE.
Studierende kennen und verstehen die Gefahren für die Privatsphäre der Nutzer des zukünftigen IoE. Sie kennen Protokolle und Mechanismen um zukünftige Anwendungen zu ermöglichen, beispielsweise Smart Metering und Smart Traffic, und gleichzeitig die Privatsphäre der Nutzer zu schützen.
Studierende kennen und verstehen klassische Sensornetz-Protokolle und Anwendungen, wie beispielsweise Medienzugriffsverfahren, Routing Protokolle, Transport Protokolle sowie Mechanismen zur Topologiekontrolle. Die Studierenden kennen und verstehen das Zusammenspiel einzelner Kommunikationsschichten und den Einfluss auf beispielsweise den Energiebedarf der Systeme.
Studierende kennen Protokolle für das Internet der Dinge wie beispielsweise 6LoWPAN, RPL, CoAP und DICE. Die Studierenden verstehen die Herausforderungen und Annahmen, die zur Standardisierung der Protokolle geführt haben.
Die Studierenden haben ein grundlegendes Verständnis von
Sicherheitstechnologien im IoE. Sie kennen typische
Schutzziele und Angriffe, sowie Bausteine und Protokolle um die Schutzziele umzusetzen.

Content
Die Vorlesung behandelt ausgewählte Protokolle, Architekturen, sowie Verfahren und Algorithmen die für das IoE wesentlich sind. Dies schließt neben klassischen Themen aus dem Bereich der drahtlosen Sensor-Aktor-Netze wie z.B. Medienzugriff und Routing auch neue Herausforderungen und Lösungen für die Sicherheit und Privatheit der übertragenen Daten im IoE mit ein. Ebenso werden gesellschaftlich und rechtlich relevante Aspekte angesprochen.

Workload
Vorlesung mit 2 SWS plus Nachbereitung/Prüfungsvorbereitung, 4 LP.
4 LP entspricht ca. 120 Arbeitsstunden, davon
ca. 30 Std. Vorlesungsbesuch
ca. 60 Std. Vor-/Nachbereitung
ca. 30 Std. Prüfungsvorbereitung

Literature

H. Karl und A. Willig, *Protocols and Architectures for Wireless Sensor Networks*, Wiley and Sons, 2005, ISBN 0470095105.

T Course: Introduction in Computer Networks [T-INFO-102015]

Responsibility: Martina Zitterbart
Contained in: [M-INFO-101178] Communication and Database Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24519		Vorlesung (V)	2	Matthias Flittner, Sebastian Friebe, Tim Gerhard, Markus Jung, Martina Zitterbart

V Event excerpt: (SS 2018)

Aim
Studierende

- beherrschen die grundlegende Architekturen und Protokolle sowie den Aufbau von Kommunikationssystemen,
- sind mit der Zusammensetzung von Protokollen aus einzelnen Protokollmechanismen vertraut und konzipieren einfache Protokolle eigenständig
- kennen und verstehen das Zusammenspiel einzelner Kommunikationsschichten und Anwendungen

Studierende kennen die Schichten-Architektur von Kommunikationssystemen und können wesentliche Internet-Protokolle in das ISO/OSI-Schichtenmodell einordnen. Studierende haben ein Verständnis für das Zusammenspiel der einzelnen Protokolle.
Studierende kennen die Einflüsse der physikalischen Grundlagen auf die Datenübertragung, wie beispielsweise Signale, deren Darstellung und Digitalisierung, sowie Möglichkeiten zur Mehrfachnutzung von Übertragungsmedien.
Studierende kennen und verstehen grundlegende Protokollmechanismen zur Flusskontrolle, z.B. die Verfahren Stop-and-Wait, Go-Back-N und Selective Repeat. Die Studierenden kennen und verstehen Mechanismen zur Fehlerkontrolle von Bit- und Paketfehlern und können diese anwenden. Sie kennen verbindungslose und verbindungsorientierte Kommunikation sowie grundlegende Mechanismen zum Verbindungsmanagement.
Die Studierenden kennen und verstehen HDLC als Protokoll der Sicherungsschicht. Studierende verstehen den grundlegenden Aufbau lokaler Netze und des Medienzugriffs. Die Studierenden kennen und beherrschen gängige Protokolle und Technologien wie Token Ring und Ethernet inklusive aktueller Entwicklungen.
Studierende kennen Mechanismen und Protokolle zur Netzkopplung. Sie kennen gängige Vermittlungstechniken und verstehen die Funktionsweisen von Repeatern, Brücken und Router.
Studierende kennen und verstehen Dienste und Aufgaben der Transportschicht des ISO/OSI-Schichtenmodells. Sie kennen den grundlegenden Aufbau und die Funktionsweise von TCP (Staukontrolle, Flusskontrolle, Verbindungsmanagement) und UDP.
Die Studierenden haben ein grundlegendes Verständnis von Sicherheitstechnologien in Kommunikationssystemen. Sie kennen typische Schutzziele und Angriffe, sowie Bausteine um Kommunikationssysteme abzusichern.
Die Studierenden kennen Grundlagen relevanter Anwendungssysteme des
Internets wie DNS, E-Mail und das World Wide Web.

Content
Das heutige Internet ist wohl das bekannteste und komplexeste Gebilde, das jemals von der Menschheit erschaffen wurde: Hunderte Millionen von vernetzten Computern und Verbindungsnetzwerke. Millionen von Benutzern, die sich zu den unterschiedlichsten Zeiten mittels der unterschiedlichsten Endgeräte mit dem Internet verbinden wie beispielsweise Handys, PDAs oder Laptops. In Anbetracht der enormen Ausmaße und der Vielseitigkeit des Internets stellt sich die Frage,

inwieweit es möglich ist zu verstehen, wie die komplexen Strukturen dahinter funktionieren. Die Vorlesung versucht dabei den Einstieg in die Welt der Rechnernetze zu schaffen, indem sie sowohl theoretische als auch praktische Aspekte von Rechnernetzen vermittelt. Behandelt werden Grundlagen der Nachrichtentechnik, fundamentale Protokollmechanismen sowie die Schichtenarchitektur heutiger Rechnernetze. Hierbei werden systematisch sämtliche Schichten beginnend mit dem physikalischen Medium bis hin zur Anwendungsschicht besprochen.

Workload
Vorlesung mit 2 SWS plus Nachbereitung/Prüfungsvorbereitung, 4 LP.
4 LP entspricht ca. 120 Arbeitsstunden, davon
ca. 30 Std. Vorlesungsbesuch
ca. 60 Std. Vor-/Nachbereitung
ca. 30 Std. Prüfungsvorbereitung

Literature

- J.F. Kurose, K.W. Ross: Computer Networking - A Top-Down Approach featuring the Internet. Addison-Wesley, 2007.
- W. Stallings: Data and Computer Communications. Prentice Hall, 2006.

Weiterführende Literatur

- F. Halsall: Computer Networking and the Internet. Addison-Wesley, 2005.
- P. Lockemann, G. Krüger, H. Krumm: Telekommunikation und Datenhaltung. Hanser Verlag, 1993.
- S. Abeck, P.C. Lockemann, J. Schiller, J. Seitz: Verteilte Informationssysteme. dpunkt-Verlag, 2003

T Course: Introduction to Programming with Java [T-WIWI-102735]

Responsibility: N.N., Johann Marius Zöllner
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511000	Introduction to Programming with Java	Vorlesung (V)	3	Johann Marius Zöllner
WS 18/19	2511002		Tutorium (Tu)	1	Lukas Struppek, Janna Ulrich, Johann Marius Zöllner
WS 18/19	2511003		Praktische Übung (PÜ)	2	Lukas Struppek, Janna Ulrich, Johann Marius Zöllner
WS 18/19	2511004		Tutorium (Tu)	1	Lukas Struppek, Janna Ulrich, Johann Marius Zöllner

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

Remarks
see german version

V Event excerpt: Introduction to Programming with Java (WS 18/19)

Aim

- Knowledge of the fundamentals, methods and systems of computer science.
- The students acquire the ability to independently solve algorithmic problems in the programming language Java, which dominates in business applications.
- In doing so, they will be able to find strategic and creative answers in finding solutions to well-defined, concrete and abstract problems.

Content
The lecture "Introduction to Programming with Java " introduces systematic programming and provides essential practical basics for all advanced computer science lectures.
Based on considerations of the structured and systematic design of algorithms, the most important constructs of modern higher programming languages as well as programming methods are explained and illustrated with examples. One focus of the lecture is on teaching the concepts of object-oriented Programming. Java is used as the programming language. Knowledge of this language is required in advanced computer science lectures.
At the end of the lecture period, a written examination will be held for which admission must be granted during the semester after successful participation in the practices. The exact details will be announced in the lecture.

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

Literature
Ratz, D. Schulmeister-Zimolong, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 8. Aktualisierte und erweiterte Auflage, Hanser 2018

T Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-103289] Stochastic Optimization
[M-WIWI-101657] Stochastic Modelling and Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550470		Vorlesung (V)		Steffen Rebennack
SS 2018	2550471		Übung (Ü)		Assistenten, Steffen Rebennack

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

Conditions
None.

T Course: Introduction to Video Analysis [T-INFO-101273]

Responsibility: Jürgen Beyerer
Contained in: [M-INFO-101241] Image-based detection and classification
[M-INFO-101239] Machine Vision
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24684	Introduction to Video Analysis	Vorlesung (V)	2	Michael Arens

V Event excerpt: Introduction to Video Analysis (SS 2018)

Aim
After visiting the lecture and elaborating on the given publications, students possess a broad overview of classical and state-of-the-art methods from different areas in the field of image sequence exploitation. The methods discussed during the lecture include motion detection, establishing of correspondences between images or frames, the estimation of three-dimensional scene structure from camera motion, the detection and tracking of objects in videos, and the conceptual interpretation of visually observable actions and behaviors.
Students analyze problems in the field of image sequence exploitation and judge methods and groups of methods according to fitness regarding a given problem. They will gain the ability to choose the right method and approach.

Content
Unter Bildfolgenauswertung als Teilgebiet des Maschinensehens versteht man die automatische Ableitung von Aussagen über die in einer Bildfolge abgebildete Szene und deren zeitlicher Entwicklung. Die abgeleiteten Aussagen können dem menschlichen Benutzer bereitgestellt werden oder aber direkt in Aktionen technischer Systeme überführt werden. Bei der Analyse von Bildfolgen ist es gegenüber der Betrachtung von Einzelbildern möglich, Bewegungen als Bestandteil der zeitlichen Veränderung der beobachteten Szene mit in die Ableitung von Aussagen einzubeziehen.

Gegenstand der Vorlesung ist zunächst die Bestimmung einer vorliegenden Bewegung in der Szene aus den Bildern einer Bildfolge. Hierbei werden sowohl änderungsbasierte wie korrespondenzbasierte Verfahren behandelt. Die Nutzung der Bewegungsschätzung zwischen Einzelbildern einer Bildfolge wird im Weiteren an Beispielen wie der Mosaikbildung, der Bestimmung von Szenenstrukturen aus Bewegungen aber auch der Objektdetektion auf der Basis von Bewegungshinweisen verdeutlicht.

Einen Schwerpunkt der Vorlesung bilden Objektdetektion und vor allem Objektverfolgungsverfahren, welche zur automatischen Bestimmung von Bewegungsspuren im Bild sowie zur Schätzung der dreidimensionalen Bewegung von Szenenobjekten genutzt werden. Die geschätzten zwei- und dreidimensionalen Spuren bilden die Grundlage für Verfahren, welche die quantitativ vorliegende Information über eine beobachtete Szene mit qualitativen Begriffen verknüpfen. Dies wird am Beispiel der Aktionserkennung in Bildfolgen behandelt. Die Nutzung der Verbegrifflichung von Bildfolgenauswertungsergebnissen zur Information des menschlichen Benutzers wie auch zur automatischen Schlussfolgerung innerhalb eines Bildauswertungssystems wird an Beispielen verdeutlicht.

Workload
Gesamt: ca. 90h, davon
1. Präsenzzeit in Vorlesungen: 23h
2. Vor-/Nachbereitung derselbigen: 23h
3. Prüfungsvorbereitung und Präsenz in selbiger: 44h

T Course: IT-Security Management for Networked Systems [T-INFO-101323]

Responsibility: Hannes Hartenstein
Contained in: [M-INFO-101204] Networking Labs
[M-WIWI-101458] Ubiquitous Computing
[M-INFO-101207] Networking Security - Theory and Praxis
[M-INFO-101210] Dynamic IT-Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24149	IT-Security Management for Networked Systems	Vorlesung / Übung (VÜ)	3	Jan Grashöfer, Hannes Hartenstein, Till Neudecker

V Event excerpt: IT-Security Management for Networked Systems (WS 18/19)

Aim
Der/Die Studierende kennt die wesentlichen technischen, organisatorischen und rechtlichen Bausteine eines professionellen IT-Sicherheitsmanagements und kann nicht nur ihre Funktionsweise beschreiben, sondern sie auch selbst in der Praxis anwenden und Vor- und Nachteile alternativer Ansätze analysieren. Weiterhin kann er/sie die Eignung bestehender IT-Sicherheitskonzepte beurteilen. Zudem kennt der/die Studierende den Stand aktueller Forschungsfragen im Bereich des IT-Sicherheitsmanagements sowie zugehörige Lösungsansätze. Die Lernziele sind im Einzelnen:

1. Der/Die Studierende kennt die wesentlichen Schutzziele der IT-Sicherheit und kann ihre Bedeutung und Zielsetzung wiedergeben.
2. Der/Die Studierende versteht Aufbau, Phasen und wichtige Standards des IT-Sicherheitsprozesses und kann seine Anwendung beschreiben.
3. Der/Die Studierende kennt die Bedeutung des Risikomanagements für Unternehmen, kann dessen wesentliche Bestandteile verdeutlichen, und kann die Risikoanalyse auf exemplarische Bedrohungen anwenden.
4. Der/Die Studierende kennt zentrale Gesetze aus dem rechtlichen Umfeld der IT-Sicherheit und kann ihre Anwendung erläutern.
5. Der/Die Studierende versteht die Funktionsweise elementarer kryptographischer Bausteine und kann deren Eignung für spezifische Fälle bewerten.
6. Der/Die Studierende kennt alternative Schlüsselmanagement-Architekturen und kann ihre Vor- und Nachteile beurteilen.
7. Der/Die Studierende versteht den Begriff der digitalen Identität und kann verschiedene Authentifikationsstrategien anwenden.
8. Der/Die Studierende kennt unterschiedliche, weit verbreitete Zugriffskontrollmodelle und kann ihre Anwendung in der Praxis verdeutlichen.
9. Der/Die Studierende kennt unterschiedliche Architekturen zum Management digitaler Identitäten und kann ihre wesentlichen Eigenschaften erörtern.
10. Der/Die Studierende versteht Bedeutung eines professionellen Notfallmanagements und kann dessen Umsetzung beschreiben.
11. Der/Die Studierende versteht die in der Vorlesung vorgestellten Problemstellungen aktueller Forschung und ist in der Lage diese zu erläutern.

Content
Ziel der Vorlesung ist es, den Studenten die Grundlagen des IT-Sicherheitsmanagements für vernetzte Systeme sowohl in methodischer als auch in technischer Hinsicht zu vermitteln und aktuelle Forschungsfragen vorzustellen.

Workload
Präsenzzeit: 45h (3 SWS * 15 Vorlesungswochen)
Vor- und Nachbereitungszeit: 67.5h (3 SWS * 1.5h/SWS * 15 Vorlesungswochen)
Klausurvorbereitung: 37.5h
Gesamt: 150h (= 5 ECTS Punkte)

Literature
Jochen Dinger, Hannes Hartenstein, Netzwerk- und IT-Sicherheitsmanagement : Eine Einführung, Universitätsverlag Karlsruhe, 2008.
Weiterführende Literatur
Claudia Eckert, IT-Sicherheit. Konzepte - Verfahren - Protokolle, 8. Auflage, Oldenbourg Wissenschaftsverlag, 2013, ISBN: 978-3486721386
Andrew S. Tanenbaum, Computernetzwerke, 5. Auflage, Pearson Studium, 2012, ISBN: 978-3868941371
Messaoud Benantar, Access Control Systems: Security, Identity Management and Trust Models, Springer, 2006, ISBN: 978-0387004457

T Course: Joint Entrepreneurship Summer School [T-WIWI-109064]

Responsibility: Orestis Terzidis
Contained in: [M-WIWI-101488] Entrepreneurship (EnTechnon)

ECTS	Recurrence	Exam type	Version
6	Unregelmäßig	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The learning control of the program (Summer School) consists of two parts:
A) **Investor Pitch**:
Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.
B) **Written elaboration:**
The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyzes and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.
The grade consists of 50% presentation performance and 50% written preparation.

Conditions
The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

Recommendations
We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

Remarks
The working language during the Summer School is English. A one-week stay in China is part of the Summer School.

T Course: Knowledge Discovery [T-WIWI-102666]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-102827] Service Computing
[M-WIWI-101456] Intelligent Systems and Services
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511302	Knowledge Discovery	Vorlesung (V)	2	Achim Rettinger, York Sure-Vetter
WS 18/19	2511303	Exercises to Knowledge Discovery	Übung (Ü)	1	Achim Rettinger, York Sure-Vetter, Steffen Thoma, Tobias Weller

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation.
Students can be awarded a bonus on their final grade if they successfully complete special assignments.

Conditions
None

V Event excerpt: Knowledge Discovery (WS 18/19)

Aim
Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Content
Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empircial evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others feauturevector-based learning, text mining and social network analysis.

Workload

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

T Course: Lab Course: Natural Language Processing and Software Engineering [T-INFO-106239]

Responsibility: Walter Tichy
Contained in: [M-INFO-103138] Lab Course: Natural Language Processing and Software Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400082	Lab Course: Natural Language Processing and Software Engineering	Praktikum (P)	4	Martin Blersch, Sebastian Weigelt

V Event excerpt: Lab Course: Natural Language Processing and Software Engineering (WS 18/19)

Aim
Studenten können. . . ..

- Sprachverarbeitungswerkzeuge (wie Parser, *named entitled recognizer,* aktive Ontologien usw.) praktisch anwenden,
- eine komplette Verarbeitungskette aus den verwendeten Werkzeugen erstellen, um ein übergeordnetes Ziel zu erreichen,
- ein Softwareprojekt im Bereich der Sprachverarbeitung in der Softwaretechnik strukturieren,
- am Rechner ein vorgegebenes Thema umsetzen und prototypisch implementieren,
- die Ausarbeitung mit minimalem Einarbeitungsaufwand anfertigen und dabei Formatvorgaben berücksichtigen, wie sie von allen Verlagen bei der Veröffentlichung von Dokumenten vorgegeben werden,
- Präsentationen im Rahmen eines wissenschaftlichen Kontextes ausarbeiten,
- die Ergebnisse des Praktikums in schriftlicher/mündlicher Form so präsentieren, wie es im Allgemeinen in wissenschaftlichen Publikationen der Fall ist,
- effektiv im Team kommunizieren,
- technische Sachverhalte verständlich präsentieren.

Workload
150h

Literature
Needed literature will be given in the lab.

T Course: Lab: Graph Visualization in Practice [T-INFO-106580]

Responsibility: Dorothea Wagner
Contained in: [M-INFO-103302] Lab: Graph Visualization in Practice
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Unregelmäßig	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400037	Graph Visualization in Practice	Praktikum (P)		Tamara Mtsentlintze, Marcel Radermacher

Learning Control / Examinations

V Event excerpt: Graph Visualization in Practice (SS 2018)

Aim
Nach erfolgreichem Besuch des Praktikums sollen die Studierenden

- sich eigenständig in Fachliteratur einarbeiten können;
- im Team basierend auf den Techniken aus der Literatur neue Lösungsideen für die aktuelle Fragestellung des Graph Drawing Contests entwickeln, diskutieren und bewerten können;
- im Team die eigenen Lösungsideen implementieren und ein Programm für die Wettbewerbsteilnahme entwickeln können;
- die Arbeitsergebnisse in einem wissenschaftlichen Vortrag präsentieren können.

Content
Graphen sind mathematische Modelle von Netzwerken, die in einer Vielzahl von Anwendungen Verwendung finden. Die Graphenvisualisierung ist ein grundlegendes Werkzeug für menschliche Betrachter, um solche Graphen zu untersuchen und zu verstehen. Es gibt eine große Zahl verschiedener Visualisierungsstile, die je nach Anwendung unterschiedlich sinnvoll sind. Für die am häufigsten verwendeten Stile existieren dementsprechen vielfältige Layoutalgorithmen im Forschungsbereich des Graphenzeichnens. Im Kern vieler Graphenlayoutprobleme zu einem gewissen Zeichenstil liegen (multikriterielle) Optimierungsprobleme. Oft sind diese Optimierungsprobleme NP-schwer und werden daher heuristisch gelöst.
In diesem Kurs bearbeiten die Teilnehmer in Kleingruppen ein ausgewähltes Optimierungsproblem im Bereich der Graphenvisualisierung aus praktischer Sicht. Ziel ist es, bis zum Ende des Praktikums ein lauffähiges Programm zum Zeichnen von Graphen im vorgegebenen Layoutstil zu erstellen, das das Optimierungsproblem möglichst gut löst. Die Teams mit den besten Programmen können im Anschluss am alljährlichen internationalen Graph Drawing Contest teilnehmen.
Im Einzelnen besteht das Praktikum aus drei Phasen:
1.) Erarbeiten der relevanten bestehenden Literatur zum Thema
2.) Entwurf eigener Lösungsansätze, beruhend auf Anpassungen und Kombinationen der bestehenden Algorithmen, sowie durch Entwicklung neuer heuristischer Verfahren
3.) Implementierung und Evaluation der entwickelten Lösungsansätze

Workload
150h

T Course: Laboratory Course Algorithm Engineering [T-INFO-104374]

Responsibility: Peter Sanders, Dorothea Wagner
Contained in: [M-INFO-101200] Advanced Algorithms: Engineering and Applications
[M-INFO-102072] Laboratory Course Algorithm Engineering
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Unregelmäßig	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24305	Practical Course in Algorithm Design	Praktikum (P)	4	Valentin Buchhold, Dorothea Wagner, Tim Zeitz, Tobias Zündorf

V Event excerpt: Practical Course in Algorithm Design (WS 18/19)

Aim
The purpose of the practical course in algorithm design is to make learned knowledge work. The students are given varying topics from algorithmics, which they have to implement in small working groups. Possible Topics are, for exmaple, algorithms for flow problems, shortest path problems, or clustering techniques. In this way students learn to write efficient code.

Workload
150 h

T Course: Language Technology and Compiler [T-INFO-101343]

Responsibility: Gregor Snelting
Contained in: [M-INFO-100806] Language Technology and Compiler
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
8	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24661	Language Technology and Compiler	Vorlesung (V)	4	Gregor Snelting

V Event excerpt: Language Technology and Compiler (SS 2018)

Aim

he participants are competent in theoretical foundations as well as practical techniques relevant to the compiler phases lexical analysis, syntactic analysis, semantic analysis, code generation and code optimization. The participants have received an overview over the state of the art in the area of compiler construction and program analysis. The participants are able to apply this knowledge in practice to build a compiler (e.g., in the compiler lab course). The participants can assess the importance of language and compiler technology for other areas of computer science.

Notably, participants can construct, minimize and implement automata for lexical analysis from regular expressions, and are competent in using generator systems like Flex. They know important properties of context-free grammars and are able to derive theoretical foundations and construction formulae for LL(k), LR(k), LALR(k), SLR(k) and Earley parsers. Students are competent in "grammar engineering" (e.g., left factorization) and are able to construct LALR(k) parsers and recursive descent parsers for small grammars. They know techniques for syntax error handling (e.g., dynamic context-sensitive anchor sets).

Students are able to specify, implement and construct an abstract syntax tree as part of syntactic analysis. They are competent in generator systems like Bison. They understand the fundamental importance of attributed grammars for describing context-sensitive analyses (e.g., name analysis, overload resolution) and understand L-attribution as well as OAG-attribution.

Students are competent in fundamental techniques for generation of intermediate code, notably for expressions and control flow, as well as basic intermediate code optimization (e.g., Ershov scheme, transformation of logical operations into control flow, elimination of redundant operations). They understand the memory representation of basic and complex data objects. They have a command of call organization using activation records, static and dynamic links, displays, as well as closures for function parameters.

Students know a portfolio of important optimization techniques. They are competent in the theoretical foundations of data flow frameworks and their implementation, including foundations of lattice theory (e.g., fixed point iteration techniques, Galois connections). They are able to apply different variants of distributive and non-distributive data flow techniques (e.g., constant propagation) and understand the importance of correctness, precision, and conservative approximation. They can construct the abstract lattice and transfer functions for simple optimization problems. They can assess the fundamental importance of dominance and SSA representation, know the connection between both, and can construct the dominance tree and SSA form of intermediate code. They can analyze the application of dominance, data flow techniques, and SSA form to program dependence graphs and intermediate representation graphs (e.g., FIRM) and assess the importance of these graphs.

Students know x86 assembly. They can apply bottom-up rewriting and related code generation techniques, and can develop and evaluate corresponding rules. Notably, they can assess the usage of different addressing modes. They understand instruction scheduling fundamentals. They can assess and apply important techniques for register allocation (e.g., linear scan, graph coloring) and understand the role of SSA form and chordal graphs during allocation. They can assess problems concerning spilling and SSA destruction during register allocation. They can assess and apply fundamental memory management techniques (e.g., copy collector, generational scavenging). Students know fundamentals of software security analysis, information flow control, non-interference as well as their realization using type systems and program dependence graphs.

The participants know the basics of software security analysis, in particular the notion of non-interference and the relevance of non-interference for software integrity and confidentiality. They know how to verify non-interference for a simple WHILE language using type systems and dependence graphs.

Content
Structure of a compiler
Lexical analysis
Syntactic analysis
Semantic analysis
Code generation
Program Analysis
Security Analysis
Code optimization
Foundations of software security analysis
Specific technologies: LL parsing, LR/LALR parsing, attributed grammars, instruction selection, register allocation, runtime mechanisms, memory management, static single assignment form and its usage in optimization, data flow techniques, information flow control, garbage collection.

Workload
approx. 270 h

T Course: Large-scale Optimization [T-WIWI-106549]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102832] Operations Research in Supply Chain Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Unregelmäßig	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550475		Vorlesung (V)	2	Steffen Rebennack
SS 2018	2550476		Übung (Ü)	1	Steffen Rebennack

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

Conditions
None.

T Course: Law of Contracts [T-INFO-101316]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-101216] Private Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24671	Law of Contracts	Vorlesung (V)	2	Alexander Hoff

V Event excerpt: Law of Contracts (SS 2018)

Aim
Der/die Studierende kennt sich aus in den Grundfragen der Vertragsgestaltung. Er/sie kennt typische Vertragsgestaltungen. Der/die Studierende kann einfach gelagerte Problemfälle lösen und einfache Vertragsentwürfe formulieren. Er/sie hat ein Problembewusstsein entwickelt, welche Schwierigkeiten auftreten können bei der Gestaltung komplexerer Sachverhalte. Er/sie ist in der Lage, auch im internationalen Kontext Bezüge herzustellen.

Content
Die Vorlesung befasst sich mit den Grundfragen der Vertragsgestaltung im Wirtschaftsrecht. Anhand ausgewählter Beispiele aus der Praxis wird ein Überblick über typische Vertragsgestaltungen vermittelt. Insbesondere werden die GmbH, die OHG, die KG, Die EWIV, der Verein und die Aktiengesellschaft behandelt. Dabei werden auch internationale und rechtsvergleichende Bezüge hergestellt.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 90 Stunden davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

Literature
Wird in der Vorlesung bekannt gegeben.

T Course: Liberalised Power Markets [T-WIWI-107043]

Responsibility: Wolf Fichtner
Contained in: [M-WIWI-101451] Energy Economics and Energy Markets
[M-WIWI-102808] Digital Service Systems in Industry
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581998	Liberalised Power Markets	Vorlesung (V)	2	Wolf Fichtner

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Conditions
See German version.

Recommendations
None

V Event excerpt: Liberalised Power Markets (WS 18/19)

Aim
The student has detailed knowledge concerning the new challenges of liberalised energy markets. He has the ability to:

- Understand the new economic reality of liberalised energy markets
- Obtain a deeper understanding of the different submarkets of the power market
- Identify problems of the liberalised energy markets

Content
1. The European liberalisation process
1.1 The concept of a competitive market
1.2 The regulated market
1.3 Deregulation in Europe
2. Pricing and investments in a liberalised power market
2.1 Merit order
2.2 Prices and investments
2.3 Market flaws and market failure
2.4 Regulation in liberalised markets
2.5 Additional regulation mechanisms
3. The power market and the corresponding submarkets
3.1 List of submarkets
3.2 Types of submarkets
3.3 Market rules
4. Risk management
4.1 Uncertainties in a liberalised market
4.2 Investment decisions under uncertainty
4.3 Estimating future electricity prices
4.4 Portfolio management
5. Market power
5.1 Defining market power
5.2 Indicators of market power

5.3 Reducing market power
6. Market structures in the value chain of the power sector

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Elective literature:
Power System Economics; Steven Stoft, IEEE Press/Wiley-Interscience Press, 0-471-15040-1

T Course: Life Cycle Assessment [T-WIWI-103133]

Responsibility: Heiko Keller
Contained in: [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581995	Life Cycle Assessment	Vorlesung (V)	2	Heiko Keller

Learning Control / Examinations
The assessment consists of an oral exam (30 min.) or a written exam (60 min.).

Conditions
None.

Recommendations
None

V Event excerpt: Life Cycle Assessment (WS 18/19)

Aim
The students

- understand why it is essential for the future viability of companies and other stakeholders in society to assess products and services based on their whole life cycles.
- know the basics and methodology of life cycle assessment.
- are able to apply life cycle assessment in basic decision contexts.
- are aware for contexts that require further in-depth knowledge in sustainability assessment.

Content
Our society has reached a historically unique material prosperity. At the same time, environmental burdens and resource consumption are continuously reaching new peaks - not only regarding greenhouse gas emissions and oil production rates. It is obvious that the material and energy intensity of products and services has to decrease if we want to keep our current level of material prosperity on the long run. Enormous efficiency gains, as they have been reached e.g. for labour productivity, however, require that environmental burdens and resource consumption per unit of product are in the first place known, transparent and can thus be optimised. This data and its calculation are increasingly requested and sooner or later will have to become as essential for management as e.g. unit labour costs.
Life cycle assessment is a methodology in sustainability assessment that provides this information and deduces optimisation potentials and decision support for companies, politics, consumers etc. To this end, material and energy flows are compiled along the whole life cycle of a product from extraction of raw materials, via production and use of a product until its disposal. Subsequently, environmental impacts of these flows are analysed.

This lecture describes structure and individual steps of life cycle assessments in detail. Furthermore, it explains its application in decision support. In interactive phases, participants recapitulate the theoretical basis by own calculations. As an outlook, further instruments in sustainability assessment are introduced that analyse other sustainability aspects.

Workload
Total effort required will account for approximately 105h (3.5 credits).

Literature
will be announced in the course

T Course: Machine Learning 1 - Basic Methods [T-INFO-101354]

Responsibility: Rüdiger Dillmann
Contained in: [M-INFO-101238] Automated visual inspection
[M-INFO-100817] Machine Learning 1 - Basic Methods
[M-INFO-101241] Image-based detection and classification
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24150	Machine Learning 1 - Basic methods	Vorlesung (V)	2	Rüdiger Dillmann, Johann Marius Zöllner

V Event excerpt: Machine Learning 1 - Basic methods (WS 18/19)

Aim

- Studierende erlangen Kenntnis der grundlegenden Methoden im Bereich des Maschinellen Lernens.
- Studierende können Methoden des Maschinellen Lernens einordnen, formal beschreiben und bewerten.
- Die Studierenden können ihr Wissen für die Auswahl geeigneter Modelle und Methoden für ausgewählte Probleme im Bereich des Maschinellen Lernens einsetzen.

Content
Das Themenfeld Wissensakquisition und Maschinelles Lernen ist ein stark expandierendes Wissensgebiet und Gegenstand zahlreicher Forschungs- und Entwicklungsvorhaben. Der Wissenserwerb kann dabei auf unterschiedliche Weise erfolgen. So kann ein System Nutzen aus bereits gemachten Erfahrungen ziehen, es kann trainiert werden, oder es zieht Schlüsse aus umfangreichem Hintergrundwissen.
Die Vorlesung behandelt sowohl symbolische Lernverfahren, wie induktives Lernen (Lernen aus Beispielen, Lernen durch Beobachtung), deduktives Lernen (Erklärungsbasiertes Lernen) und Lernen aus Analogien, als auch subsymbolische Techniken wie Neuronale Netze, Support Vektor-Maschinen, Genetische Algorithmen und Reinforcement Lernen. Die Vorlesung führt in die Grundprinzipien sowie Grundstrukturen lernender Systeme und der Lerntheorie ein und untersucht die bisher entwickelten Algorithmen. Der Aufbau sowie die Arbeitsweise lernender Systeme wird an einigen Beispielen, insbesondere aus den Gebieten Robotik, autonome mobile Systeme und Bildverarbeitung vorgestellt und erläutert.

Workload
Vorlesung mit 2 SWS, plus Nachbereitung durch die Studierenden.

T Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

Responsibility: Johann Marius Zöllner
Contained in: [M-WIWI-103356] Machine Learning
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24150	Machine Learning 1 - Basic methods	Vorlesung (V)	2	Rüdiger Dillmann, Johann Marius Zöllner

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None.

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-101354] *Machine Learning 1 - Basic Methods* must not have been started.

Remarks
New course starting winter term 2017/2018.

V Event excerpt: Machine Learning 1 - Basic methods (WS 18/19)

Aim

- Studierende erlangen Kenntnis der grundlegenden Methoden im Bereich des Maschinellen Lernens.
- Studierende können Methoden des Maschinellen Lernens einordnen, formal beschreiben und bewerten.
- Die Studierenden können ihr Wissen für die Auswahl geeigneter Modelle und Methoden für ausgewählte Probleme im Bereich des Maschinellen Lernens einsetzen.

Content
Das Themenfeld Wissensakquisition und Maschinelles Lernen ist ein stark expandierendes Wissensgebiet und Gegenstand zahlreicher Forschungs- und Entwicklungsvorhaben. Der Wissenserwerb kann dabei auf unterschiedliche Weise erfolgen. So kann ein System Nutzen aus bereits gemachten Erfahrungen ziehen, es kann trainiert werden, oder es zieht Schlüsse aus umfangreichem Hintergrundwissen.
Die Vorlesung behandelt sowohl symbolische Lernverfahren, wie induktives Lernen (Lernen aus Beispielen, Lernen durch Beobachtung), deduktives Lernen (Erklärungsbasiertes Lernen) und Lernen aus Analogien, als auch subsymbolische Techniken wie Neuronale Netze, Support Vektor-Maschinen, Genetische Algorithmen und Reinforcement Lernen. Die Vorlesung führt in die Grundprinzipien sowie Grundstrukturen lernender Systeme und der Lerntheorie ein und untersucht die bisher entwickelten Algorithmen. Der Aufbau sowie die Arbeitsweise lernender Systeme wird an einigen Beispielen, insbesondere aus den Gebieten Robotik, autonome mobile Systeme und Bildverarbeitung vorgestellt und erläutert.

Workload
Vorlesung mit 2 SWS, plus Nachbereitung durch die Studierenden.

T Course: Machine Learning 2 - Advanced Methods [T-INFO-101392]

Responsibility: Rüdiger Dillmann
Contained in: [M-INFO-100855] Machine Learning 2 - Advanced Methods
[M-INFO-101241] Image-based detection and classification

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24620	Machine Learning 2 - Advanced methods	Vorlesung (V)	2	Rüdiger Dillmann, Johann Marius Zöllner

V Event excerpt: Machine Learning 2 - Advanced methods (SS 2018)

Aim

- Studierende verstehen erweiterte Konzepte des Maschinellen Lernens sowie ihre Anwendungsmöglichkeit.
- Studierende können Methoden des Maschinellen Lernens einordnen, formal beschreiben und bewerten.
- Im Einzelnen können Methoden des Maschinellen Lernens in komplexe Entscheidungs- und Inferenzsysteme eingebettet und angewendet werden.
- Die Studierenden können ihr Wissen zur Auswahl geeigneter Modelle und Methoden des Maschinellen Lernens für vorliegende Probleme im Bereich der Maschinellen Intelligenz einsetzen.

Content
Das Themenfeld Maschinelle Intelligenz und speziell Maschinelles Lernen unter Berücksichtigung realer Herausforderungen komplexer Anwendungsdomänen ist ein stark expandierendes Wissensgebiet und Gegenstand zahlreicher Forschungs- und Entwicklungsvorhaben.

Die Vorlesung behandelt erweiterte Methoden des Maschinellen Lernens wie semi-überwachtes und aktives Lernen, tiefe Neuronale Netze (deep learning), gepulste Netze, hierarchische Ansätze z.B. beim Reinforcement Learning sowie dynamische, probabilistisch relationale Methoden. Ein weiterer Schwerpunkt liegt in der Einbettung und Anwendung von maschinell lernenden Verfahren in realen Systemen.

Die Vorlesung führt in die neusten Grundprinzipien sowie erweiterte Grundstrukturen ein und erläutert bisher entwickelte Algorithmen. Der Aufbau sowie die Arbeitsweise der Verfahren und Methoden werden anhand einiger Anwendungsszenarien, insbesondere aus dem Gebiet technischer (teil-)autonomer Systeme (Robotik, Neurorobotik, Bildverarbeitung etc.) vorgestellt und erläutert.

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: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

Responsibility: Johann Marius Zöllner
Contained in: [M-WIWI-103356] Machine Learning
[M-WIWI-101637] Analytics and Statistics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2511502	Machine Learning 2 - Advanced methods	Vorlesung (V)	2	Johann Marius Zöllner
SS 2018	2511503	Exercises for Machine Learning 2 - Advanced Methods	Übung (Ü)	1	Johann Marius Zöllner

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None.

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-101392] *Machine Learning 2 - Advanced Methods* must not have been started.

Remarks
New course starting summer term 2017.

V Event excerpt: Machine Learning 2 - Advanced methods (SS 2018)

Aim

- Students understand extended concepts of machine learning and their possible applications.
- Students can classify, formally describe and evaluate methods of machine learning.
- In detail, methods of machine learning can be embedded and applied in complex decision and inference systems.
- Students can use their knowledge to select suitable models and methods of machine learning for existing problems in the field of machine intelligence.

Content
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.
The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.
The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

Workload
Vorlesung mit 2 SWS, plus Nachbereitung durch die Studierenden.

Literature
The slides are available as a PDF
Related Literature

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Further (specific) literature on individual topics will be given in the lecture.

T Course: Machine Learning in Finance [T-WIWI-106195]

Responsibility: Maxim Ulrich
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The course has been cancelled.
The grade is based on an exam. The exam covers all the material that is taught in the current semester. The exam takes place in the last week of the lecture-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period). Throughout the semester we distributed exercises that can be solved by students on a voluntary basis. A student who solves at least 80% of these exercises will obtain a 0.3 bonus on top of his exam grade.

Conditions
None

Recommendations
None

T Course: Macro-Finance [T-WIWI-106194]

Responsibility: Maxim Ulrich
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The grade is based on an exam. The exam covers all the material that is taught in the current semester. The exam takes place in the last week of the lecture-free period. Students who fail the exam are allowed to retake it in the following semester (last week of the respective lecture-free period).

Conditions
None

Recommendations
None

Remarks
New course starting winter term 2016/2017.

T Course: Management Accounting 1 [T-WIWI-102800]

Responsibility: Marcus Wouters
Contained in: [M-WIWI-101498] Management Accounting
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2579900	Management Accounting 1	Vorlesung (V)	2	Marcus Wouters
SS 2018	2579901		Übung (Ü)	2	N.N., Marcus Wouters

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester in combination with a project that runs for several weeks during the semester.

Conditions
None

V Event excerpt: Management Accounting 1 (SS 2018)

Aim
Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.
We will use international material written in English.
We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).
The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

T Course: Management Accounting 2 [T-WIWI-102801]

Responsibility: Marcus Wouters
Contained in: [M-WIWI-101498] Management Accounting
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2579902	Management Accounting 2	Vorlesung (V)	2	Marcus Wouters
WS 18/19	2579903		Übung (Ü)	2	Ana Mickovic, Marcus Wouters

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester in combination with a project that runs for several weeks during the semester.

Conditions
None

Recommendations
It is recommended to take part in the course "Management Accounting 1" before this course.

V Event excerpt: Management Accounting 2 (WS 18/19)

Aim
Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems and customer value propositions.
We will use international material written in English.
We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).
The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

T Course: Management of IT-Projects [T-WIWI-102667]

Responsibility: Roland Schätzle
Contained in: [M-WIWI-101477] Development of Business Information Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2511214	Management of IT-Projects	Vorlesung (V)	2	Roland Schätzle
SS 2018	2511215		Übung (Ü)	1	Roland Schätzle

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

Conditions
None.

V Event excerpt: Management of IT-Projects (SS 2018)

Aim
Students

- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropiate to current project phases and project contexts,
- consider organisational and social impact factors.

Content
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h

Preparation of exercises 30h
Exam preparation 44h
Exam &1h

Total: 150h

Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004
- Project Management Institute Standards Committee. A Guide to the Project Management Body of Knowledge (PMBoK guide). Project Management Institute. Four Campus Boulevard. Newton Square. PA 190733299. U.S.A.

Further literature is given in each lecture individually.

T Course: Managing New Technologies [T-WIWI-102612]

Responsibility: Thomas Reiß
Contained in: [M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2545003	Managing New Technologies	Vorlesung (V)	2	Thomas Reiß
SS 2018	2545004	Exercise: Managing New Technologies	Übung (Ü)	1	Thomas Reiß

Learning Control / Examinations
Written exam 100% following §4, Abs. 2.

Conditions
None

Recommendations
None

V Event excerpt: Managing New Technologies (SS 2018)

Aim
New technologies can contribute substantially to the international competitiveness of different industrial sectors. This course provides the necessary knowledge for understanding how industrial enterprises and policy-makers are dealing with the challenge to realise in time the potentials of new technologies and to use them most efficiently. Key tasks of the management of new technologies will be practised.

Content
The course provides an overview of the international development of a selected number of key technologies such as biotechnology, nanotechnology, neurotechnologies, converging technologies. Methods for monitoring new technologies including foresight approaches will be presented and the economic and social impacts of new technologies will be discussed.

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

Literature

- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

T Course: Market Engineering: Information in Institutions [T-WIWI-102640]

Responsibility: Christof Weinhardt
Contained in: [M-WIWI-102754] Service Economics and Management
[M-WIWI-101409] Electronic Markets
[M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101446] Market Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540460	Market Engineering: Information in Institutions	Vorlesung (V)	2	Tim Straub, Christof Weinhardt
SS 2018	2540461	Übungen zu Market Engineering: Information in Institutions	Übung (Ü)	1	Simon Kloker, Esther Marie Mengelkamp, Tim Straub, Christof Weinhardt

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained.

Conditions
None

V Event excerpt: Market Engineering: Information in Institutions (SS 2018)

Aim
The students

- understand the role of an economist as an engineer to design markets,
- compare different markets and market mechanisms to evaluate their efficiency,
- apply game theoretic modelling and mechanism design as well as auction theory for interdisciplinary evaluation.

Content
The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

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

Literature

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.

- Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
- Smith, V. "Theory, Experiments and Economics", The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

T Course: Market Research [T-WIWI-107720]

Responsibility:
Contained in: [M-WIWI-101647] Data Science: Evidence-based Marketing
[M-WIWI-101487] Sales Management
[M-WIWI-101490] Marketing Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2571150	Market Research	Vorlesung (V)	2	Martin Klarmann
SS 2018	2571151	Market Research Tutorial	Übung (Ü)	1	Maximilian Lüders

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
None

Remarks
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

V Event excerpt: Market Research (SS 2018)

Aim
Topics addressed in this course are for example:

Theoretical priciples of market research
Statistical foundations of market research
Measuring customer attitudes
Understanding of customer reactions
Strategical decision making

Content
Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

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

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T Course: Marketing Analytics [T-WIWI-103139]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101647] Data Science: Evidence-based Marketing
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	3

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2572170	Marketing Analytics	Vorlesung (V)	2	Martin Klarmann
WS 18/19	2572171		Übung (Ü)	1	Ingo Halbauer

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation)

Conditions
None.

Recommendations
It is strongly recommended to complete the course Market Research prior to taking the Marketing Analytics course.

Remarks
For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu).
Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

V Event excerpt: Marketing Analytics (WS 18/19)

Aim
Students

- receive based on the course market research an overview of advanced empirical methods
- learn in the course of the lecture to handle advanced data collection and data analysis methods
- are based on the acquired knowledge able to interpret results and derive strategic implications

Content
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling, structural equation modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

Workload
Total workload for 4.5 ECTS: ca. 135 hours

Literature

- Hanssens, Dominique M., Parsons, Leonard J., Schultz, Randall L. (2003), Market response models: Econometric and time series analysis, 2nd ed, Boston.
- Gelman, Andrew, Hill, Jennifer (2006), Data analysis using regression and multilevel/hierarchical models, New York.
- Cameron, A. Colin, Trivedi, Pravin K. (2005), Microeconometrics: methods and applications, New York.
- Chapman, Christopher, Feit, Elea M. (2015), R for Marketing Research and Analytics, Cham.
- Ledolter, Johannes (2013), Data mining and business analytics with R, New York.

T Course: Marketing Communication [T-WIWI-102902]

Responsibility: Ju-Young Kim
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540440	Marketing Communication	Vorlesung (V)	2	Ju-Young Kim
SS 2018	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 2018)

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.
- Gedenk, Karen (2002), "Verkaufsförderung"

See lecture slides for further recommendations on literature

T Course: Marketing Strategy Business Game [T-WIWI-102835]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101490] Marketing Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2571183	Marketing Strategy Business Game	Block (B)	1	Assistenten, Martin Klarmann

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a group presentation and a subsequent round of questions totalling 20 minutes.

Conditions
None

Recommendations
None

Remarks
Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.
In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

V Event excerpt: Marketing Strategy Business Game (SS 2018)

Aim
Students
- are able to operate the strategic marketing simulation software "Markstrat"
- are able to take strategic marketing decisions in groups
- know how to apply strategic marketing concepts to practical contexts (e.g. for market segmentation, product launches, coordination of the marketing mix, market research, choice of the distribution channel or competitive behavior)
- are capable to collect and to select information usefully with the aim of decision-making
- are able to react appropriately to predetermined market conditions
- know how to present their strategies in a clear and consistent way
- are able to talk about the success, problems, critical incidents, external influences and strategy changes during the experimental game and to reflect and present their learning success

Content
Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups' companies.

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T Course: Markets and Organizations: Principles [T-WIWI-102821]

Responsibility: Andreas Geyer-Schulz
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Conditions
None

Recommendations
None

Remarks
The course is not offered at the moment.

T Course: Markov Decision Models I [T-WIWI-102710]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101444] Stochastic Models in Information Engineering and Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

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

T Course: Markov Decision Models II [T-WIWI-102711]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101657] Stochastic Modelling and Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	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: Master Thesis [T-WIWI-103142]

Responsibility: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Contained in: [M-WIWI-101656] Module Master Thesis

ECTS	Exam type	Version
30	Abschlussarbeit	1

Learning Control / Examinations
see module description

Conditions
see module description

T Course: Mechanisms and Applications of Workflow Systems [T-INFO-101257]

Responsibility: Jutta Mülle
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24111		Vorlesung (V)	3	Jutta Mülle

V Event excerpt: (WS 18/19)

Aim
Am Ende des Kurses sollen die Teilnehmer in der Lage sein, Workflows zu modellieren, die Modellierungsaspekte und ihr Zusammenspiel zu erläutern, Modellierungsmethoden miteinander zu vergleichen und ihre Anwendbarkeit in unterschiedlichen Anwendungsbereichen einzuschätzen. Sie sollten den technischen Aufbau eines Workflow-Management-Systems mit den wichtigsten Komponenten kennen und verschiedene Architekturen bewerten können. Schließlich sollten die Teilnehmer einen Einblick in die aktuellen relevanten Standards und in den Stand der Forschung durch aktuelle Forschungsthemen gewonnen haben.

Content
Workflow-Management-Systeme (WFMS) unterstützen die Abwicklung von Geschäftsprozessen entsprechend vorgegebener Arbeitsabläufe. Immer wichtiger wird die Unterstützung von Abläufen im Service-orientierten Umfeld.

- Die Vorlesung beginnt mit der Einordnung von WFMS in betriebliche Informationssysteme und stellt den Zusammenhang mit der Geschäftsprozessmodellierung her.
- Es werden formale Grundlagen für WFMS eingeführt (Petri- Netze, Pi-Kalkül).
- Modellierungsmethoden für Workflows und der Entwicklungsprozess von Workflow-Management-Anwendungen werden vorgestellt und in Übungen vertieft.
- Insbesondere der Einsatz von Internettechniken speziell von Web Services und Standardisierungen für Prozessmodellierung, Orchestrierung und Choreographie werden in diesem Kontext vorgestellt.
- Im Teil Realisierung von Workflow-Management-Systemen werden verschiedene Architekturen sowie Systemtypen und beispielhaft konkrete Systeme behandelt.
- Weiterhin wird auf anwendungsgetriebene Vorgehensweisen zur Änderung von Workflows, speziell Geschäftsprozess-Reengineering und kontinuierliche Prozessverbesserung eingegangen.
- Abschließend werden Ergebnisse aus aktuellen Forschungsrichtungen, wie Methoden und Konzepte zur Unterstützung flexibler, adaptiver Workflows, Security für Workflows und Prozess-Mining behandelt.

Workload
130h
1. Präsenzzeit in Vorlesungen, Übungen: 36h
2. Vor-/Nachbereitung derselbigen (inkl. Übungsaufgaben bearbeiten): 36h
3. Prüfungsvorbereitung und Präsenz in selbiger: 58h

Literature

- W.M.P. van der Aalst. The Application of Petri Nets to Workflow Management. The Journal of Circuits, Systems and Computers, Seiten 1-45, Band 7:1, 1998.
- S. Jablonski, M. Böhm, W. Schulze (Hrsg.): Workflow-Management - Entwicklung von Anwendungen und Systemen. dpunkt-Verlag, Heidelberg, 1997
- Frank Leymann, Dieter Roller: Production Workflows - Concepts and Techniques. Prentice-Hall, 2000

- W.M.P. van der Aalst: Workflow Management: Models, Methods, and Systems. MIT Press, 368 pp., 2002
- Michael Havey: Essential Business Process Modeling. O'Reilly Media, Inc., 2005

Weiterführende Literatur

- M. Dumas, Wil M. P. van der Aalst, Arthur H. M. ter Hofstede (eds.): Process-Aware Information Systems. Wiley, 2005
- D. Harel: Statecharts: A Visual Formalism for Complex Systems, Science of Computer Programming Vol. 8, 1987.
- Dirk Wodtke, Gerhard Weikum A Formal Foundation for Distributed Workflow Execution Based on State Charts. Foto N. Afrati, Phokion Kolaitis (Eds.): Database Theory - ICDT '97, 6th International Conference, Delphi, Greece, January 8-10, 1997, Proceedings. Lecture Notes in Computer Science 1186, Springer Verlag, Seiten 230-246, 1997.
- H.M.W. Verbeek, T. Basten, and W.M.P. van der Aalst Diagnosing workflow processes using Woflan. Computing Science Report 99/02, Eindhoven University of Technology, Eindhoven, 1999.

T Course: Medical Simulation Systems I [T-INFO-101379]

Responsibility: Rüdiger Dillmann
Contained in: [M-INFO-101250] Medical Simulation and Neural Medicine
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24173		Vorlesung (V)	2	Rüdiger Dillmann

V Event excerpt: (WS 18/19)

Aim

Die Studierenden kennen die wesentlichen Komponenten von Systemen zur computerassistierten Chirurgie. Sie können wesentliche Methoden der Bildakquisition, Bildverarbeitung, Segmentierung, Modellbildung, Wissensrepräsentation und Visualisierung erklären, bewerten und den Gegebenheiten entsprechend auswählen. Auf Basis dieses Wissens sind sie sind sie in der Lage eigene Systeme zu konzipieren und wichtige Designentscheidungen korrekt zu fällen.
Studierende beherrschen insbesondere die Bildgebungsmodalitäten Röntgen, CT, MRT, Sonographie und Endoskopie. Sie kennen Methoden zur Vorverarbeitung solcher Bilder und darauf aufbauend unterschiedliche Segmentierungsmethoden, u.a. punkt-, regionen- und modellbasierte Verfahren. Sie beherrschen unterschiedliche Registrierungsverfahren in der prä- und intraoperativen Anwendung und verstehen grundlegende Modellierungs- und Visualisierungstechniken für ein computergestütztes Assistenzsystem. Sie kennen Methoden zur endoskopischen Bildauswertung sowie Modellierungstechniken für Trainingssysteme in der minimal-invasiven Chirurgie. Schließlich kennen sie unterschiedliche Anwendungsszenarien in der computergestützten Chirurgie, bspw. intraoperative Navigation oder diagnostische Bildauswertung.

Workload

1. Präsenzzeit in Vorlesungen: 30h
2. Vor-/Nachbereitung: 45h
3. Prüfungsvorbereitung: 15h

T Course: Medical Simulation Systems II [T-INFO-101380]

Responsibility: Rüdiger Dillmann
Contained in: [M-INFO-101250] Medical Simulation and Neural Medicine
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Sommersemester	Prüfungsleistung mündlich	1

T Course: Meshes and Point Clouds [T-INFO-101349]

Responsibility: Hartmut Prautzsch
Contained in: [M-INFO-101214] Algorithms in Computer Graphics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400026		Praktikum (P)	2	Hartmut Prautzsch

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
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.
The examination can also be combined with the examination of *Mixed Integer Programming II* [25140]. In this case, the duration of the written examination takes 120 minutes.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-102733] *Mixed Integer Programming I and II* must not have been started.

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-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
9	Jedes Semester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550140		Vorlesung (V)	2	Oliver Stein
SS 2018	2550141		Übung (Ü)	1	Christoph Neumann, Oliver Stein

Learning Control / Examinations
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation.

Conditions
None.

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-102719] *Mixed Integer Programming I* must not have been started.
2. The course [T-WIWI-102720] *Mixed Integer Programming II* must not have been started.

Remarks
Please refer to the partial exams to find the learning objectives and content.

V Event excerpt: (SS 2018)

Aim
The student

- knows and understands the fundamentals of convex and of nonconvex mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, or the time minimal covering of a distance with a vehicle equipped with a gear shift. While optimal points can be defined straightforwardly, for their numerical identification an interplay of ideas from discrete and continuous optimization is necessary. Part I of the lecture deals with linear mixed integer programs.
Part II treats methods for the numerical solution of optimization problems which depend nonlinearly on continuous as well as discrete variables. It is structured as follows:

- Concepts of convex optimization
- Mixed integer convex programming (branch and bound methods)
- Mixed integer nonconvex programming
- Generalized Benders decomposition
- Outer approximation methods
- Heuristics

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

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

Literature
Elective literature:

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T Course: 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
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550140		Vorlesung (V)	2	Oliver Stein
SS 2018	2550141		Übung (Ü)	1	Christoph Neumann, Oliver Stein

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

The examination can also be combined with the examination of *Mixed Integer Programming I* [2550138]. In this case, the duration of the written examination takes 120 minutes.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-102733] *Mixed Integer Programming I and II* must not have been started.

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Remarks
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

V Event excerpt: (SS 2018)

Aim
The student

- knows and understands the fundamentals of convex and of nonconvex mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as

discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, or the time minimal covering of a distance with a vehicle equipped with a gear shift. While optimal points can be defined straightforwardly, for their numerical identification an interplay of ideas from discrete and continuous optimization is necessary. Part I of the lecture deals with linear mixed integer programs.
Part II treats methods for the numerical solution of optimization problems which depend nonlinearly on continuous as well as discrete variables. It is structured as follows:

- Concepts of convex optimization
- Mixed integer convex programming (branch and bound methods)
- Mixed integer nonconvex programming
- Generalized Benders decomposition
- Outer approximation methods
- Heuristics

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

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

Literature
Elective literature:

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T Course: Mobile Communication [T-INFO-101322]

Responsibility: Oliver Waldhorst, Martina Zitterbart
Contained in: [M-INFO-101205] Future Networking
[M-INFO-101203] Wireless Networking
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24643	Mobile Communications	Vorlesung (V)	2	Markus Jung, Oliver Waldhorst

V Event excerpt: Mobile Communications (WS 18/19)

Aim
Lernziele
Studierende
- kennen die Grundbegriffe der Mobilkommunikation und können grundlegende Methoden sowie Einflussfaktoren der drahtlosen Kommunikation bewerten
- beherrschen Struktur und Funktionsweise prominenter, praktisch relevanter Mobilkommunikationssysteme (z.B. GSM, UMTS, WLAN)
- kennen typische Problemstellungen in Mobilkommunikationssystemen und können zur Lösung geeignete Methoden bewerten, auswählen und anwenden

Die Studierenden kennen typische Probleme bei der drahtlosen Übertragung (z.B. Signalausbreitung, Dämpfung) und können diese anhand von Beispielen erläutern und zueinander in Beziehung setzen. Sie können zudem erkennen, wo diese Probleme typischerweise beim Entwurf unterschiedlicher Kommunikationssysteme auftreten.
Die Studierenden kennen ein Portfolio von Methoden zur Modulation digitaler Daten, zum Multiplexen, zur Koordination konkurrierender Medienzugriffe und zum Mobilitätsmanagement. Sie können diese in eigenen Worten erläutern, können sie bewerten und geeignete Kandidaten beim Entwurf von Systemen zur Mobilkommunikation auswählen.
Die Studierenden beherrschen die grundsätzlichen Konzepte drahtloser lokaler Netze nach IEEE 802.11 sowie drahtloser persönlicher Netze mit Bluetooth. Sie können diese erläutern und die jeweiligen Varianten miteinander vergleichen. Weiterhin können sie insbesondere den Medienzugriff detailliert analysieren und bewerten.
Die Studierenden beherrschen den Aufbau digitaler Telekommunikationssysteme wie GSM, UMTS und LTE sowie die einzelnen Aufgaben der jeweiligen Komponenten und deren detailliertes Zusammenspiel im Gesamtsystem. Sie beherrschen die konzeptionellen Unterschiede der vorgestellten Systeme und können in eigenen Worten erläutern, aus welchem Grund bestimmte Methoden aus dem Portfolio in den jeweiligen Systemen eingesetzt werden.
Die Studierenden kennen grundlegende Verfahren im Bereich des Routings in selbstorganisierenden drahtlosen Ad-hoc Netzen und können diese umfassend analysieren sowie ihren Einsatz abhängig vom Anwendungsszenario bewerten. Weiterhin beherrschen sie die grundlegenden Konzepte zur Mobilitätsunterstützung im Internet (Mobile IP und Mobile IPv6).

Content
Die Vorlesung diskutiert zunächst typische Probleme bei der drahtlosen Übertragung, wie z.B: Signalausbreitung, -dämpfung, Reflektionen und Interferenzen. Ausgehend davon erarbeitet sie ein Portfolio von Methoden zur Modulation digitaler Daten, zum Multiplexing, zur Koordination konkurrierender Medienzugriffe und zum Mobilitätsmanagement. Um zu veranschaulichen, wo und wie diese Methoden in der Praxis eingesetzt werden, werden typische Mobilkommunikationssysteme mit großer Praxisrelevanz im Detail vorgestellt. Dazu gehören drahtlose lokale Netze nach IEEE 802.11, drahtlose persönliche Netze mit Bluetooth sowie drahtlose Telekommunikationssysteme wie GSM, UMTS mit HSPA und LTE. Diskussionen von Mechanismen auf Vermittlungsschicht (Mobile Ad-hoc Netze und MobileIP) sowie Transportschicht runden die Vorlesung ab.

Workload
Vorlesung mit 2 SWS plus Nachbereitung/Prüfungsvorbereitung, 4 LP.
4 LP entspricht ca. 120 Arbeitsstunden, davon
ca. 30 Std. Vorlesungsbesuch
ca. 60 Std. Vor-/Nachbereitung
ca. 30 Std. Prüfungsvorbereitung

Literature
J. Schiller; Mobilkommunikation; Addison-Wesley, 2003.
Weiterführende Literatur
C. Eklund, R. Marks, K. Stanwood, S. Wang; IEEE Stadard 802.16: A Technical Overview of the WirelessMANTM Air Interface for the Broadband Wireless Access; IEEE Communications Magazine, June 2002.
H. Kaaranen, A. Ahtiainen, et. al., UMTS Networks - Architecture, Mobility and Services, Wiley Verlag, 2001.
B. O'Hara, A. Petrick, The IEEE 802.11 Handbook - A Designers Companion IEEE, 1999.
B. A. Miller, C. Bisdikian, Bluetooth Revealed, Prentice Hall, 2002
J. Rech, Wireless LAN - 802.11-WLAN-Technologien und praktische Umsetzung im Detail, Verlag Heinz Heise, 2004.
B. Walke, Mobilfunknetze und ihre Protokolle, 3. Auflage, Teubner Verlag, 2001.
R. Read, Nachrichten- und Informationstechnik; Pearson Studium 2004.
What You Should Know About the ZigBee Alliance http://www.zigbee.org.
C. Perkins, Ad-hoc Networking, Addison Wesley, 2000.
H. Holma, WCDMA For UMTS, HSPA Evolution and LTE, 2007

T Course: Model Driven Software Development [T-INFO-101278]

Responsibility: Ralf Reussner
Contained in: [M-INFO-101202] Software Methods
[M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24657	Model-Driven Software Engineering	Vorlesung (V)	2	Erik Burger

V Event excerpt: Model-Driven Software Engineering (WS 18/19)

Aim
Studierende verstehen modellgetriebene Ansätze zur Software-Entwicklung, können diese einsetzen und bewerten. Studierende können eigene Meta-Modelle und Transformationen nach etablierten modellgetriebenen Entwicklungsprozessen erstellen, unter Einsatz gängiger Standards der OMG (MOF, QVT, XMI, UML, etc.). Studierende kennen die theoretischen Hintergründe von Modelltransformationssprachen. Sie können sich kritisch mit den Standards und Techniken auseinandersetzen und sind in der Lage, deren jeweilige Vor- und Nachteile zu nennen und gegeneinander abzuwägen.

Content
Modellgetriebene Software-Entwicklung verfolgt die Entwicklung von Software-Systemen auf Basis von Modellen. Dabei werden die Modelle nicht nur, wie bei der herkömmlichen Software-Entwicklung üblich, zur Dokumentation, Entwurf und Analyse eines initialen Systems verwendet, sondern dienen vielmehr als primäre Entwicklungsartefakte, aus denen das finale System nach Möglichkeit vollständig generiert werden kann. Diese Zentrierung auf Modelle bietet eine Reihe von Vorteilen, wie z.B. eine Anhebung der Abstraktionsebene, auf der das System spezifiziert wird, verbesserte Kommunikationsmöglichkeiten, die durch domänenspezifische Sprachen (DSL) bis zum Endkunden reichen können, und eine Steigerung der Effizienz der Software-Erstellung durch automatisierte Transformationen der erstellten Modelle hin zum Quellcode des Systems. Allerdings gibt es auch noch einige zum Teil ungelöste Herausforderungen beim Einsatz von modellgetriebener Software-Entwicklung wie beispielsweise Modellversionierung, Evolution der DSLs, Wartung von Transformationen oder die Kombination von Teamwork und MDSD. Obwohl aufgrund der genannten Vorteile MDSD in der Praxis bereits im Einsatz ist, bieten doch die genannten Herausforderungen auch noch Anschlussmöglichkeiten für aktuelle Forschung.
Die Vorlesung führt Konzepte und Techniken ein, die zu MDSD gehören. Als Grundlage wird dazu die systematische Erstellung von Meta-Modellen und DSLs einschließlich aller nötigen Bestandteile (konkrete und abstrakte Syntax, statische und dynamische Semantik) eingeführt. Anschließend erfolgt eine allgemeine Diskussion der Konzepte von Transformationsprachen sowie eine Einführung in einige ausgewählte Transformationssprachen. Die Einbettung von MDSD in den Software-Entwicklungsprozess bietet die nötigen Grundlagen für deren praktische Verwendung. Die verbleibenden Vorlesungen beschäftigen sich mit weiterführenden Fragestellungen, wie der Modellversionierung, Modellkopplung, MDSD-Standards, Teamarbeit auf Basis von Modellen, Testen von modellgetrieben erstellter Software, sowie der Wartung und Weiterentwicklung von Modellen, Meta-Modellen und Transformationen. Abschließend werden modellgetriebene Verfahren zur Analyse von Software-Architekturmodellen als weiterführende Einheit behandelt. Die Vorlesung vertieft Konzepte aus existierenden Veranstaltungen wie Software-Technik oder Übersetzerbau bzw. überträgt und erweitert diese auf modellgetriebene Ansätze. Weiterhin werden in Transformationsprachen formale Techniken angewendet, wie Graphgrammatiken, logische Kalküle oder Relationenalgebren.

Workload
(2 SWS + 1,5 x 2 SWS) x 15 + 15 h Prüfungsvorbereitung = 90 h

T Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

Responsibility: Verena Dorner, Jella Pfeiffer, Christof Weinhardt
Contained in: [M-WIWI-101489] Strategy, Communication, and Data Analysis
[M-WIWI-101506] Service Analytics
[M-WIWI-103118] Data Science: Data-Driven User Modeling
[M-WIWI-101448] Service Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540470	Modeling and Analyzing Consumer Behavior with R	Vorlesung (V)	2	Jella Pfeiffer
SS 2018	2540471		Übung (Ü)	1	Dominik Jung, Jella Pfeiffer

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

Recommendations
None

Remarks
Limited number of slots
The course has been added summer term 2015.

V Event excerpt: Modeling and Analyzing Consumer Behavior with R (SS 2018)

Aim
The students

- have advanced knowledge in handling the statistics software R
- understands the approach of modelling and analysis consumer data
- masters methods for evaluation, analysis and visualization of data

Content
Students learn the fundamental methods, algorithms and concepts for analysing consumer data. The students deepen their knowledge in working on a case study and computer exercises, especially in the areas of e-commerce and behavioural economics. In addition, students learn to write applications in R and to organize and execute larger data mining and general data analytics projects. Furthermore, students learn methods for evaluating and visualizing data.
The event will focus on the following topics:
1. basic programming concepts in R
2. data mining with R using established process models such as CRISP-DM
3. text mining and analysis of online data with R
4. working on a case study from the area of Consumer and User Analytics
5. data visualization and evaluation with R

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

Literature

Field, A., Miles, J., Field, Z., Discovering Statistics Using R, SAGE 2014
Jones, O., Maillardet, R., Robinson, A., Scientific Programming and Simulation Using R, Chapmann & Hall / CRC Press 2009
Venables, W.N., Smith, D.M. and the R Core Team, "An Introduction to R", 2012 (Version 2.15.2), http://cran.r-project.org/doc/manuals/R-intro.pdf
Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)

T Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102808] Digital Service Systems in Industry
[M-WIWI-102832] Operations Research in Supply Chain Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Semester	Prüfungsleistung anderer Art	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550490		Praktikum (P)	3	Stefan Nickel, Melanie Reuter-Oppermann

Learning Control / Examinations
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the software laboratory and the following term.

Conditions
None.

Recommendations
Basic knowledge as conveyed in the module*Introduction toOperations Research*is assumed.
Successful completion of the courseModeling and OR-Software: Introduction.

Remarks
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

V Event excerpt: (SS 2018)

Aim
The student

- is an expert in using computer systems to model and solve industry-related optimization problems,
- conducts an advanced approach to modeling and implementation software for OR models and is able to use them in practice,
- knows and explains the practical application possibilities of OR software in complex combinatorial and nonlinear optimization problems.

Content
The task of solving combinatorial and nonlinear optimization problems imposes much higher requirements on suggested solution approaches as in linear programming.
During the course of this software laboratory, students get to know important methods from combinatorial optimization, e.g. Branch & Cut- or Column Generation methods and are enabled to solve problems with the software system IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL. In addition, issues of nonlinear optimization, e.g. quadratic optimization, are addressed. As an important part of the software laboratory, students get the possibility to model combinatorial and nonlinear problems and implement solution approaches in the software system.
The software laboratory also introduces some of the most frequently used modelling and programming languages that are used in practice to solve optimization problems.

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

T Course: Modeling Strategic Decision Making [T-WIWI-102803]

Responsibility: Hagen Lindstädt
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The course will not be offered anymore from winter term 2016/2017 on. The examination will be offered latest until summer term 2017 (repeaters only).
Written exam 100% following §4, Abs. 2.

Conditions
None

Recommendations
None

T Course: Modelling, Measuring and Managing of Extreme Risks [T-WIWI-102841]

Responsibility: Ute Werner
Contained in: [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
2.5	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
Non exam assessment (following §4(2), 3 of the examination regulation).
T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks will be offered latest until summer term 2017 (beginners only).

Conditions
None

Recommendations
None

T Course: Modern Development Environments Using the Example of .NET [T-INFO-101350]

Responsibility: Walter Tichy
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24634		Vorlesung (V)	2	Martin Blersch, Walter Tichy

V Event excerpt: (SS 2018)

Aim
Studierende kennen die .NET-Philosophie, Entwurfsziele und Einsatzzweck. Sie können die konzeptionellen Unterschiede zu Java erläutern.
Studierende kennen das .NET-Typsysteme und die CLS, können deren Zusammenhang erläutern und für ein gegebenes Problem, die geeigneten Typen auswählen. Sie sind in der Lage das Typsystem mit anderen Programmierumgebungen (bspw. Java) zu vergleichen.
Studierende kennen den Unterschied zwischen Wert- und Referenztypen.
Studierende verstehen das Ausführungsmodell von .NET und kennen die Bestandteile der Common Language Infrastructure CLI (virtuelle Maschine mit gemeinsamem Typsystem, Instruktionssatz und Laufzeitsystem). Studierende können die Zwischensprache IL erklären und verstehen die Funktionsweise des IL-Erzeugers.
Studierende kennen die Common Language Runtime CLR und ihre Bestandteile. Studierende können die Algorithmen für Speicherverwaltung und Registerverwaltung (Mark-Compact Collector, Linear Scan Allocation) anwenden. Studierende können die Vor- und Nachteile von Kellermaschinen herleiten und die Instruktionsausführung darstellen. Studierende kennen die Grundzüge des Laufzeitübersetzers, insbesondere die verschiedenen Phasen. Studierende können Programme in SSA-Form überführen.
Studierende beherrschen Syntax und Semantik der Programmiersprache C#, inklusive weiterführender Konzepte wie Nebenläufigkeit und generische Programmierung.

Content
Im ersten Teil der Veranstaltung wird die Programmiersprache C# auf Grundlage des ECMA-Standards 334 eingehend besprochen. Dabei liegt der Schwerpunkt auf den Erweiterungen gegenüber Java. Das Wesen der Vorlesung ist, die exakte Semantik (und die vollständige Syntax) der Programmierkonstrukte zu betrachten. Insbesondere die Betrachtung der Randfälle hilft, die innere Funktionsweise einer modernen Programmiersprache zu verstehen.

Der zweite Teil der Veranstaltung beschäftigt sich mit der Laufzeitumgebung CLI. Hierbei werden die Aufgaben aber auch Schutz- und Leistungs-Potenziale moderner virtueller Maschinen erörtert.

Workload
3 LP entspricht ca. 90 Arbeitsstunden, davon

ca. 30 Std. Vorlesungsbesuch
ca. 45 Std. Vor- und Nachbearbeitung
ca. 15 Std. Prüfungsvorbereitung

Literature
Als vertiefende LIteratur werden die Standards ECMA-334 C# Language Specification, C' Version 4 Specification und ECMA-335 Common Language Infrastructure (CLI) angeraten. Als Buchlektüre raten wir zu Jeffrey Richters Net-Büchern

in der aktualisierten dritten Auflage. Die Konzepte der CLI werden in beiden Büchern gleichermaßen gut behandelt.

T Course: Multicore Computers and Computer Clusters [T-INFO-101325]

Responsibility: Walter Tichy
Contained in: [M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24112		Vorlesung (V)	2	Walter Tichy, Martin Tillmann

V Event excerpt: (WS 18/19)

Aim

Studierende sind in der Lage den Begriff Parallelität zu motivieren und können Trends in der Rechnerentwicklung bzgl. Taktrate, Anzahl Transistoren und Anzahl Kerne diskutieren. Studierende sind in der Lage, Power Wall, ILP Wall, Memory Wall und die Moore´sche Regel zu definieren. Studierende können Flynns Rechnerkategorien definieren und Beispiele dazu geben. Sie sind in der Lage, die Speicherorganisation von Parallelrechnern zu erläutern und können Multikernrechner, Rechnerbündel und Grafikprozessor definieren und vergleichen. Sie kennen die ungefähre Anzahl von Prozessoren, die der schnellste Rechner der aktuellen Top500-Liste hat.
Studierende sind in der Lage OpenMP zu beschreiben und beherrschen die Konstrukte für parallele Schleifen und Tasks. Sie kennen Konstrukte zur Synchronisation und können diese vergleichen. Studierende erkennen Probleme in einfachen OpenMP-Programmen und sind in der Lage, einfache OpenMP-Programme zu entwickeln. Sie können die Sichtbarkeit von Daten und nützliche OpenMP-Konstrukte erläutern.
Studierende können Konstrukte zum Erzeugen von Parallelität in Java beschreiben. Sie beherrschen die Konzepte kritische Abschnitte und Monitore, Warten und Benachrichtigung, Unterbrechung von Fäden, CAS und volatile. Studierende können Verklemmungen erkennen und vermeiden. Sie sind in der Lage double-checked locking zu erläutern.
Studierende sind in der Lage die Unterschiede zwischen CPU und GPU zu erklären und können die prinzipielle Funktionsweise von GPUs erläutern. Sie können die Faden- und Speicherorganisation für GPUs erklären und einfache Kerne und deren Aufrufe lesen und schreiben.
Studierende sind in der Lage, Zweck und grundsätzliche Operation von Transactional Memory zu erklären, insbesondere Transaktionskonzept und Compare-and-Swap (CAS). Sie verstehen die Implementierungstechnik für Software Transactional Memory (STM) und können diese erläutern. Studierende können Probleme mit STM nennen.
Studierende können theoretische Bewertungskriterien für Netze definieren und bestimmen (Grad, Durchmesser, Kantenkonnektivität, Bisektionsbreite). Sie können Netztopologien definieren, Bewertungskritierien berechnen und Routing-Regeln angeben für Bus, Ring, Torus, Hypercubus, Kreuzschienenverteiler, Mischungspermutation, Butterfly-Netz, Clos-Netz, Fattree, CBB-Netze. Studierende können praktische Bewertungskriterien für Netze definieren
(Latenz, Verzögerung, Bandbreite, Durchsatz) und Vermittlungstechniken erklären (Leitungsvermittlung, Paketvermittlung mit Varianten) sowie Techniken der Hochgeschwindigkeitskommunikation erläutern. Sie können Beispiele für Hochgeschwindigkeitsnetzwerke nennen (Myrinet, Infiniband, Gigabit-Ethernet).
Studierende sind in der Lage, die Kommunikationsmodelle klassisches Send/Receive, erweitertes Send/Receive, Methodenfernaufruf: Remote Procedure Call (RPC), (virtueller) gemeinsamer Speicher: Virtual Shared Memory und Bulk Synchronous Parallelism (BSP) zu erläutern und zu vergleichen.
Studierende können das Programmiermodell von MPI und dessen Kommunikationskonstrukte und ihre Varianten wiedergeben (Punkt-zu-Punkt, kollektive und einseitige Operationen, Kommunikatoren und virtuelle Topologien). Sie sind in der Lage, einfache MPI-Programme zu erklären und zu schreiben.
Studierende können das Maschinenmodell Parallel Random Access Machine (PRAM) erklären, kennen Speicherzugriffsvarianten und können Laufzeit, Beschleunigung, Effizienz sowie Arbeit erklären und bestimmen. Studierende kennen Sprachkonstrukte zur PRAM-Programmierung und können Algorithmen auf PRAM (Reduktion, Prä- und Postfixoperationen, Broadcast, Kompaktifizierung von Listen, Rekurrenzen) erklären. Studierende beherrschen die Transformation eines

PRAM Algorithmus zum MPI Programm (Datenverteilung, Prozessverteilung, Virtualisierung und Kommunikation).
Studierende können parallele Algorithmen erklären und ihre Laufzeit bestimmen (Matrizenmultiplikation, transitive Hülle, Zusammenhangskomponenten, Bestimmung aller kürzesten Pfade, lineare Gleichungen, tridiagonale Gleichungssysteme, diskrete/schnelle Fourier Transformation, minimaler Spannbaum, odd-even Transposition Sort, Sortieren mit Stichproben).

Content

- Diese Lehrveranstaltung soll Studierenden die theoretischen und praktischen Aspekte der Multikern-Rechner und Rechnerbündel vermitteln.
- Es werden Systemarchitekturen als auch Programmierkonzepte behandelt.
- Die Lehrveranstaltung vermittelt einen Überblick über Netzwerktechnik, ausgewählte Hochgeschwindigkeitsnetzwerke (Gigabit Ethernet, Myrinet, Infiniband u.a.) und Hochleistungs-Kommunikationsbibliotheken.
- Ergänzend werden auch Ressourcenmanagement, Ablaufplanung, verteilte/parallele Dateisysteme, Programmiermodelle (MPI, gemeinsamer verteilter Speicher, JavaParty) und parallele Algorithmen diskutiert.

Workload
4 ECTS entspricht 120h:
Präsenzzeit: 30h
Vor- / Nachbereitung der Vorlesung: 60h
Prüfungsvorbereitung: 30h

T Course: Multimedia Communications [T-INFO-101320]

Responsibility: Roland Bless, Martina Zitterbart
Contained in: [M-INFO-101205] Future Networking
[M-INFO-101206] Networking
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24132	Multimedia Communications	Vorlesung (V)	2	Roland Bless

V Event excerpt: Multimedia Communications (WS 18/19)

Aim
Studierende

- kennen grundlegende Eigenschaften von Multimedia-Anwendungen und Audio-/Videodaten, die für den Transport über das Internet relevant sind, und können diese erläutern.
- kennen grundlegende digitale Repräsentationen und Verfahren zur Kompression von Audio- und Videodaten und können diese anwenden.
- beherrschen Mechanismen und Kommunikationsprotokolle (z.B. RTP, SIP), um die Übertragung von Multimediadaten über das unzuverlässige Internet zu ermöglichen bzw. zu unterstützen, und können diese anwenden.
- besitzen die Fähigkeit, Kommunikationsprotokolle für die Übertragung von Audio-/Videodaten zu analysieren und zu bewerten

Insbesondere kennen Studierende typische Eigenschaften von Multimediakommunikation und können diese anhand von Beispielen erläutern. Zudem kennen Studierende verschiedene Klassen von multimedialen Anwendungen, deren Eigenschaften und können diese analysieren und bewerten.
Des Weiteren beherrschen Studierende grundlegende Mechanismen für die Übertragung von multimedialen Daten und können diese für den Entwurf von Multimediakommunikationsprotokollen anwenden.
Studierende kennen Standards zur Übertragung bzw. Steuerung von Multimediadaten (u.a. MPEG, SIP, RTP, RTSP) und können den Protokollablauf in eigenen Worten erläutern, grundlegende Konzepte (z.B. Intra-bzw. Inter-Strom-Synchronisation) benennen und anwenden. Zudem beherrschen Studierende relevante Kommunikationsprotokolle zum Transport von Audio-/Videodaten im Internet und können diese erklären und anwenden.
Studierende kennen unterschiedliche Audio-/Videocodecs und können deren Eigenschaften erläutern und miteinander vergleichen. Des Weiteren beherrschen Studierende das Session Initiation Protocol (SIP) zum Aufbau von multimedialen Sitzungen bzw. Voice-over-IP-Verbindungen und können dessen Funktionsweise in eigenen Worten detailliert erklären und anwenden. Überdies entwickeln die Studierenden ein Verständnis für die Funktionsweise von Audio/Video-Streaming und können technische Verfahren zur Steuerung und Caching erläutern und anwenden. Zusätzlich kennen Studierende den Aufbau und die grundlegende Funktionsweise der DVB-Standards für digitales Fernsehen.

Content
Diese Vorlesung beschreibt Techniken und Protokolle, um beispielsweise Audio- und
Videodaten im Internet zu übertragen. Behandelte Themen sind unter anderem: Audio- und Videokonferenzen, Audio/Video-Transportprotokolle, Voice over IP (VoIP), SIP zur
Signalisierung und Aufbau sowie Steuerung von Multimedia-Sitzungen, RTP zum Transport von Multimediadaten über das Internet, RTSP zur Steuerung von A/V-Strömen, ENUM zur Rufnummernabbildung, A/V-Streaming, Middleboxes und Caches, Advanced TV und Video on Demand.

Workload
Vorlesung mit 2 SWS plus Nachbereitung/Prüfungsvorbereitung, 4 LP.
4 LP entspricht ca. 120 Arbeitsstunden, davon

ca. 30 Std. Vorlesungsbesuch
ca. 60 Std. Vor-/Nachbereitung
ca. 30 Std. Prüfungsvorbereitung

Literature
J.F. Kurose, K.W. Ross: „Computer Networking: A Top-Down Approach“, 6th Ed., Pearson, 2012, ISBN-13: 978-0-273-76896-8, Chapter Multimedia Networking

T Course: Multivariate Statistical Methods [T-WIWI-103124]

Responsibility: Oliver Grothe
Contained in: [M-WIWI-101637] Analytics and Statistics
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-101639] Econometrics and Statistics II
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550554		Vorlesung (V)	2	Oliver Grothe
SS 2018	2550555		Übung (Ü)	2	Maximilian Coblenz, Oliver Grothe

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).
The exam is offered every semester. Re-examinations are offered only for repeaters.

Conditions
None

Recommendations
The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course ''Advanced Statistics''. Without this, participation in the course is not advised.
Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

V Event excerpt: (SS 2018)

Aim
Students

- choose appropriate methods for the illustration of multivariate data and apply these.
- choose appropriate methods for structure analysis and apply these.
- choose appropriate methods for dimension reduction and apply these.
- apply software.

Content
Graphical methods for multivariate Data
Regression Analysis (incl. logistic regression, Ridge and Lasso)
Principal Component, and Correspondence Analysis
Local linear Embedding
Multidimensional Scaling
Hierarchical Classification

Literature
Comprehensive lecture notes

T Course: Natural Language Processing and Software Engineering [T-INFO-101272]

Responsibility: Walter Tichy
Contained in: [M-INFO-101202] Software Methods
[M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24187		Vorlesung (V)	2	Walter Tichy, Sebastian Weigelt

V Event excerpt: (WS 18/19)

Aim
Studierende kennen Grundbegriffe der Linguistik, wie Syntax, Semantik und Pragmatik und können diese erläutern sowie vergleichen. Sie kennen lexikalische Relationen (z.B.: Polysemie, Homonymie, Troponymie u. Ä) und können Beispiele entsprechend zuordnen. Weiterhin können Zusammenhänge zwischen den Relationen identifiziert und verglichen werden. Studierende sind mit grundlegenden Konzepten der Computerlinguistik vertraut. Grundlegende Techniken, wie Wortartetikettierung, Lemmatisierung, Bestimmung von Wortähnlichkeiten oder Disambiguierungen können erläutert werden. Zugehörige Verfahren (lexikalisch, regelbasiert oder probabilistisch) können beschrieben und die jeweilige Stärken und Schwächen beurteilt werden. Unterschiedliche Parser-Verfahren können benannt, erläutert und konzeptionell reproduziert werden.
Studierende können Struktur, Inhalt und Nutzen unterschiedlicher Wissensdatenbanken beschreiben und vergleichen. Neben den übergeordneten Konzepten der Ontologie, Wortnetzen und anderen Wissensrepräsentationen sind sie auch mit konkreten Vertretern, wie researchCyc, WordNet, FrameNet und ähnlichen, vertraut und können diese nutzen. Verfahren zum manuellen und automatischen Aufbau von Ontologien sowie zur automatischen Relationsextraktion können von den Studierenden angewendet werden.
Die Studierenden verstehen den Zusammenhang zwischen Funktionsweise grundlegender Techniken der Computerlinguistik und ihrer Anwendbarkeit in der Softwaretechnik. Darüber hinaus können sie Werkzeugketten in Einzelbestandteile gliedern und bewerten. Insbesondere sind die Studierenden in der Lage unterschiedliche Anwendungen zu analysieren und zu bewerten. Hierzu zählen Anwendungen zur Modellierung mithilfe der Linguistik, Verbesserung von Spezifikationstexten und Qualitätsbeurteilung von Quelltextkommentaren.
Darüber hinaus können Studierende das Konzept aktiver Ontologien und deren Anwendung und Nutzung im Umfeld der Sprachverarbeitung erläutern.
Studierende können Anwendungsszenarien in der Softwaretechnik für Textanalysesysteme identifizieren und eigene Lösungen entwerfen. Hierfür sind den Studierenden unterschiedliche Werkzeuge zur Sprachverarbeitung, wie GATE, Protegé und NLTK, bekannt. Sie sind grundlegend mit ihrer Funktionsweise vertraut und können sie praktisch anwenden. Insbesondere können Studierende eigene Anwendungen mithilfe der vorgestellten Werkzeuge entwerfen und implementieren. Dabei können neue Lösungsansätze anhand der bekannten Verfahren konstruiert werden.

Content
Diese Vorlesung bietet die Grundlagen für die maschinelle Verarbeitung natürlichsprachlicher Texte.
Sprachverarbeitung wird immer wichtiger. In interaktiven Systemen ist oftmals eine sprachliche Eingabe wünschenswert, z.B. für sprachliche Kommandos, für Hilfesysteme oder Anfragen im Internet. Außerdem ist die Analyse und Weiterverarbeitung von Software-Anforderungen ein neues Forschungsgebiet. Die Computerlinguistik ist somit nicht nur für Softwareanwendungen von großer Bedeutung, sondern auch für die Softwaretechnik selbst.
Ziel dieser Veranstaltung für Diplom- und Masterstudenten der Informatik und Informationswirtschaft ist es, das Grundwissen der Sprachverarbeitung und Anwendungsmöglichkeiten bei der Entwicklung von Software-Systemen zu vermitteln. Die Themen umfassen die Verarbeitung von Texten mithilfe von Parsern, die Mehrdeutigkeit der natürlichen Sprache, die Erfassung von Semantik mithilfe von thematischen Rollen, die automatische Übersetzung von Texten in Softwaremodelle

sowie den Aufbau und die Verwendung von Ontologien bei der Textanalyse. Zudem wird in der Vorlesung auf aktuelle Forschungsarbeiten eingegangen.

Workload
3 LP entspricht ca. 90 Arbeitsstunden, davon

ca. 30 Std. Vorlesungsbesuch
ca. 45 Std. Vor- und Nachbearbeitung
ca. 15 Std. Prüfungsvorbereitung

T Course: Nature-Inspired Optimisation Methods [T-WIWI-102679]

Responsibility: Pradyumn Kumar Shukla
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2511106		Vorlesung (V)	2	Pradyumn Kumar Shukla

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called "bonus exam", 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exersices . The bonus exam may be split into several shorter written tests.
The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

V Event excerpt: (SS 2018)

Aim
To learn:

1. Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization
2. Different aspects and limitation of the methods
3. Applications of such methods
4. Multi-objective optimization methods
5. Constraint handling methods
6. Different aspects in parallelization and computing platforms

Content
Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

Literature
* E. L. Aarts and J. K. Lenstra: 'Local Search in Combinatorial Optimization'. Wiley, 1997 * D. Corne and M. Dorigo and F. Glover: 'New Ideas in Optimization'. McGraw-Hill, 1999 * C. Reeves: 'Modern Heuristic Techniques for Combinatorial Optimization'. McGraw-Hill, 1995 * Z. Michalewicz, D. B. Fogel: How to solve it: Modern Heuristics. Springer, 1999 * E. Bonabeau, M. Dorigo, G. Theraulaz: 'Swarm Intelligence'. Oxford University Press, 1999 * A. E. Eiben, J. E. Smith: 'Introduction to Evolutionary Computation'. * M. Dorigo, T. Stützle: 'Ant Colony Optimization'. Bradford Book, 2004 Springer, 2003

T Course: Network Security: Architectures and Protocols [T-INFO-101319]

Responsibility: Martina Zitterbart
Contained in: [M-INFO-101206] Networking
[M-INFO-101204] Networking Labs
[M-INFO-101203] Wireless Networking
[M-INFO-101207] Networking Security - Theory and Praxis
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24601		Vorlesung (V)	2	Ingmar Baumgart, Roland Bless, Hauke Alexander Heseding, Martina Zitterbart

V Event excerpt: (SS 2018)

Aim
Studierende

- kennen grundlegende Herausforderungen, Schutzziele und kryptographische Bausteine, die für den Entwurf sicherer Kommunikationssysteme relevant sind
- beherrschen sicherheitsrelevante Kommunikationsprotokolle (z.B. Kerberos, TLS, IPSec) und können grundlegende Sicherheitsmechanismen identifizieren und erläutern
- besitzen die Fähigkeit, Kommunikationsprotokolle unter Sicherheitsaspekten zu analysieren und zu bewerten
- besitzen die Fähigkeit, die Qualität von Sicherheitsmechanismen im Bezug zu geforderten Schutzzielen zu beurteilen und zu bewerten

Insbesondere kennen Studierende typische Angriffstechniken wie Abhören, Zwischenschalten oder Wiedereinspielen und können diese anhand von Beispielen erläutern. Zudem beherrschen Studierende kryptographische Primitiven wie symmetrische und asymmetrische Verschlüsselung, digitale Signaturen, Message Authentication Codes und können diese insbesondere für den Entwurf sicherer Kommunikationsdienste anwenden.
Studierende kennen den verteilten Authentifizierungsdienst Kerberos und können den Protokollablauf in eigenen Worten erläutern und grundlegende Konzepte (z.B. Tickets) benennen. Zudem beherrschen Studierende relevante Kommunikationsprotokolle zum Schutz der Kommunikation im Internet (u.a. IPsec, TLS) und können diese erklären sowie deren Sicherheitseigenschaften analysieren und bewerten.
Studierende kennen unterschiedliche Verfahren zum Netzzugangsschutz und können verbreitete Authentifizierungsverfahren (z.B. CHAP, PAP, EAP) erläutern und miteinander vergleichen. Des Weiteren beherrschen Studierende Verfahren zum Schutz drahtloser Zugangsnetze und können u.a. Verfahren wie WEP, WPA und WPA2 analysieren und bewerten.
Studierende beherrschen unterschiedliche Vertrauensmodelle und können grundlegende technische Konzepte (z.B. digitale Zertifikate, PKI) in eigenen Worten erklären und anwenden. Zudem entwickeln die Studierenden ein Verständnis für Datenschutzaspekte in Kommunikationsnetzen und können technische Verfahren zum Schutz der Privatsphäre erläutern und anwenden.

Content
Die Vorlesung "Netzsicherheit: Architekturen und Protokolle" betrachtet Herausforderungen und Techniken im Design sicherer Kommunikationsprotokolle sowie Themen des Datenschutzes und der Privatsphäre. Komplexe Systeme wie Kerberos werden detailliert betrachtet und ihre Entwurfsentscheidungen in Bezug auf Sicherheitsaspekte herausgestellt. Spezieller Fokus wird auf PKI-Grundlagen, -Infrastrukturen sowie spezifische PKI-Formate gelegt. Weitere Schwerpunkte stellen die verbreiteten Sicherheitsprotokolle IPSec und TLS/SSL sowie Protokolle zum Infrastrukturschutz dar.

Workload
Vorlesung mit 2 SWS plus Nachbereitung/Prüfungsvorbereitung, 4 LP.
4 LP entspricht ca. 120 Arbeitsstunden, davon
ca. 30 Std. Vorlesungsbesuch
ca. 60 Std. Vor-/Nachbereitung
ca. 30 Std. Prüfungsvorbereitung

Literature
Roland Bless et al. Sichere Netzwerkkommunikation. Springer-Verlag, Heidelberg, Juni 2005.
Weiterführende Literatur

- Charlie Kaufman, Radia Perlman und Mike Speciner. Network Security: Private Communication in a Public World. 2nd Edition. Prentice Hall, New Jersey, 2002.
- Carlisle Adams und Steve Lloyd. Understanding PKI. Addison Wesley, 2003
- Rolf Oppliger. Secure Messaging with PGP and S/MIME. Artech House, Norwood, 2001.
- Sheila Frankel. Demystifiying the IPsec Puzzle. Artech House, Norwood, 2001.
- Thomas Hardjono und Lakshminath R. Dondeti. Security in Wireless LANs and MANs. Artech House, Norwood, 2005.
- Eric Rescorla. SSL and TLS: Designing and Building Secure Systems. Addison Wesley, Indianapolis, 2000.

T Course: Neural Networks [T-INFO-101383]

Responsibility: Alexander Waibel
Contained in: [M-INFO-100846] Neural Networks

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400024	Deep Neural Networks	Vorlesung (V)	4	Thanh-Le HA, Alexander Waibel

V Event excerpt: Deep Neural Networks (SS 2018)

Aim

- Die Studierenden sollen den Aufbau und die Funktion verschiedener Typen von neuronalen Netzen lernen.
- Die Studierenden sollen die Methoden zum Training der verschiedenen Netze lernen, sowie ihre Anwendung auf Probleme.
- Die Studierenden sollen die Anwendungsgebiete der verschiedener Netztypen erlernen.
- Gegeben ein konkretes Szenario sollen die Studierenden in die Lage versetzt werden, den geeigneten Typs eines neuronalen Netzes auswählen zu können.

Content
Die Vorlesung Neuronale Netze führt ein die Verwendung von Neuronalen Netzen zur Lösung verschiedener Fragestellungen im Bereich des Maschinellen Lernens, etwa der Klassifikation, Prediktion, Steuerung oder Inferenz. Verschiedene Typen von Neuronalen Netzen werden dabei behandelt und ihre Anwendungsgebiete an Hand von Beispielen aufgezeigt.

Workload
180h

T Course: Next Generation Internet [T-INFO-101321]

Responsibility: Roland Bless, Martina Zitterbart
Contained in: [M-INFO-101205] Future Networking
[M-INFO-101206] Networking
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24674		Vorlesung (V)	2	Roland Bless

V Event excerpt: (SS 2018)

Aim
Studierende

- kennen grundlegende Eigenschaften und Architektur-Konzepte des Internets
- kennen die neuere Version des Internetprotokolls (IPv6) und können die Kenntnisse praktisch anwenden, neuere Transportprotokolle und aktuelle Ansätze zur Erhöhung der Flexibilität von Internet-basierter Kommunikation
- beherrschen Konzepte zur Dienstgüteunterstützung und Gruppenkommunikation und können Mechanismen zu deren Umsetzung im Internet anwenden
- besitzen die Fähigkeit, Peer-to-Peer-Systeme zu analysieren und zu bewerten

Insbesondere kennen Studierende wichtige Architekturkonzepte und Entwurfsprinzipien, die im Internet Anwendung finden und können diese anhand von Beispielen erläutern bzw. selbst beim Systementwurf anwenden. Außerdem kennen Studierende den Begriff der Dienstgüte sowie wichtige Dienstgüteparameter, beherrschen grundlegende Mechanismen zur Unterstützung von Dienstgüte (z.B. Klassifizierer, Verkehrsformer, Warteschlangen- und Bedienstrategien, Signalisierungsprotokolle zur Ressourcenreservierung), können diese analysieren und bewerten und können sie für den Entwurf von Kommunikationssystemen anwenden.
Studierende kennen Konzepte und Standards zur Bereitstellung Gruppenkommunikation im Internet und können Protokollabläufe in eigenen Worten erläutern und grundlegende Konzepte benennen. Zudem beherrschen Studierende das neue Internetprotokoll Version 6 (IPv6), können es praktisch anwenden und können dessen Funktionsweise bzw. Unterschiede zur alten Version 4 erklären.
Studierende kennen die Eigenschaften von Peer-to-Peer-Systemen können diese erläutern und verschiedene Organisationsformen miteinander vergleichen. Des Weiteren beherrschen Studierende Verfahren zum Routing in solch dezentral organisierten Peer-to-Peer-Systemen und können dessen Funktionsweise in eigenen Worten detailliert erklären und anwenden. Überdies entwickeln die Studierenden ein Verständnis für die Funktionsweise neuerer Ansätze zur Erhöhung der Flexibilität von Kommunikationsnetzen (z.B. Netzvirtualisierung, Software-Defined Networking), können technische Verfahren zur Umsetzung analysieren, erläutern und anwenden.

Content
Im Mittelpunkt der Vorlesung stehen aktuelle Entwicklungen im Bereich der Internet-basierten Netztechnologien. Zunächst werden architekturelle Prinzipien des heutigen Internets vorgestellt und diskutiert, sowie anschließend motiviert, welche Herausforderungen heute und zukünftig existieren. Methoden zur Unterstützung von Dienstgüte, die Signalisierung von Anforderungen der Dienstgüte sowie IPv6 und Gruppenkommunikationsunterstützung werden besprochen. Der Einsatz der vorgestellten Technologien in IP-basierten Netzen wird diskutiert. Fortgeschrittene Ansätze wie aktive bzw. programmierbare Netze sind ebenso Gegenstand dieser Vorlesung wie neuere Entwicklungen im Bereich der Peer-to-Peer-Netzwerke.

Workload
Vorlesung mit 2 SWS plus Nachbereitung/Prüfungsvorbereitung, 4 LP.
4 LP entspricht ca. 120 Arbeitsstunden, davon

ca. 30 Std. Vorlesungsbesuch
ca. 60 Std. Vor-/Nachbereitung
ca. 30 Std. Prüfungsvorbereitung

Literature

James F. Kurose, and Keith W. Ross *Computer Networking* 6th edition, Addison-Wesley/Pearson, 2013, ISBN 978-0-273-76896-8, Chapters 1, 2.6 (P2P), 4 (Network Layer), 7.5 (Scheduling, IntServ, DiffServ, RSVP)

Weiterführende Literatur

Ralf Steinmetz, Klaus Wehrle (Eds) *Peer-to-Peer Systems and Applications* LNCS 3854, Springer 2005

M. Blanchet: *Migrating to IPv6: A Practical Guide to Implementing IPv6 in Mobile and Fixed Network*, John Wiley & Sons, ISBN 0-471-49892-0, November 2005

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
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
Knowledge of the contents covered by the course *"Applied Econometrics"* [2520020]

Remarks
The course takes place every second winter semester: 2018/19 then 2020/21

T Course: Nonlinear Optimization I [T-WIWI-102724]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	3

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2550111		Vorlesung (V)	2	Oliver Stein
WS 18/19	2550112		Übung (Ü)		Robert Mohr, Oliver Stein
WS 18/19	2550142		Übung (Ü)		Robert Mohr, Oliver Stein

Learning Control / Examinations
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of*Nonlinear 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.

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-103637] *Nonlinear Optimization I and II* must not have been started.

Remarks
Part I and II of the lecture are held consecutively in the *same*semester.

V Event excerpt: (WS 18/19)

Aim
The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
9	Jedes Wintersemester	Prüfungsleistung schriftlich	5

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2550111		Vorlesung (V)	2	Oliver Stein
WS 18/19	2550112		Übung (Ü)		Robert Mohr, Oliver Stein
WS 18/19	2550113		Vorlesung (V)	2	Oliver Stein
WS 18/19	2550142		Übung (Ü)		Robert Mohr, Oliver Stein

Learning Control / Examinations
The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.

Conditions
None.

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-102724] *Nonlinear Optimization I* must not have been started.
2. The course [T-WIWI-102725] *Nonlinear Optimization II* must not have been started.

Remarks
Part I and II of the lecture are held consecutively in the **same** semester.

V Event excerpt: (WS 18/19)

Aim
The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

V Event excerpt: (WS 18/19)

Aim
The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T Course: Nonlinear Optimization II [T-WIWI-102725]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2550112		Übung (Ü)		Robert Mohr, Oliver Stein
WS 18/19	2550113		Vorlesung (V)	2	Oliver Stein

Learning Control / Examinations
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The exam can also be combined with the examination of *Nonlinear OptimizationI* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Conditions
None.

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-103637] *Nonlinear Optimization I and II* must not have been started.

Remarks
Part I and II of the lecture are held consecutively in the same semester.

V Event excerpt: (WS 18/19)

Aim
The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T Course: Numerical Mathematics 1 - Exam [T-MATH-106391]

Responsibility: Willy Dörfler, Marlis Hochbruck, Tobias Jahnke, Andreas Rieder, Christian Wieners
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	0108700		Vorlesung (V)	3	Marlis Hochbruck
WS 18/19	0108800		Übung (Ü)	1	Marlis Hochbruck

T Course: Online Marketing [T-WIWI-103141]

Responsibility: Ju-Young Kim
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
None

Remarks
new course starting winter term 2015/2016

T Course: Open Innovation - Concepts, Methods and Best Practices [T-WIWI-102901]

Responsibility: Alexander Hahn
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	englisch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2571199	Open Innovation – Concepts, Methods and Best Practices	Block (B)		Alexander Hahn

Learning Control / Examinations
The course is no more available.
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.
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 2018)

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
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the lecture and the following lecture.

Conditions
None

Recommendations
Basic knowledge as conveyed in the module*Introduction toOperations Research*[WI1OR] is assumed.

Remarks
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T Course: Operations Research in Supply Chain Management [T-WIWI-102715]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-101473] Mathematical Programming
[M-WIWI-103289] Stochastic Optimization
[M-WIWI-102805] Service Operations
[M-WIWI-102832] Operations Research in Supply Chain Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the lecture and the following lecture.

Conditions
None

Recommendations
Basic knowledge as conveyed in the module*Introduction toOperations Research* and in the lectures*Facility Location and Strategic SCM*,*Tactical and operational SCM*is assumed.

Remarks
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T Course: Optimization in a Random Environment [T-WIWI-102628]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101657] Stochastic Modelling and Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	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 under uncertainty [T-WIWI-106545]

Responsibility: Steffen Rebennack
Contained in: [M-WIWI-103289] Stochastic Optimization
[M-WIWI-103243] Optimization under uncertainty in Information Engineering and Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Unregelmäßig	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2550464		Vorlesung (V)		Marcel Sinske
WS 18/19	2550465		Übung (Ü)		Christian Füllner
WS 18/19	2550466		Übung (Ü)	2	Christian Füllner

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

Conditions
None.

T Course: OR-Oriented Modeling and Analysis of Real Problems (Project) [T-WIWI-102730]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101657] Stochastic Modelling and Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung anderer Art	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-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on.

Conditions
None

Recommendations
See German version.

T Course: Panel Data [T-WIWI-103127]

Responsibility: Wolf-Dieter Heller
Contained in: [M-WIWI-101638] Econometrics and Statistics I
[M-WIWI-101639] Econometrics and Statistics II
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2520320		Vorlesung (V)	2	Wolf-Dieter Heller
SS 2018	2520321		Übung (Ü)	2	Wolf-Dieter Heller, Carlo Siebenschuh

Conditions
None

T Course: Parallel Algorithms [T-INFO-101333]

Responsibility: Peter Sanders
Contained in: [M-INFO-101200] Advanced Algorithms: Engineering and Applications
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-100796] Parallel Algorithms
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400053	Parallel Algorithms	Vorlesung (V)	2/1	Timo Bingmann, Peter Sanders

T Course: Parallel Computer Systems and Parallel Programming [T-INFO-101345]

Responsibility: Achim Streit
Contained in: [M-INFO-101210] Dynamic IT-Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24617	Parallel computer systems and parallel programming	Vorlesung (V)	2	Hartmut Häfner, Achim Streit

V Event excerpt: Parallel computer systems and parallel programming (SS 2018)

Aim
Studierende erörtern die Grundbegriffe paralleler Architekturen und die Konzepte ihrer Programmierung. Sie analysieren verschiedene Architekturen von Höchstleistungsrechnern und differenzierenzwischen verschiedene Typen anhand von Beispielen aus der Vergangenheit und Gegenwart.
Studierende analysieren Methoden und Techniken zum Entwurf, Bewertung und Optimierung paralleler Programme, die für den Einsatz in Alltags- oder industriellen Anwendungen geeignet sind und wenden diese an. Studierende können Probleme im Bereich der Parallelprogrammierung beschreiben, analysieren, und beurteilen.

Content
Die Vorlesung gibt eine Einführung in die Welt moderner Parallel- und Höchstleistungsrechner, des Supercomputings bzw. des High-Performance Computings (HPC) und die Programmierung dieser Systeme.

Zunächst werden allgemein und exemplarisch Parallelrechnersysteme vorgestellt und klassifiziert. Im Einzelnen wird auf speichergekoppelte und nachrichtengekoppelte System, Hybride System und Cluster sowie Vektorrechner eingegangen. Aktuelle Beispiele der leistungsfähigsten Supercomputer der Welt werden ebenso wie die Supercomputer am KIT kurz vorgestellt.

Im zweiten Teil wird auf die Programmierung solcher Parallelrechner, die notwendigen Programmierparadigmen und Synchronisationsmechanismen, die Grundlagen paralleler Software sowie den Entwurf paralleler Programme eingegangen. Eine Einführung in die heute üblichen Methoden der parallelen Programmierung mit OpenMP und MPI runden die Veranstaltung ab.

Workload
120 h / Semester, davon 30 h Präsenzzeit und 90 h Selbstlernen aufgrund der Komplexitätdes Stoffs

Literature

1. David E. Culler, Jaswinder Pal Singh, Anoop Gupta: "Parallel computer architecture: a hardware, software approach", Morgan Kaufmann, 1999, ISBN 1-55860-343-3
2. Theo Ungerer: „Parallelrechner und parallele Programmierung", Spektrum Verlag, 1997, ISB: 3-8274-0231-X
3. John L. Hennessy, David A. Patterson: "Computer architecture: a quantitative approach (4. edition)", Elsevier, 2007, ISBN 0-12-370490-1, 978-0-12-370490-0
4. Kai Hwang, Zhiwei Xu: "Scalable parallel computing: technology, architecture, programming", McGraw-Hill, 1998, ISBN 0-07-031798-4
5. William Gropp, Ewing Lusk, Anthony Skjellum: "Using MPI: portable parallel programming with the message-passing interface (2. edition)", MIT Press, 1999, ISBN 0-262-57132-3, 0-262-57134-X

6. Barbara Chapman, Gabriele Jost, Ruud van der Pas: “Using OpenMP: portable shared memory parallel programming”, MIT Press, 2008, ISBN 0-262-53302-2, 978-0-262-53302-7

T Course: Parametric Optimization [T-WIWI-102855]

Responsibility: Oliver Stein
Contained in: [M-WIWI-101473] Mathematical Programming
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

Conditions
None

Recommendations
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Remarks
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T Course: Patent Law [T-INFO-101310]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101215] Intellectual Property Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24656	Patent Law	Vorlesung (V)	2	Matthias Koch

V Event excerpt: Patent Law (SS 2018)

Aim
Ziel der Vorlesung ist es, den Studenten aufbauend auf der Überblicksvorlesung *Gewerblicher Rechtsschutz und Urheberrecht* vertiefte Kenntnisse auf dem Rechtsgebiet des Patentrechts und des Business mit technischem IP zu verschaffen. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen und den rechtspolitischen Anliegen, auf dem Gebiet des technischen IP, insbesondere auf dem Gebiet der Informations- und Kommunikationstechnik kennen lernen. Sie sollen die Regelungen des nationalen, europäischen und internationalen Patentrechts, des Know-How-Schutzes kennen lernen und auf praktische Sachverhalte anwenden, insbesondere für die Nutzung von technischem IP durch Verträge und Gerichtsverfahren. Der Konflikt zwischen dem MonopolPatent und der Politik der Europäischen Kartellrechtsverwaltung wird mit den Studenten erörtert.

Content
Die Vorlesung befasst sich mit dem Recht und den Gegenständen des technischen IP, insbesondere Erfindungen, Patente, Gebrauchsmuster, Geschmacksmuster, Know-How, den Rechten und Pflichten von Arbeitnehmererfindern als Schöpfern von technischem IP, der Lizenzierung, den Beschränkungen und Ausnahmen der Patentierbarkeit, der Schutzdauer, der Durchsetzung der Rechte und der Verteidigung gegen solche Rechte in Nichtigkeits- und Löschungsverfahren. Gegenstand der Vorlesung ist nicht allein das deutsche, sondern auch das amerikanische und das europäische und das internationale Patentrecht. Die Studenten sollen die Zusammenhänge zwischen den wirtschaftlichen Hintergründen, den rechtspolitischen Anliegen bei technischem IP, insbesondere bei der Informations- und Kommunikationstechnik, und dem rechtlichen Regelungsrahmen erkennen und auf praktische Sachverhalte anwenden, insbesondere für die Nutzung von technischem IP durch Verträge und Gerichtsverfahren. Der Konflikt zwischen dem MonopolPatent und der Politik der Europäischen Kartellrechtsverwaltung wird mit den Studenten erörtert.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

T Course: Pattern Recognition [T-INFO-101362]

Responsibility: Jürgen Beyerer
Contained in: [M-INFO-101238] Automated visual inspection
[M-INFO-101241] Image-based detection and classification
[M-INFO-101239] Machine Vision
[M-INFO-101240] Automated Planning and Decision-making
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24675	Pattern Recognition	Vorlesung (V)	2	Jürgen Beyerer

V Event excerpt: Pattern Recognition (SS 2018)

Aim

- Students have a sound knowledge for the selection, construction, and properties of features which are useful for the characterization of objects that have to be classified. Students know how feature space can be explored, how features can be transformed and how distances in feature space can be calculated. Students master feature normalization and the construction of features. Additionally, students know techniques to reduce the dimensionality of the feature space.
- Students have a sound knowledge for the selection and adaptation of appropriate classifiers for different tasks. They know Bayesian decision theory, parameter estimation and parameter-free methods, linear discriminance functions, support vector machines and matched filters. In addition they know how to do classification with nominal features.
- Students are in the position to solve pattern recognition problems, considering the efficiency of classifiers and interrelations of the processing chain object - pattern - features – classifier. Students know general principles for classifier performance evaluation as well as boosting.

Content
Features:

- types of features
- exploration of the feature space
- transformation of the features
- distance measures within the feature space
- normalization of features
- selection and construction of features
- reduction of the dimension of the feature space

Classifiers:

- Bayesian decision theory
- parameter estimation
- parameter free methods
- linear classifiers
- support vector machine
- template matching, matched filter
- classification with rejection
- classification with regard to nominal features

General principles:

- Vapnik-Chervonenkis theory
- evaluation of classifiers
- boosting

Workload
Gesamt: ca. 90h, davon
1. Präsenzzeit in Vorlesungen: 20h
2. Vor-/Nachbereitung derselbigen: 20h
3. Prüfungsvorbereitung und Präsenz in selbiger: 50h

Literature
Weiterführende Literatur
- Richard O. Duda, Peter E. Hart, Stork G. David. Pattern Classification. Wiley-Interscience, second edition, 2001
- K. Fukunaga. Introduction to Statistical Pattern Recognition. Academic Press, second edition, 1997
- R. Hoffman. Signalanalyse und -erkennung. Springer, 1998
- H. Niemann. Pattern analysis and understanding. Springer, second edition, 1990
- J. Schürmann. Pattern classification. Wiley & Sons, 1996
- S. Theodoridis, K. Koutroumbas. Pattern recognition. London: Academic, 2003
- V. N. Vapnik. The nature of statistical learning theory. Springer, second edition, 2000

T Course: Personalization and Services [T-WIWI-102848]

Responsibility: Andreas Sonnenbichler
Contained in: [M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101410] Business & Service Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540533	Personalization & Services	Vorlesung (V)	2	Andreas Sonnenbichler
WS 18/19	2540534	Exercise Personalization & Services	Übung (Ü)	1	Andreas Sonnenbichler

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

Conditions
None

Recommendations
None

V Event excerpt: Personalization & Services (WS 18/19)

Aim
The student

- knows the options and opportunities of personalization, especially in the area of Internet based services
- knows important methods for authentication, authorization, and accounting
- can use these methods practically in internet-based services.

Content

- Personalization of Services and Applications
- User Modeling
- User Profiles
- Authentification
- Authorization
- Applications in e-Commerce and for internet-based Services
- Personalized Web Search
- Privacy

Workload
The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
The course follows latest scientific papers. References to these papers are listed at the end of each course unit.

T Course: Photorealistic Rendering [T-INFO-101268]

Responsibility: Carsten Dachsbacher
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24682		Vorlesung (V)	2	Johannes Schudeiske

V Event excerpt: (SS 2018)

Aim
Die Studierenden verstehen Algorithmen und Verfahren zur Erzeugung realistischer Bilder (z.B. Reflexionsmodelle, Lichttransportsimulation, Monte Carlo Methoden), können diese analysieren und beurteilen, und können geeignete Rendering-Verfahren für einen gegebenen Einsatzzweck auswählen und implementieren.

Content
Algorithmen und Verfahren der Computergrafik für die Erzeugung fotorealistischer Bilder. Themen sind unter anderem: globale Beleuchtung und Lichttransportphänomene, Path Tracing, Photon Mapping, Radiometrie, BRDFs, Radiosity, Monte Carlo Verfahren und Importance Sampling.

T Course: Planning and Management of Industrial Plants [T-WIWI-102631]

Responsibility: Frank Schultmann
Contained in: [M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581952	Planning and Management of Industrial Plants	Vorlesung (V)	2	Simon Glöser-Chahoud
WS 18/19	2581953		Übung (Ü)	2	Sonja Rosenberg, Carmen Schiel

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: Planning and Management of Industrial Plants (WS 18/19)

Aim

- Students shall be able to describe the tasks of plant management.
- Students shall be proficient in using selected methods of investment and cost estimates.
- Students shall be able to consider necessary processing and logistical requirements of designing industrial plants.
- Students shall be able to discuss interdependencies between capacity planning, process design and plant optimization.
- Students shall be proficient in discussing and applying selected methods of quality management, plant maintenance and plant dismantling.

Content
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.
During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

Workload
Total effort required will account for approximately 165h (5.5 credits).

Literature
will be announced in the course

T Course: Portfolio and Asset Liability Management [T-WIWI-103128]

Responsibility: Mher Safarian
Contained in: [M-WIWI-101639] Econometrics and Statistics II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2520357	Portfolio and Asset Liability Management	Vorlesung (V)	2	Mher Safarian
SS 2018	2520358		Übung (Ü)	2	Mher Safarian

Learning Control / Examinations
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Conditions
None

V Event excerpt: Portfolio and Asset Liability Management (SS 2018)

Aim
Introduction and deepening of various portfolio management techniques in the financial industry.

Content
Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment
Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

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

Literature
To be announced in lecture.
Elective literature:
To be announced in lecture.

T Course: Practical Course Computer Vision for Human-Computer Interaction [T-INFO-105943]

Responsibility: Rainer Stiefelhagen
Contained in: [M-INFO-101239] Machine Vision
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24893	Practical Course Computer Vision for Human-Computer Interaction	Praktikum (P)	2	Monica-Laura Haurilet, Daniel Koester, Rainer Stiefelhagen

V Event excerpt: Practical Course Computer Vision for Human-Computer Interaction (SS 2018)

Aim
Die Studierenden erwerben praktische Erfahrungen in Methoden der Computer Vision im Anwendungsfeld Mensch-Maschine-Interaktion. Zu diesem Zweck sollen sie die grundlegenden Konzepte der Computer Vision verstehen und deren Anwendung erlernen, in Gruppenarbeit ein Computer Vision System aufbauen, Lösungen zu den entstehenden praktischen Problemen erarbeiten und am Schluss die entwickelten Komponenten evaluieren.
Darüber hinaus sollen die Studierenden erste Erfahrungen darin sammeln, den notwendigen Zeitaufwand der einzelnen Entwicklungsschritte einzuschätzen. Ferner soll durch die Arbeit in einer Gruppe und die abschließende Präsentation die Fähigkeit der Studierenden gefördert werden, die eigene Arbeit und die erzielten Ergebnisse der Gruppe zu präsentieren.

Content
Da in diesem Projektpraktikum praxistaugliche Systeme entwickelt werden sollen, setzen wir einen Fokus auf die Realisierung von echtzeitfähigen, interaktiven Systemen, die im Idealfall in realistischen Umgebungen getestet werden sollen. Da in diesem Kontext häufig Probleme auftreten, die in den Vorlesungen nicht vermittelt werden können, bildet die eigene Erfahrung im Umgang mit praktischen Problemen einen wichtigen Bestandteil der Veranstaltung.
Zur Realisierung können verschiedenste Sensoren benutzt werden, von der einfachen WebCam über GoPros bis hin zu tragbaren HMD Kameras. Diese ermöglichen es, mit Hilfe von Computer Vision Algorithmen die Umgebung wahrzunehmen und dem Träger z.B. in Mensch zu Mensch Interaktionen zu helfen oder sich in seiner Umgebung zurechtzufinden. Zur Übermittlung dieser Informationen an den Träger eines solchen Systems werden in der Regel akustische oder haptische Signale verwendet, auch dies ist im Rahmen des Praktikums erwünscht, jedoch nicht zwingend erforderlich.

Workload

- wöchentliches Gruppentreffen mit den Betreuern (ca. 1-1,5h)
- wöchentliche Vor-/Nachbereitung der Projektarbeit mit der Gruppe
- Vorbereitung der Abschlusspräsentation

T Course: Practical Course Database Systems [T-INFO-103201]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Studienleistung	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24286		Praktikum (P)	2	Klemens Böhm, Martin Schäler

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-101497] *Database Systems* must have been passed.

V Event excerpt: (WS 18/19)

Aim
Im Praktikum soll das aus Vorlesungen wie "Datenbanksysteme" und "Datenbankeinsatz" erlernte Wissen in die Praxis umgesetzt werden. Dabei geht es vor allem um Anwendungsprogrammierung mit Datenbanksystemen, Benutzung interaktiver Anfragesprachen, sowie um Datenbankentwurf. Darüber hinaus sollen die Studenten lernen, im Team zusammenzuarbeiten, um die einzelnen Versuche erfolgreich zu absolvieren.

Content
Das Datenbankpraktikum bietet Studierenden den praktischen Einsatz von Datenbanksystemen in Ergänzung zu den unterscchiedlichen Vorlesungen kennenzulernen. Die Teilnehmer werden in ausgewählten Versuchen mit kommerzieller (objekt-)relationaler sowie XML Datenbanktechnologie vertraut gemacht. Darüber hinaus können sie Datenbankentwurf an praktischen Beispielen erproben. Im Einzelnen stehen folgende Versuche auf dem Programm:

- Zugriff auf Datenbanken, auch aus Anwendungsprogrammen heraus,
- Verwaltung von Datenbeständen mit nicht konventioneller Datenbanktechnologie,
- Performanceoptimierungen bei der Anfragebearbeitung,
- Datenbank-Entwurf.

Arbeiten im Team ist ein weiterer wichtiger Aspekt bei allen Versuchen.

Workload
Jeder Leistungspunkt (Credit) entspricht ca. 25-30h Arbeitsaufwand (des Studierenden). Hierbei ist vom durchschnittlichen Studierenden auszugehen, der eine durchschnittliche Leistung erreicht. Unter den Arbeitsaufwand fallen (für eine Vorlesung)
1. Präsenzzeit in Vorlesungen, Übungen
2. Vor-/Nachbereitung derselbigen
3. Klausurvorbereitung und Präsenz in selbiger.

T Course: Practical Course Protocol Engineering [T-INFO-104386]

Responsibility: Martina Zitterbart
Contained in: [M-INFO-101206] Networking
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400086	Protocol Engineering	Praktikum (P)	4	Robert Bauer, Polina Holzmann, Martina Zitterbart

V Event excerpt: Protocol Engineering (WS 18/19)

Aim
Der/Die Studierende kennt den Prozess der Standardisierung von Internetprotokollen und wendet dieses Wissen an, um ein neues Internetprotokoll in Gruppenarbeit zu entwerfen. Hierbei bewertet der/die Studierende verschiedene Herangehensweisen. In der Diskussion mit den weiteren Teilnehmern, wählen diese gemeinsam passende Lösungen aus. Hierbei wendet der/die Studierende die theoretischen Grundkenntnisse aus der LV Telematik [24128] in der Praxis an und vertieft somit die erlernten Konzepte.

Content
Das semesterbegleitende Projekt behandelt die Standardisierung eines Internetprotokolls. Diese gliedert sich in Entwurf, Spezifikation, Implementierung und Interoperabilitätstest.

Workload
4 ETCS:
Präsenzzeit / Treffen in Groß- und Kleingruppen: 30h
Konzeption + Spezifikation: 20h
Implementierung: 40h
Präsentation: 10h
Interoparabilitätstest + Nachbereitung: 10h

T Course: Practical course: Geometric Modeling [T-INFO-103207]

Responsibility: Hartmut Prautzsch
Contained in: [M-INFO-101214] Algorithms in Computer Graphics
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400024		Praktikum (P)		Hamid Mir-Mohammad-Sadeghi, Hartmut Prautzsch

T Course: Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data [T-INFO-106219]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Unregelmäßig	Studienleistung	1

T Course: Practical Course: Smart Data Analytics [T-INFO-106426]

Responsibility: Michael Beigl
Contained in: [M-INFO-103235] Practical Course: Smart Data Analytics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24895	Practical Course: Smart Data Analytics	Praktikum (P)	4	Michael Beigl, Erik Pescara, Ploylearn Ravivanpong, Till Riedel

V Event excerpt: Practical Course: Smart Data Analytics (SS 2018)

Aim
Nach Abschluss des Praktikums können die Studierenden

- neue kontextsensitive Systeme unter Einsatz existierender "IoT", "Machine Learning" und "Big Data"-Komponenten implementieren
- existierende Komponenten und Algorithmen im Bereich Maschine Learning, Data Mining und Big Data auswählen und anpassen
- Datensätze aufbereiten und hierzu geeignete Verfahren identifizieren
- durch Experimente verschiedene Verfahren und Parametrisierungen bewerten und vergleichen
- durch Analyse der experimentellen Ergebnissen Verfahren und Verarbeitungsketten anwendungsspezifisch verbessern
- explorative Konzepte der Smart Data Innovation als "Data Analyst" bzw. "Data Scientist" selbständig anwenden

Content
Kontextsensitivität wird oftmals als Schlüsselkomponente intelligenter Software bezeichnet. Systeme, die den Kontext ihrer Nutzer erkennen und verarbeiten können, können Dienste optimal und idealerweise ohne explizite Eingaben der Nutzer erbringen (siehe auch Beschreibung zur Vorlesung 24658)
Im Praktikum werden Techniken, Methoden und Software der Kontexterfassung und -verarbeitung als Basis von Smart Data Analytics vertieft. Im Fokus steht vorallem die im Smart Data Innovation Lab verwendete Hardware und Software (industriell genutzte Systeme wie SAP HANA und SAP HANA Vora, IBM SPSS und Big Insights, Software AG Terracotta und Apama aber auch insbesodere Open Source Software zur Datenanalyse wie Jupyther/iPython Notebooks und scikit-learn).
Die praktischen Aufgaben finden im Umfeld aktueller wissenschaftlicher Arbeiten sowie aktueller Plattformen und Technologien statt. Das Praktikum ist forschungsorientiert und orientiert sich thematisch an aktuellen Projekte am Smart Data Innovation Lab am KIT. Dabei sollen insbesondere Einblicke in aktuelle Problemstellungen in der industriellen Anwendung gewährt werden. Ziel ist es auf Basis von konkreten Anwendungsbeispielen in Gruppen innovative, effiziente und praxisorientierte Lösungsansätze zu erarbeiten und als technologische Demonstratoren wissenschaftlich zu präsentieren.
Die Teilnehmerinnen und Teilnehmer werden bei der Durchführung von den wissenschaftlichen Mitarbeiterinnen und Mitarbeitern unterstützt und erhalten Zugang zu den notwendigen Datenquellen und Großrechnern.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 180 Stunden (6.0 Credits).
Aktivität
Arbeitsaufwand
Präsenzzeit: Präsentation/Diskussion
15 x 45 min
11 h 15 min

Persönliche Nachbereitung der Folien/Aufgaben
15 x 30 min
7 h 30 min
Individuelle Präsentation eines für die Implementierung relevanten wiss. Artikels
30 h 0 min
Praktische Bearbeitung der Aufgaben in Gruppe und individuell
15 x 8h
120 h 0 min
Ergebnisse dokumentieren und für Präsentation aufbereiten
15 x 45 min
11 h 15min
SUMME
180 h 00 min
Arbeitsaufwand für die Lerneinheit " Praktikum: Kontextsensitive ubiquitäre Systeme"

T Course: Practical Course: Virtual Neurorobotics in the Human Brain Project [T-INFO-106417]

Responsibility: Rüdiger Dillmann
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Unregelmäßig	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2400044	Praktikum: Virtual Neurorobotics in the Human Brain Project	Praktikum (P)	2	Rüdiger Dillmann, Juan Camilo Vasquez Tieck

Recommendations
Previous visit of the lectures *Machine Learning* or *Cognitive* Systems is helpful but not mandatory.

V Event excerpt: Praktikum: Virtual Neurorobotics in the Human Brain Project (WS 18/19)

Aim
- Students understand the basic of neuroscience, neuro-robotics and neuro-informatics
- Students are able to model functional networks of artificial spiking neurons for robot control.
- They are familiar with neural and physical simulation environments (especially the simulator developed in the Human Brain Project) and can design and conduct scientific experiments within.

Workload
Die Erfolgskontrolle erfolgt in Form einer Prüfungsleistung anderer Art nach § 4 Abs. 2 Nr. 3 SPO. Es müssen eine schriftliche Ausarbeitung erstellt und eine Präsentation gehalten werden.
Ein Rücktritt ist innerhalb von zwei Wochen nach Vergabe des Themas möglich

T Course: Practical Course: Web Applications and Service-Oriented Architectures (II) [T-INFO-103121]

Responsibility: Sebastian Abeck
Contained in: [M-INFO-104061] Microservice-Based Web Applications

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24873	Practical Course: Web Applications and Service-Oriented Architectures (II)	Praktikum (P)	2	Sebastian Abeck, Michael Schneider

V Event excerpt: Practical Course: Web Applications and Service-Oriented Architectures (II) (SS 2018)

Aim

- Die Studierenden können den Einsatz von Web-Technologien am Beispiel einer serviceorientierten Web-Anwendung nachvollziehen und bewerten (Verstehen, Anwenden, Analysieren).
- Die Studierenden können Analyse-Werkzeuge einsetzen, durch die sie die Qualität gewisser Service-Eigenschaften einer Web-Anwendung auf der Grundlage von Metriken bestimmen können (Anwenden, Beurteilen).

Content
Im Praktikum wird eine individuelle Projektaufgabe gestellt, die vom Studierenden unter Nutzung der in der Vorlesung "Web-Anwendungen und Serviceorientierte Architekturen (I und II)" behandelten Konzepte in einem Projektteam zu lösen ist.

Workload
120h
Präsenzzeit (Projektteamtreffen) 22,5 (15 x 1,5)
Nacharbeit der Projektteamtreffen (Ergebnisprotokoll) 7,5 (15 x 0,5)
Entwicklungsarbeiten, praktische Experimente 45 (15 x 3)
Ausarbeitung 45 (15 x 3)

Literature

- Anleitung der Forschungsgruppe zur Durchführung von Arbeiten im Projektteam
- Vorlesungsskript 'Advanced Web Applications'

Weiterführende Literatur
Literaturbestand des jeweiligen Projektteams

T Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

Responsibility: Wolf Fichtner, Alexander Mädche, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt

Contained in: [M-WIWI-102808] Digital Service Systems in Industry
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540554	Practical Seminar: Information Systems and Service Design	Seminar (S)	3	Alexander Mädche

Learning Control / Examinations
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Conditions
None

Recommendations
None

Remarks
New course title starting summer term 2017: "Practical Seminar Digital Service Systems".
The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

V Event excerpt: Practical Seminar: Information Systems and Service Design (SS 2018)

Aim
The students will:

- Explore a real-world digital service design challenge
- Learn and apply selected digital service design practices & tools
- Understand capabilities of state-of-the-art digital platforms and realize a digital service prototype

Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

T Course: Practical Seminar Knowledge Discovery [T-WIWI-102670]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-102827] Service Computing
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Semester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 of the Prüfungsordnung für Informationswirtschaft in form of an examination of the written seminar thesis, a presentation and a project. The final mark is based on the examination of the written seminar thesis and the project but can be upgraded or downgraded according to the quality of the presentation.

Conditions
None

Recommendations
Knowledge of algorithms in the area of knowledge discovery is assumed. Therefore it is recommended to attend the course [2511302] Knowledge Discovery beforehand.

T Course: Practical Seminar Service Innovation [T-WIWI-102799]

Responsibility: Gerhard Satzger
Contained in: [M-WIWI-102806] Service Innovation, Design & Engineering
[M-WIWI-101410] Business & Service Engineering
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.
The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-105774] *Practical Seminar: Digital Service Design* must not have been started.

Recommendations
Knowledge of Service Innovation Methods is assumed. Therefore it is recommended to attend the course Service Innovation [2540468] beforehand.

Remarks
Due to the project work, the number of participants is limited and participation requires knowledge about models, concepts and approaches that are taught in the Service Innovation lecture. Having taken the Service Innovation lecture or demonstrating equivalent knowledge is a prerequisite for participating in this Practical Seminar. Details for registration will be announced on the web pages for this course.
The seminar is not offered regularly.

T Course: Practical Seminar: Advanced Analytics [T-WIWI-108765]

Responsibility: Florian Glaser, Christof Weinhardt
Contained in: [M-WIWI-103118] Data Science: Data-Driven User Modeling
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Semester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The assessment consists of practical work in the field of crowd analytics, a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Conditions
None

Recommendations
At least one module offered by the institute should have been chosen before attending this seminar.

Remarks
The course is held in English. The course is not offered regularly.

Replaces
T-WIWI-106214

T Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

Responsibility: Alexander Mädche, Thomas Setzer, Christof Weinhardt
Contained in: [M-WIWI-103117] Data Science: Data-Driven Information Systems
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Semester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Conditions
None

Recommendations
At least one module offered by the institute should have been chosen before attending this seminar.

Remarks
The course is held in english. The course is not offered regularly.

T Course: Practical Seminar: Digital Service Design [T-WIWI-105774]

Responsibility: Norbert Koppenhagen, Alexander Mädche
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung anderer Art	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540554	Practical Seminar: Information Systems and Service Design	Seminar (S)	3	Alexander Mädche

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

Conditions
None.

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-102799] *Practical Seminar Service Innovation* must not have been started.
2. The course [T-WIWI-108437] *Practical Seminar: Information Systems and Service Design* must not have been started.

Recommendations
Attending the course „Digital Service Design“ is recommended, but not mandatory.

Remarks
The course is held in English.

V Event excerpt: Practical Seminar: Information Systems and Service Design (SS 2018)

Aim
The students will:

- Explore a real-world digital service design challenge
- Learn and apply selected digital service design practices & tools
- Understand capabilities of state-of-the-art digital platforms and realize a digital service prototype

Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

T Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102805] Service Operations
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Semester	Prüfungsleistung anderer Art	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550498	Practical seminar: Health Care Management	Veranstaltung (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: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]

Responsibility: Norbert Koppenhagen, Alexander Mädche
Contained in: [M-WIWI-104080] Designing Interactive Information Systems
[M-WIWI-102806] Service Innovation, Design & Engineering
[M-WIWI-104068] Information Systems in Organizations
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540554	Practical Seminar: Information Systems and Service Design	Seminar (S)	3	Alexander Mädche

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

Conditions
None.

Modeled Conditions
The following conditions must be met:

1. The course [T-WIWI-102799] *Practical Seminar Service Innovation* must not have been started.
2. The course [T-WIWI-105774] *Practical Seminar: Digital Service Design* must not have been started.

Recommendations
Attending the course „Digital Service Design“ is recommended, but not mandatory.

Remarks
The course is held in English.

V Event excerpt: Practical Seminar: Information Systems and Service Design (SS 2018)

Aim
The students will:

- Explore a real-world digital service design challenge
- Learn and apply selected digital service design practices & tools
- Understand capabilities of state-of-the-art digital platforms and realize a digital service prototype

Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

T Course: Practical: Course Analysis of Complex Data Sets [T-INFO-105796]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101256] Theory and Practice of Data Warehousing and Mining
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Unregelmäßig	Studienleistung	1

T Course: Predictive Mechanism and Market Design [T-WIWI-102862]

Responsibility: Johannes Philipp Reiß
Contained in: [M-WIWI-101453] Applied Strategic Decisions
[M-WIWI-101505] Experimental Economics
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Remarks
The course is given every second fall term, e.g., WS2017/18, WS2019/20, ...
The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.

T Course: Price Management [T-WIWI-105946]

Responsibility: Andreas Geyer-Schulz, Paul Glenn
Contained in: [M-WIWI-101409] Electronic Markets
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540529	Price Management	Vorlesung (V)	2	Paul Glenn
SS 2018	2540530	Exercise Price Management	Übung (Ü)	1	Paul Glenn

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively.
The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

Conditions
None

Recommendations
None

Remarks
The lecture is offered for the first time in summer term 2016.

V Event excerpt: Price Management (SS 2018)

Aim
Students

- know the conceptual and methodic basics of price management (price-sales function, price elasticity and adequate measurement, estimation and optimization techniques)
- know pricing strategies and the managerial instruments of price management (including price communication, enforcement and control)

- know methods of price formation in complex environments (product-spanning price optimization, bundling, services and solutions) and can make use of them
- know and understand pricing processes and the involved pricing department(s) in firms
- know and understand special topics in price management (pricing on the internet, yield management and international price management)
- know the regulatory framework of European competition law

Content

1. Introduction to Price Management
2. Pricing Strategies
3. Information Base for Pricing in Price Management
4. Price-Sales Function, Price Elasticity and Survey Methods
5. Procedure of the Price Formation and innovative Pricing-Models
6. Willingness of Payment, Value, Methods of Measuring Value and Value-Based Pricing
7. Behavioural Science and Psychology of Prices
8. Multidimensional Pricing and Price Differentiation
9. Product-Spanning Price Optimisation and Bundling
10. B2B and B2C Pricing
11. Price Management for Services and Solutions
12. Excursion: Pricing-Tools, Professional Software for Pricing
13. Enforcing Prices, Discounting and Systems of Terms and Conditions
14. Communication of Prices, Price Adjustments and Controlling
15. International Pricing and Global Price Management
16. Pricing and Competition Law
17. Organisational Forms of Pricing, Processes, Development Paths, and Change Management in Enterprises

Workload
The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature

- H. Simon and M. Fassnacht, *Preismanagement*, vol. 4. Wiesbaden: Springer Gabler, 2016.
- T. T. Nagle, J. E. Hogan, and J. Zalee, *The Strategy and Tactics of Pricing: A guide to growing more profitably*. New Jersey: Prentice Hall, 2010.

T Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

Responsibility: Martin Klarmann, Mark Schröder
Contained in: [M-WIWI-101487] Sales Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	deutsch	Jedes Wintersemester	Prüfungsleistung anderer Art	3

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2572198	Price Negotiation and Sales Presentations	Block (B)	1	Martin Klarmann, Mark Schröder

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a presentation with a subsequent discussion totalling 25 minutes. Moreover learning contents are checked by realistic 30-minute price negotiations.

Conditions
None

Recommendations
None

Remarks
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu).
Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).
Please note that only one of the following courses can be attended in the Sales Management module: Country Manager Simulation, Case Studies in Sales and Pricing, Price Negotiation and Sales Presentations or Digital Marketing and Sales in B2B.

V Event excerpt: Price Negotiation and Sales Presentations (WS 18/19)

Aim
Students

- gain a clear impression of the theoretical knowledge about price negotiations and sales presentations
- improve their own negotiation abilities

Content
At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
None

T Course: Pricing [T-WIWI-102883]

Responsibility: Sven Feurer
Contained in: [M-WIWI-101489] Strategy, Communication, and Data Analysis
[M-WIWI-101487] Sales Management
[M-WIWI-101490] Marketing Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2572157	Pricing	Vorlesung (V)	2	Sven Feurer
WS 18/19	2572169		Übung (Ü)	1	Wiebke Klingemann

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
None

V Event excerpt: Pricing (WS 18/19)

Aim
See German version.

Content
This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

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

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.
Simon, Hermann, Fassnacht, Martin (2008), Preismanagement, 3. Aufl., Wiesbaden.

T Course: Principles of Information Engineering and Management [T-WIWI-102638]

Responsibility: Timm Teubner, Christof Weinhardt
Contained in: [M-WIWI-101443] Information Engineering and Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540450	Principles of Information Engineering and Management	Vorlesung (V)	2	Christof Weinhardt
WS 18/19	2540451		Übung (Ü)	1	Dominik Jung

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
None

V Event excerpt: Principles of Information Engineering and Management (WS 18/19)

Aim
The students should be able to understand and analyze the central role of information as an economic good, a production factor, and a competitive factor in today's societies. Students are supposed to be able to identify, evaluate, price, and market information goods with the help of the concepts and methods taught in the lecture. Furthermore, students learn basic aspects about information systems and information flows within and between organizations, as well as their design parameters.

Content
Information plays a central role in today's society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the "information lifecycle" that systematizes all phases from information generation to information distribution. The single phases of that cycle,

- extraction/generation,
- storage,
- transformation,
- evaluation,
- marketing
- and usage of information

are analyzed from the business administration perspective and the microeconomic perspective. The state of the art of economic theory is presented across this information lifecycle within the lectures. The content of the lecture is deepened in accompanying lecture courses.

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

Literature

- Shapiro, C., Varian, H., Information Rules: A Strategic Guide to the Network Economy. Harvard Business School Press 1999.

- Stahlknecht, P., Hasenkamp, U., Einführung in die Wirtschaftsinformatik. Springer Verlag 7. Auflage, 1999.
- Wirth, H., Electronic Business. Gabler Verlag 2001.

T Course: Principles of Insurance Management [T-WIWI-102603]

Responsibility: Ute Werner
Contained in: [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung mündlich	1

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).
The examination will be offered latest until summer term 2017 (beginners only).

Conditions
None

Recommendations
None

T Course: Probabilistic Planning [T-INFO-101277]

Responsibility: Marco Huber
Contained in: [M-INFO-101240] Automated Planning and Decision-making
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
6	Jedes Wintersemester	Prüfungsleistung mündlich	1

T Course: Product and Innovation Management [T-WIWI-102812]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101490] Marketing Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2571154	Product and Innovation Marketing	Vorlesung (V)	2	Sven Feurer

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Remarks
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

V Event excerpt: Product and Innovation Marketing (SS 2018)

Aim
See German version.

Content
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Homburg, Christian (2012), Marketingmanagement, 4. Aufl., Wiesbaden.

T Course: Production and Logistics Management [T-WIWI-102632]

Responsibility: Frank Schultmann
Contained in: [M-WIWI-101412] Industrial Production III
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581954	Production and Logistics Management	Vorlesung (V)	2	Simon Glöser-Chahoud
SS 2018	2581955		Übung (Ü)	2	Andreas Rudi, Tobias Zimmer

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: Production and Logistics Management (SS 2018)

Aim

- Students discuss the basic tasks of an operative production and logistics management.
- Students discuss approaches to solve these tasks and shall be able to apply certain ones.
- Students explain the interdependencies between the tasks and methods to solve.
- Students discuss possible IT tools for production and logistics management.
- Students describe emerging trends in production and logistics management.

Content
This course covers central tasks and challenges of operational production and logistics management. Systems analytically, central planning tasks are discussed. Exemplary solution approaches for these tasks are presented. Further practical approaches are explained. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in Supply Chain Management.

Workload
Total effort required will account for approximately 165h (5.5 credits).

Literature
will be announced in the course

T Course: Programming Internship: Solving Computational Risk and Asset Management Problems [T-WIWI-103110]

Responsibility: Maxim Ulrich
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
There are weekly learning controls in the form of weekly programming problem sets. During the first three weeks, problem sets are voluntary to set expectations on the workload and degree of difficulty that is to be expected. Starting in week 4, all weekly problem sets are part of the course wide exam. The final course grade coincides with the equal weighted average across all weekly programming problem sets (starting in week 4). It is planned that programming problem sets can be solved in a group of 2 students. Every student has to submit his own solution and must document for which part of the solution he has been responsible (to satisfy KIT exam regulations). More information will be shared at the first day of class.

Conditions
The lecture Computational Risk and Asset Management has to be attended in the same semester.

Recommendations
None

Remarks
New course starting winter term 2015/16.

T Course: Project Management [T-WIWI-103134]

Responsibility: Frank Schultmann
Contained in: [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581963	Project Management	Vorlesung (V)	2	Felix Hübner, Carmen Schiel, Frank Schultmann, Kira Schumacher, Rebekka Volk, Marcus Wiens
WS 18/19	2581964		Übung (Ü)	1	Felix Hübner, Carmen Schiel, Kira Schumacher, Rebekka Volk, Marcus Wiens

Learning Control / Examinations
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: Project Management (WS 18/19)

Aim
The students get to know the context, rationale, strategy and tactics of project management with emphasis on the importance of project planning and project control and by identifying and examining project phases. The students discuss various approaches and standards of project management. They explain the iterative processes and the core skills required by successful project managers. The context and learning of the course enable the participants to apply project management skills to projects in a variety of industries including engineering, information technology, consulting, production, procurement, maintenance, logistics and supply chain, construction, and manufacturing. By focussing on providing knowledge in core areas of scope, time, cost and quality, and facilitating areas of risk, procurement, HR, integration, and communication management, the participants are able to confidently deal with the ever growing complexities and challenges of project management.

Content

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management

8. Stakeholder
9. Communication, Negotiation and Leadership
10. Project Controlling

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course

T Course: Project Management in Practice [T-INFO-101976]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	deutsch	Unregelmäßig	Studienleistung	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400019	Project Management in Practice	Vorlesung (V)	2	Klemens Böhm, Wolfgang Schnober

V Event excerpt: Project Management in Practice (SS 2018)

Aim
At the end of the course, the participants:

- Know the principles of project management and are able to make use of them in real-world case studies.
- Have profound knowledge about project phases, principles of project planning, fundamental elements such as project charter & scope definitions, descriptions of project goals, acitvity planning, milestones, project-structure plans, agenda and cost planning and risk management. Further, they know principle elements of project implementation, crisis management, escalation and, last but not least , project-termination activities.
- Understand and are able to adopt the fundamentals of planning as well as the subjective factors which are relevant in a project. This includes topics such as communication, group processes, teambuilding, leadership, creative solution methods and risk-assessment methods.

The following key skills are taught:

- Project planning
- Project control
- Communication
- Leadership behavior
- Crisis management
- Identification of and solutions of difficult situations
- Team building
- Motivation (of oneself and of others)

Content

- General project conditions
- Project goals / creative methods for identifying project goals and priorities
- Project planning
- Activity planning
- Cost/time/resource planning
- Phase models
- Risk management
- Project control / success control / monitoring
- Crisis management
- Project termination / lessons learned

Workload
Präsenzzeit: 3 x 8h = 24h
Einarbeitung: 3 x 2h = 6h

Summe: 30h

T Course: Provable Security in Cryptography [T-INFO-101259]

Responsibility: Dennis Hofheinz
Contained in: [M-INFO-101198] Advanced Topics in Cryptography
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24166	Provable Security in Cryptography	Vorlesung (V)	2	Andy Rupp

V Event excerpt: Provable Security in Cryptography (SS 2018)

Aim
The student

- knows the foundations of the security analysis of cryptographic systems that offer provable security guarantees
- understands and explains cryptographically desirable and provable security guarantees of cryptographic systems,
- understands and explains examples of provably secure cryptographic systems

Content
When is an encryption scheme secure? What type of security is guaranteed by a digital signature scheme? How can secure cryptographic systems be constructed? These and more questions are the topic of this lecture. We put particular emphasis on concrete examples: we will present several cryptographic schemes (such as encryption schemes) and analyze their security properties. In this, the notion of a security proof will play a central role. We endeavour to find mathematical proofs that a given system achieves certain desirable properties under well-defined complexity-theoretic assumptions.

Workload

1. Präsenzzeit in Vorlesungen: 24 h
2. Vor-/Nachbereitung derselbigen: 16 h
3. Prüfungsvorbereitung und Präsenz in selbiger: 50 h

T Course: Public Management [T-WIWI-102740]

Responsibility: Berthold Wigger
Contained in: [M-WIWI-101504] Collective Decision Making
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2561127	Public Management	Vorlesung / Übung (VÜ)	3	Berthold Wigger

Learning Control / Examinations
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

Conditions
None

Recommendations
Basic knowledge of Public Finance is required.

V Event excerpt: Public Management (WS 18/19)

Aim
See German version.

Content
The lecture "Public Management" deals with the economic theory of public sector administration. It is divided into four parts. The first section gives an overview of the legal framework of governmental administration in the Federal Republic of Germany and introduces the classical theory of administration as developed by Weber. Part two studies concepts of public decision-making, which have a significant impact on the operation of public sector administrations and where one focus is on consistency problems of collective decision-making. The third chapter deals with efficiency problems arising in conventionally organized public administrations and companies. X-inefficiency, information and control problems, the isolated consideration of income-spending-relations as well as rent-seeking problems will be considered. In section four the concept of New Public Management, which is a new approach to public sector administration that is mainly based in contract theory, is introduced. Its foundations in institutional economics are developed, with a focus on the specific incentive structures in self-administered administrations. Finally, the achievements of New Public Management approaches are discussed.

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

Literature
Elective literature:

- Damkowski, W. and C. Precht (1995): Public Management; Kohlhammer
- Richter, R. and E.G. Furubotn (2003): Neue Institutionenökonomik; 3rd edition; Mohr
- Schedler, K. and I. Proeller (2003): New Public Management; 2nd edition; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2nd edition; Springer

T Course: Public Media Law [T-INFO-101311]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101217] Public Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24082	Public Media Law	Vorlesung (V)	2	Christian Kirchberg

V Event excerpt: Public Media Law (WS 18/19)

Aim
Die "neuen Medien" (online-Dienste bzw. Internet) sind genauso wie die herkömmlichen Medien (Presse, Rundfunk bzw. Fernsehen) in einen öffentlich-rechtlichen Ordnungsrahmen eingespannt, wenn auch mit unterschiedlicher Regelungsdichte sowie mit manifesten Auswirkungen auf die Privatrechtsordnung. Wesentliche Impulse erhält das Medienrecht insbesondere durch das Verfassungsrecht und das Europäische Gemeinschaftsrecht. Die Vorlesung will eine Übersicht über die Gemeinsamkeiten und Unterschiedlichkeiten der aktuellen Medienordnung und über die absehbaren Perspektiven der Kongruenz der Medien vermitteln. Aktuelle Entwicklungen der Tages- und Wirtschaftspolitik, die den Vorlesungsstoff berühren, werden zur Veranschaulichung des Vorlesungsstoffes in die Darstellung integriert. Darüber hinaus die Teilnahme an einschlägigen Gerichtsverhandlungen, insbesondere an einer solchen entweder des Bundesverfassungsgerichts und/oder des Bundesgerichtshofs, geplant.

Content
Die Vorlesung erläutert zunächst die verfassungsrechtlichen Grundlagen der geltenden Medienordnung, also einerseits die entsprechenden Zuständigkeitsverteilungen zwischen Bund und Ländern sowie andererseits die Meinungs- und Informationsfreiheit sowie die Mediengrundrechte des Art. 5 Abs. 1 GG und ihre Einschränkungen durch allgemeine Gesetze, das Zensurverbot und das Gegendarstellungsrecht. Ergänzt wird dieser Grundsatzabschnitt durch die Darstellung der gemeinschaftsrechtlichen Vorgaben der Rundfunk- und Medienordnung. Daran anschließend erfolgt ein Überblick über die Mediengesetze im Einzelnen, also im Bereich des Rundfunks (insbesondere: Rundfunkstaatsvertrag), des Presserechts (Landespressegesetze) und der sog. Telemedien (Telemediengesetz). Daran schließt sich die Darstellung des Jugendschutzes in den Medien nach Maßgabe des Jugendschutzgesetzes einerseits und des Jugendmedienschutz-Staatsvertrages andererseits an.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

Literature
Zum Verständnis der rechtlichen Grundlagen ist eine entsprechende Textsammlung erforderlich, z.B. 'Telemediarecht. Telekommunikations- und Multimediarecht', Beck-Texte im dtv, 7. Aufl. 2007.
Als Einführung und Studienliteratur wird empfohlen: Frank Fechner, Medienrecht, Verlag Mohr Siebek, 8. Aufl. 2007.

T Course: Quality Control I [T-WIWI-102728]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101657] Stochastic Modelling and Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	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-101657] Stochastic Modelling and Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	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: Quantitative Methods in Energy Economics [T-WIWI-107446]

Responsibility: Dogan Keles, Patrick Plötz
Contained in: [M-WIWI-101451] Energy Economics and Energy Markets
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581007	Quantitative Methods in Energy Economics	Vorlesung (V)	2	Dogan Keles, Patrick Plötz
WS 18/19	2581008		Übung (Ü)	1	Patrick Plötz

Learning Control / Examinations
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: Quantitative Methods in Energy Economics (WS 18/19)

Aim
The student

- knows and understands selected quantitative methods of energy economics
- is able to use selected quantitative methods of energy economics
- understands they range of usage, limits and is autonomously able to adress new problems by them.

Content
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
Wird in der Vorlesung bekannt gegeben.

T Course: Randomized Algorithms [T-INFO-101331]

Responsibility: Thomas Worsch
Contained in: [M-INFO-100794] Randomized Algorithms
[M-INFO-101200] Advanced Algorithms: Engineering and Applications
[M-INFO-101199] Advanced Algorithms: Design and Analysis
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24171	Randomized Algorithms	Vorlesung / Übung (VÜ)	3	Thomas Worsch

V Event excerpt: Randomized Algorithms (WS 18/19)

Aim
Die Studierenden kennen grundlegende Ansätze und Techniken für den Einsatz von Randomisierung in Algorithmen sowie Werkzeuge für deren Analyse.
Sie sind in der Lage, selbst typische Schwachstellen deterministischer Algorithmen zu identifizieren und randomisierte Ansätze zu deren Behebung zu entwickeln und zu beurteilen.

Content
Randomisierte Algorithmen sind nicht deterministisch. Ihr Verhalten hängt vom Ausgang von Zufallsexperimenten ab. Diese Idee wurde erstmals von Rabin durch einen randomisierten Primzahltest bekannt. Inzwischen gibt es für eine Vielzahl von Problemen randomisierte Algorithmen, die (in dem einen oder anderen Sinne) schneller sind als deterministische Verfahren. Außerdem sind randomisierte Algorithmen mitunter einfacher zu verstehen und zu implementieren als "normale" (deterministische) Algorithmen.

Im Rahmen der Vorlesung werden nicht nur verschiedene "Arten" randomisierter Algorithmen (Las Vegas, Monte Carlo, ...) vorgestellt, sondern auch die für die Analyse ihrer Laufzeit notwendigen wahrscheinlichkeitstheoretischen Grundlagen weitgehend erarbeitet und grundlegende Konzepte wie Markov-Ketten behandelt. Da stochastische Methoden in immer mehr Informatikbereichen von Bedeutung sind, ist diese Vorlesung daher auch über das eigentliche Thema hinaus von Nutzen.

Themen: probabilitische Komplexitätsklassen, Routing in Hyperwürfeln, Spieltheorie, Random Walks, randomisierte Graphalgorithmen, randomisiertes Hashing, randomisierte Online-Algorithmen

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).
\begin{tabular}{|l|c|r|}
\hline
Aktivität & & Arbeitsaufwand \\
\hline
\itshape Präsenzzeit & & \\
Besuch der Vorlesung & 15 x 90min & 22h 30m \\
\hline
Vor- / Nachbereitung der Vorlesung & 15 x 150min & 37h 30m \\
Skript 2x wiederholen & 2 x 12h & 24h 00m \\
Prüfung vorbereiten & & 36h 00m \\

\hline
Summe & & 120h 00m \\
\hline
\end{tabular}
\caption{Arbeitsaufwand für die Lerneinheit Randomisierte Algorithmen}

Literature

- J. Hromkovic : Randomisierte Algorithmen, Teubner, 2004
- M. Mitzenmacher, E. Upfal: Probability and Computing, Cambridge Univ. Press, 2005
- R. Motwani, P. Raghavan: Randomized Algorithms, Cambridge Univ. Press, 1995

Weiterführende Literatur

- E. Behrends: Introduction to Markov Chains, Vieweg, 2000
- A. Borodin, R. El-Yaniv: Online Computation and Competitive Analysis, Cambridge Univ. Press, 1998

T Course: Recommender Systems [T-WIWI-102847]

Responsibility: Andreas Geyer-Schulz
Contained in: [M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101410] Business & Service Engineering
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2540506	Recommender Systems	Vorlesung (V)	2	Andreas Geyer-Schulz
SS 2018	2540507	Exercise Recommender Systems	Übung (Ü)	1	Victoria-Anne Schweigert

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.
Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: <50

The grade consists of approximately 91% of exam points and 9% of exercise points.
Occasionally, it is possible to achieve an additional bonus of up to 3 points (e.g. in the context of experiments) which depends on performance. Note that this bonus is a purely voluntary additional achievement. Possibly gained bonus points are added to a passed exam within the current examination period.

Conditions
None

Recommendations
None

V Event excerpt: Recommender Systems (SS 2018)

Aim
The student

- is proficient in different statistical, data-mining, and game theory methods of computing implicit and explicit recommendations
- evaluates recommender systems and compares these with related services

Content
At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):
Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
Rakesh Agrawal, Tomasz Imielinski, and Arun Swami. Mining association rules between sets of items in large databases. In Sushil Jajodia Peter Buneman, editor, Proceedings of the ACM SIGMOD International Conference on Management of Data, volume 22, Washington, D.C., USA, Jun 1993. ACM, ACM Press.
Rakesh Agrawal and Ramakrishnan Srikant. Fast algorithms for mining association rules. In Proceedings of the 20th Very Large Databases Conference, Santiago, Chile, pages 487 – 499, Sep 1994.
Asim Ansari, Skander Essegaier, and Rajeev Kohli. Internet recommendation systems. Journal of Marketing Research, 37:363 – 375, Aug 2000.
Christopher Avery, Paul Resnick, and Richard Zweckhauser. The market for evaluations. American Economic Review, 89(3):564 – 584, 1999.
Ibrahim Cingil, Asuman Dogac, and Ayca Azgin. A Broader Approach to Personalization. Communications of the ACM, 43(8):136 – 141, Aug 2000.
Richard O. Duda, Peter E. Hart, and David G. Stork. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.
Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. A customer purchase incidence model applied to recommender services. In R. Kohavi et al., editor, Proceedings of the WebKDD 2001 – Mining log data across all customer touchpoints, volume 2356 of Lecture Notes in Artificial Intelligence LNAI, pages 25–47, Berlin, 2002. ACM, Springer-Verlag.
Jon M. Kleinberg. Authoritative sources in a hyperlinked environment. JACM, 46(5):604–632, sep 1999.
Joseph Konstan, Bradley Miller, David Maltz, Jonathan Herlocker, Lee Gordon, and John Riedl. Grouplens: Applying Collaborative Filtering to Usernet News. Communications of the ACM, 40(3):77 – 87, Mar 1997.
Paul Resnick, Neophytos Iacovou, Peter Bergstrom, and John Riedl. Grouplens: An open architecture for collaborative filtering of netnews. In Proceedings of the conference on Computer supported cooperative work, pages 175 – 186. ACM Press, 1994.
Elective literature:
Antoinette Alexander. The return of hardware: A necessary evil? Accounting Technology, 15(8):46 – 49, Sep 1999.
Christopher Avery and Richard Zeckhauser. Recommender systems for evaluating computer messages. Communications of the ACM, 40(3):88 – 89, Mar 1997.
Steven Bellman, Gerald Lohse, and Eric Johnson. Predictors of Online Buying Behavior. Communications of the ACM, 42(12):32 – 38, Dec 1999.
Thomas J. Blischok. Every transaction tells a story. Chain Store Age Executive with Shopping Center Age, 71(3):50–56, Mar 1995.
Hans Hermann Bock. Automatische Klassifikation. Vandenhoeck und Ruprecht, Göttingen, 1974.
Andrew S.C. Ehrenberg. Repeat-Buying: Facts, Theory and Applications. Charles Griffin & Company Ltd, London, 2 edition, 1988.
Wolfgang Gaul, Andreas Geyer-Schulz, Michael Hahsler, and Lars Schmidt-Thieme. eMarketing mittels Recommendersystemen. Marketing ZFP, 24:47 – 55, 2002.
Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. myvu: a next generation recommender system based on observed consumer behavior and interactive evolutionary algorithms. In W. Gaul, O. Opitz, and M. Schader, editors,

Data Analysis – Scientific Modeling and Practical Applications, volume 18 of Studies in Classification, Data Analysis and Knowledge Organization, pages 447 – 457, Heidelberg, Germany, 2000. Springer.
Andreas Geyer-Schulz, Michael Hahsler, and Maximillian Jahn. Educational and scientific recommender systems: Designing the information channels of the virtual university. International Journal of Engineering Education, 17(2):153 – 163, 2001.
Mark-Edward Grey. Recommendersysteme auf Basis linearer Regression, 2004.
John A. Hartigan. Clustering Algorithms. John Wiley and Sons, New York, 1975.
Kevin Kelly. New Rules for the New Economy: 10 Radical Strategies for a Connected World. Viking, 1998.
Taek-Hun Kim, Young-Suk Ryu, Seok-In Park, and Sung-Bong Yang. An improved recommendation algorithm in collaborative filtering. In K. Bauknecht, A. Min Tjoa, and G. Quirchmayr, editors, E-Commerce and Web Technologies, Third International Conference, Aix-en-Provence, France, volume 2455 of Lecture Notes in Computer Science, pages 254–261, Berlin, Sep 2002. Springer-Verlag.
Ron Kohavi, Brij Masand, Myra Spiliopoulou, and Jaideep Srivastava. Web mining. Data Mining and Knowledge Discovery, 6:5 – 8, 2002.
G. S. Maddala. Introduction to Econometrics. John Wiley, Chichester, 3 edition, 2001.
Andreas Mild and Martin Natter. Collaborative filtering or regression models for Internet recommendation systems? Journal of Targeting, Measurement and Analysis for Marketing, 10(4):304 – 313, Jan 2002.
Andreas Mild and Thomas Reutterer. An improved collaborative filtering approach for predicting cross-category purchases based on binary market basket data. Journal of Retailing & Consumer Services, 10(3):123–133, may 2003.
Paul Resnick and Hal R. Varian. Recommender Systems. Communications of the ACM, 40(3):56 – 58, Mar 1997.
Badrul M. Sarwar, Joseph A. Konstan, Al Borchers, Jon Herlocker, Brad Miller, and John Riedl. Using filtering agents to improve prediction quality in the grouplens research collaborative filtering system. In Proceedings of ACM Conference on Computer-Supported Cooperative Work, Social Filtering, Social Influences, pages 345 – 354, New York, 1998. ACM Press.
J. Ben Schafer, Joseph Konstan, and Jon Riedl. Recommender Systems in E-commerce. In Proceedings of the 1st ACM conference on Electronic commerce, pages 158 – 166, Denver, Colorado, USA, Nov 1999. ACM.
Upendra Shardanand and Patti Maes. Social information filtering: Algorithms for automating "word of mouth". In Proceedings of ACM SIGCHI, volume 1 of Papers: Using the Information of Others, pages 210 – 217. ACM, 1995.

T Course: Regulation Theory and Practice [T-WIWI-102712]

Responsibility: Kay Mitusch
Contained in: [M-WIWI-101451] Energy Economics and Energy Markets
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2560234	Regulation Theory and Practice	Vorlesung (V)		Kay Mitusch
SS 2018	2560235		Übung (Ü)		Cornelia Gremm

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

Conditions
None

Recommendations
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.
Particularly helpful but not necessary: Industrial Economics and Principal-Agent- or Contract theories. Prior attendance of the lecture*Competition in Networks* [26240] is helpful in any case but not considered a formal precondition.

V Event excerpt: Regulation Theory and Practice (SS 2018)

Aim
Students

- will learn the basic aims and possibilities as well as the problems and limits of regulation
- will achieve an understanding of regulation as an incentive system under severe problems of asymmetric information and corporate governance
- will be able to apply general formal methods to the practice of regulation.

The lecture is suited for all students who want to work in companies of the network sectors – or who would like to become active on the side of regulators or in the respective political areas

Content
The lecture begins with a short description about the history of regulation and its relation to competition policies. Then it turns to the aims, the possibilities and the practice of regulation which are presented and analyzed critically. This happens from both a theoretical (microeconomic modelling) perspective as well as from a practical perspective with the help of various examples.

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

Literature
Literature and lecture notes are handed out during the course.

T Course: Requirements Analysis and Requirements Management [T-WIWI-102759]

Responsibility: Ralf Kneuper
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Learning Control / Examinations
The course will no longer be available from winter semester 2018/2019.
The exam will be offered for the last time in the summer semester 2018 (only for repeaters).
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: Requirements Engineering [T-INFO-101300]

Responsibility: Anne Koziolek
Contained in: [M-INFO-101202] Software Methods
[M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Sommersemester	Prüfungsleistung mündlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400050	Requirements Engineering	Vorlesung (V)	2	Anne Koziolek
SS 2018	8030085		Klausur		Anne Koziolek

Recommendations
Das Modul Softwaretechnik II wird empfohlen.

V Event excerpt: Requirements Engineering (SS 2018)

Aim
Students have acquired basic knowledge and skills in the core methods, languages, processes, and practices in Requirements Engineering (RE). In particular, they acquired the following skills

They can name and describe the terms and concepts of RE, identify stakeholders of the RE process and system boundaries, analyse the context of a system, differentiate between analysis activities and design activities, evaluate risk and value of RE efforts, classify types of requirements, elicit requirements and document them in different forms (natural language, static models, behaviour models, user interaction models, goal models), as well as select and instantiate RE processes for a given software project

In addition, they know and understand the methods to validate requirements and the method to manage requirements.

Workload
Two SWS (1.5 hours) of lecture per week in 15 weeks plus ca. 15 hours preparation for the exam = 90h

Literature
The lecture is based on slides and works by Martin Glinz, which is why there is no book that accompanies the lecture. Students are welcome to discuss differences between the lecture and the content of the course in class.
Main suggestion: Pohl, K. (2010). Requirements Engineering: Fundamentals, Principles, and Techniques. Springer Verlag. (will be available in library)
Further reading:

- I. Alexander, R. Stevens (2002). Writing Better Requirements. London: Addison-Wesley.
- A. Davis (2005). Just Enough Requirements Management. New York: Dorset House.
- D.C. Gause, G.M. Weinberg (1989). Exploring Requirements: Quality before Design. New York: Dorset House.
- M. Glinz (2013). A Glossary of Requirements Engineering Terminology, Version 1.5. International Requirements Engineering Board (IREB). Originally published in 2011. Available at http://www.ireb.org (check-out CPRE Glossary)
- E. Gottesdiener (2002). Requirements by Collaboration: Workshops for Defining Needs. Boston: Addison-Wesley.
- M.A. Jackson (1995). Software Requirements and Specifications: A Lexicon of Practice, Principles and Prejudices. Addison-Wesley (ACM Press books): Wokingham, etc.
- A. van Lamsweerde (2009). Requirements Engineering: From System Goals to UML Models to Software Specifications. Chichester: John Wiley & Sons.

- S. Robertson, J. Robertson (2006). Mastering the Requirements Process. 2nd edition. Boston: Addison-Wesley.
- K. Wiegers (2006). More About Software Requirements: Thorny Issues and Practical Advice. Redmond: Microsoft Press.

T Course: Risk Communication [T-WIWI-102649]

Responsibility: Ute Werner
Contained in: [M-WIWI-101449] Insurance Management II
[M-WIWI-101469] Insurance Management I
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung mündlich	1

Learning Control / Examinations
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (30 min.) according to Section 4 (2), 2 of the examination regulation.
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

Conditions
None

Recommendations
None

T Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

Responsibility: Marcus Wiens
Contained in: [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581992	Risk Management in Industrial Supply Networks	Vorlesung (V)	2	Marcus Wiens
WS 18/19	2581993	Übung zu Risk Management in Industrial Supply Networks	Übung (Ü)	1	Miriam Klein, Marcus Wiens

Learning Control / Examinations
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: Risk Management in Industrial Supply Networks (WS 18/19)

Aim
Students shall learn methods and tools to manage risks in complex and dynamically evolving supply chain networks. Students learn the characteristics of modern logistics and supply chain management including trends such as globalization, lean production and e-business and learn to identify and analyze the arising risks. On the basis of this overview on supply chain management, the students gain knowledge about approaches and methods of industrial risk management. These approaches will be adapted to answer the specific questions arising in supply chain management. Key aspects include the identification of major risks, which provide the basis for the development of robust networks, and the design of strategic and tactic risk prevention and mitigation measures. In this manner, students will gain knowledge in designing and steering of robust internal and external value-creating networks.

Content

- supply chain management: introduction, aims and trends
- industrial risk management
- definition und characterization of risks: sourcing and procurement, demand, production and infrastructure
- identification of risks
- risk controlling
- risk assessment and decision support tools
- risk prevention and mitigation strategies
- robust design of supply chain networks
- supplier selection
- capacity management
- business continuity management

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course

T Course: Roadmapping [T-WIWI-102853]

Responsibility: Daniel Jeffrey Koch
Contained in: [M-WIWI-101507] Innovation Management
[M-WIWI-101488] Entrepreneurship (EnTechnon)
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
None

Recommendations
Prior attendance of the course *Innovation Management* [2545015] is recommended.

Remarks
See German version.

T Course: Robotics I – Introduction to Robotics [T-INFO-108014]

Responsibility: Tamim Asfour
Contained in: [M-INFO-100893] Robotics I - Introduction to Robotics

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2424152	Robotics I - Introduction to Robotics	Vorlesung (V)	3/1	Tamim Asfour, Jonas Beil, Peter Kaiser, Fabian Paus

V Event excerpt: Robotics I - Introduction to Robotics (WS 18/19)

Aim
Studierende sind in der Lage die vorgestellten Konzepte auf einfache und realistische Aufgaben aus dem Bereich der Robotik anzuwenden.
Dazu zählt die Beherrschung und Herleitung der für die Robotermodellierung relevanten mathematischen Modelle.
Weiterhin beherrschen Studierende die kinematische und dynamische Modellierung von Robotersystemen, sowie die Modellierung und den Entwurf einfacher Positionsund Kraftbasierter Regler.Die Studierenden sind in der Lage für reale Aufgaben in der Robotik, beispielsweise der Greif- oder Bewegungsplanung, geeignete geometrische Umweltmodelle auszuwählen.
Die Studierenden kennen die algorithmischen Grundlagen der Pfad-, Bewegungs- und Greifplanung und können diese Algorithmen auf Problemstellungen im Bereich der Robotik anwenden.
Sie kennen Algorithmen aus dem Bereich der maschinellen Bildverarbeitung und sind in der Lage, diese auf einfache Problemstellungen der Bildverarbeitung anzuwenden.
Die Studierenden besitzen Kenntnisse über den Entwurf passender Datenverarbeitungsarchitekturen und können gegebene, einfache Aufgabenstellungen als symbolisches Planungsproblem modellieren und lösen.

Content
Die Vorlesung vermittelt einen Überblick über die Grundlagen der Robotik am Beispiel von Industrierobotern, Service-Robotern und autonomen humanoiden Robotern. Im Mittelpunkt stehen die Modellierung von Robotern, sowie Methoden zur Steuerung und Planung von Roboteraktionen.
In der Vorlesung werden die grundlegenden System- und Steuerungskomponenten eines Roboters behandelt. Es werden elementare Verfahren zur kinematischen und dynamischen Robotermodellierung vorgestellt, sowie unterschiedliche Regelungsund Steuerungsverfahren. Weiterhin werden Ansätze zur Umwelt- und Objektmodellierung vorgestellt, die anschließend von Bewegungsplanungs-, Kollisionsvermeidungs- und Greifplanungsverfahren verwendet werden. Abschließend werden Themen der Bildverarbeitung, Programmierverfahren und Aktionsplanung behandelt und aktuelle intelligente autonome Robotersysteme und ihre Roboterarchitekturen vorgestellt.

Workload
Vorlesung mit 3 SWS + 1 SWS Übung.
6 LP entspricht ca. 180 Stunden
ca. 45 Std. Vorlesungsbesuch,

ca. 15 Std. Übungsbesuch,
ca. 90 Std. Nachbearbeitung und Bearbeitung der Übungsblätter
ca. 30 Std. Prüfungsvorbereitung

Literature
Weiterführende Literatur
Fu, Gonzalez,Lee: Robotics - Control, Sensing, Vision, and Intelligence
Russel, Norvig: Artificial Intelligenz - A Modern Approach, 2nd. Ed.

T Course: Robotics I – Introduction to Robotics [T-INFO-101465]

Responsibility: Tamim Asfour
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2424152	Robotics I - Introduction to Robotics	Vorlesung (V)	3/1	Tamim Asfour, Jonas Beil, Peter Kaiser, Fabian Paus

V Event excerpt: Robotics I - Introduction to Robotics (WS 18/19)

Aim
Studierende sind in der Lage die vorgestellten Konzepte auf einfache und realistische Aufgaben aus dem Bereich der Robotik anzuwenden.
Dazu zählt die Beherrschung und Herleitung der für die Robotermodellierung relevanten mathematischen Modelle.
Weiterhin beherrschen Studierende die kinematische und dynamische Modellierung von Robotersystemen, sowie die Modellierung und den Entwurf einfacher Positionsund Kraftbasierter Regler.Die Studierenden sind in der Lage für reale Aufgaben in der Robotik, beispielsweise der Greif- oder Bewegungsplanung, geeignete geometrische Umweltmodelle auszuwählen.
Die Studierenden kennen die algorithmischen Grundlagen der Pfad-, Bewegungs- und Greifplanung und können diese Algorithmen auf Problemstellungen im Bereich der Robotik anwenden.
Sie kennen Algorithmen aus dem Bereich der maschinellen Bildverarbeitung und sind in der Lage, diese auf einfache Problemstellungen der Bildverarbeitung anzuwenden.
Die Studierenden besitzen Kenntnisse über den Entwurf passender Datenverarbeitungsarchitekturen und können gegebene, einfache Aufgabenstellungen als symbolisches Planungsproblem modellieren und lösen.

Content
Die Vorlesung vermittelt einen Überblick über die Grundlagen der Robotik am Beispiel von Industrierobotern, Service-Robotern und autonomen humanoiden Robotern. Im Mittelpunkt stehen die Modellierung von Robotern, sowie Methoden zur Steuerung und Planung von Roboteraktionen.
In der Vorlesung werden die grundlegenden System- und Steuerungskomponenten eines Roboters behandelt. Es werden elementare Verfahren zur kinematischen und dynamischen Robotermodellierung vorgestellt, sowie unterschiedliche Regelungsund Steuerungsverfahren. Weiterhin werden Ansätze zur Umwelt- und Objektmodellierung vorgestellt, die anschließend von Bewegungsplanungs-, Kollisionsvermeidungs- und Greifplanungsverfahren verwendet werden. Abschließend werden Themen der Bildverarbeitung, Programmierverfahren und Aktionsplanung behandelt und aktuelle intelligente autonome Robotersysteme und ihre Roboterarchitekturen vorgestellt.

Workload
Vorlesung mit 3 SWS + 1 SWS Übung.
6 LP entspricht ca. 180 Stunden
ca. 45 Std. Vorlesungsbesuch,

ca. 15 Std. Übungsbesuch,
ca. 90 Std. Nachbearbeitung und Bearbeitung der Übungsblätter
ca. 30 Std. Prüfungsvorbereitung

Literature
Weiterführende Literatur
Fu, Gonzalez,Lee: Robotics - Control, Sensing, Vision, and Intelligence
Russel, Norvig: Artificial Intelligenz - A Modern Approach, 2nd. Ed.

T Course: Robotics III - Sensors in Robotics [T-INFO-101352]

Responsibility: Tamim Asfour
Contained in: [M-INFO-101251] Autonomous Robotics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch/englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400067	Robotics III - Sensors in Robotics	Vorlesung (V)	2	Tamim Asfour, Markus Grotz

V Event excerpt: Robotics III - Sensors in Robotics (SS 2018)

Aim
The student has to understand the principles of sensors that are essential and common in robotics. The student has to understand the data flow, starting from the physical measurement, over digitization, application of the sensor model to image processing, feature extraction and the integration of the information in an environment model. The student has to be able to propose suitable sensor concepts for simple tasks and to justify them.

Content
The lecture Robotics III complements the lecture Robotics I with a broad overview over sensors used in robotics and the interpretation of their data. One focus of the lecture is on the topic of computer vision, which is being dealt with from data acquisition, over calibration to object recognition and localization.
Sensors are important subcomponents of control circuits and enable robots to perform their tasks safely. Furthermore, sensors serve to capture the environment as well as dynamical processes and actions in the surroundings of the robots. The topics that are addressed in the lecture, are as follows: Sensor technology for a whole taxonomy of sensor systems (including image and 3D sensors), sensor modeling (including color calibration and hdr imaging), theory and practice of digital signal processing, machine vision, multi-sensor integration and fusion.
Among others, sensor systems such as relative position sensors (optical encoders, potentiometer), velocity sensors (encoder, tachometer), acceleration sensors (piezo-resistive, piezo-electric, optical and others), inertial sensors (gyroscope, gravitometer and others), tactile sensors (foil sensors, pressure sensitive materials and others), proximity sensors, distance sensors (ultrasonic, laser, time-of-flight, interferometry, structured light, stereo camera systems and others), image sensors (photodiode, CCD and others), absolute position sensors (GPS, fiducial markers). Laser sensors as well as image sensors are dealt with priority.

Workload
80h

Literature
The student has to understand the principles of sensors that are essential and common in robotics. The student has to understand the data flow, starting from the physical measurement, over digitization, application of the sensor model to image processing, feature extraction and the integration of the information in an environment model. The student has to be able to propose suitable sensor concepts for simple tasks and to justify them.

T Course: Sales Management and Retailing [T-WIWI-102890]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101487] Sales Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2572156	Sales Management and Retailing	Vorlesung (V)	2	Martin Klarmann

Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
None

Remarks
The lecture is compulsory for the module Sales Management. It is taught in English.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

V Event excerpt: Sales Management and Retailing (WS 18/19)

Aim
Students

- know challenges regarding the organization of distribution systems
- have knowledge in the field of forecasting and are able to predict the expected sales with the help of different approaches (e.g. exponential smoothing and moving averages)
- are able to plan and to put into practice customer satisfaction measurements
- know the main goals of customer relationship management and are able to implement them with the suitable instruments (e.g. loyalty programs, cross selling and customers-recruit-customers programs)
- are capable to put customer prioritization into place and to calculate the customer lifetime value
- know and have mastered the processes to generate recommendations (e.g. collaborative filtering process and affinity analysis)
- have well-founded knowledge of complaint management and customer recovery)
- understand the transaction cost theory and know its meaning in practice
- know different kinds of sales channels and can analyze their success
- are aware of power sources and conflicts between producer and retailer and can use this knowledge for a successful vertical marketing
- know the particularities of trade marketing regarding the components of the extended marketing mix
- have well-founded knowledge of quantitative determining of retail prices

Content
The aim of the course "Sales Management and Retailing" is on the one hand to give insights into the challenging realization of a successful sales management and on the other hand to discuss peculiarities of retailing contexts. The contents are below others:

- Customer relationship management (word-of-mouth-analysis, key account management, loyalty programs, complain management etc.)
- Retail marketing (trends, point of sale design etc.)

- Retailer-producer relationships

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T Course: Security [T-INFO-101371]

Responsibility: Dennis Hofheinz, Jörn Müller-Quade
Contained in: [M-INFO-101197] Computer Security
[M-INFO-101207] Networking Security - Theory and Praxis
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24941	Security	Vorlesung (V)	3	Dennis Hofheinz

V Event excerpt: Security (SS 2018)

Aim
Der /die Studierende

- kennt die theoretischen Grundlagen sowie grundlegende Sicherheitsmechanismen aus der Computersicherheit und der Kryptographie,
- versteht die Mechanismen der Computersicherheit und kann sie erklären,
- liest und versteht aktuelle wissenschaftliche Artikel,
- beurteilt die Sicherheit gegebener Verfahren und erkennt Gefahren,
- wendet Mechanismen der Computersicherheit in neuem Umfeld an.

Content

- Theoretische und praktische Aspekte der Computersicherheit
- Erarbeitung von Schutzzielen und Klassifikation von Bedrohungen
- Vorstellung und Vergleich verschiedener formaler Access-Control-Modelle
- Formale Beschreibung von Authentifikationssystemen, Vorstellung und Vergleich verschiedener Authentifikationsmethoden (Kennworte, Biometrie, Challenge-Response-Protokolle)
- Analyse typischer Schwachstellen in Programmen und Web-Applikationen sowie Erarbeitung geeigneter Schutzmassnahmen/Vermeidungsstrategien
- Einführung in Schlüsselmanagement und Public-Key-Infrastrukturen
- Vorstellung und Vergleich gängiger Sicherheitszertifizierungen
- Blockchiffren, Hashfunktionen, elektronische Signatur, Public-Key-Verschlüsselung bzw. digitale Signatur (RSA,ElGamal) sowie verschiedene Methoden des Schlüsselaustauschs (z.B. Diffie-Hellman)
- Einführung in beweisbare Sicherheit mit einer Vorstellung der grundlegenden Sicherheitsbegriffe (wie IND-CCA)
- Darstellung von Kombinationen kryptographischer Bausteine anhand aktuell eingesetzter Protokolle wie Secure Shell (SSH) und Transport Layer Security (TLS)

Workload
Der Gesamtarbeitsaufwand für dieses Modul beträgt ca. 180 Stunden (6 Credits). Die Gesamtstundenzahl ergibt sich dabei aus dem Aufwand für den Besuch der Vorlesungen und Übungen, sowie den Prüfungszeiten und dem zeitlichen Aufwand, der zur Erreichung der Lernziele des Moduls für einen durchschnittlichen Studenten für eine durchschnittliche Leistung erforderlich ist.
Präsenzzeit: 67 h 30 min (Vorlesung: 33 h 45 min, Übung: 11 h 15 min, Tutorium 22 h 30 min)
Klausur: 1 h
Vor- und Nachbereitung der Veranstaltungen: 67 h 30 min
Klausurvorbereitung: 44 h

T Course: Selected Issues in Critical Information Infrastructures [T-WIWI-109251]

Responsibility: Ali Sunyaev
Contained in: [M-WIWI-104403] Critical Digital Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015). Details will be announced in the respective course.

Conditions
None.

T Course: Selected legal issues of Internet law [T-INFO-108462]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101215] Intellectual Property Law

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24821	Selected legal issues of Internet law	Kolloquium (KOL)	2	Thomas Dreier

Modeled Conditions
The following conditions must be met:

- The course [T-INFO-101307] *Internet Law* must not have been started.

T Course: Selected Topics in Cryptography [T-INFO-101373]

Responsibility: Jörn Müller-Quade
Contained in: [M-INFO-101198] Advanced Topics in Cryptography
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24623	Selected topics in Cryptography	Vorlesung (V)	2	Brandon Broadnax, Jörn Müller-Quade

V Event excerpt: Selected topics in Cryptography (SS 2018)

Aim
The student

- knows applications of cryptographic techniques that exceed encryption,
- knows and understands cryptographic building blocks for larger security applications,
- understands the difficulty in the composition (e.g. in a modular design) of security applications,
- understands and applies the new techniques which enable a modular design.

Content

- Basic security protocols such as fair coin toss over the phone, Byzantine Agreement, Dutch Flower Auctions, Zero Knowledge
- Threat models and security definitions
- Modular design and protocol composition
- Security definitions of simulatability
- Universal Composability
- Deniability as an additional safety feature
- Electronic Voting

Workload
1. Präsenzzeit in Vorlesungen, Übungen: 22,5 h
2. Vor-/Nachbereitung derselbigen: 40 h
3. Prüfungsvorbereitung und Präsenz in selbiger: 27 h

T Course: Selling IT-Solutions Professionally [T-INFO-101977]

Responsibility: Klemens Böhm
Contained in: [M-INFO-101208] Innovative Concepts of Data and Information Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
1.5	Unregelmäßig	Studienleistung	1

T Course: Semantic Web Technologies [T-WIWI-102874]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-102827] Service Computing
[M-WIWI-101455] Web Data Management
[M-WIWI-101457] Semantic Technologies
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2511310	Semantic Web Technologies	Vorlesung (V)	2	Maribel Acosta Deibe, York Sure-Vetter
SS 2018	2511311	Exercises to Semantic Web Technologies	Übung (Ü)	1	Maribel Acosta Deibe, Tobias Christof Käfer, York Sure-Vetter

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None

Recommendations
Lectures on Informatics of the Bachelor on Information Management (Semester 1-4) or equivalent are required.

V Event excerpt: Semantic Web Technologies (SS 2018)

Aim
The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Content
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Workload

- The total workload for this course is approximately 150 hours

- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Additional Literature

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

T Course: Seminar 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-102736] Seminar Module Economic Sciences
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch/englisch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400121	Practical Seminar: Interactive Analytics	Proseminar / Seminar (PS/S)	2	Michael Beigl, Alexander Mädche, Erik Pescara, Peyman Toreini
SS 2018	2530364	Applied Risk and Asset Management	Seminar (S)	2	Maxim Ulrich
SS 2018	2530372	Automated Financial Advisory	Seminar (S)	2	Elmar Jakobs, Maxim Ulrich
SS 2018	2530580	Seminar in Finance (Master, Prof. Uhrig-Homburg)	Seminar (S)	2	Jelena Eberbach, Stefan Fiesel, Michael Hofmann, Marcel Müller, Michael Reichenbacher, Philipp Schuster, Marliese Uhrig-Homburg
SS 2018	2540510		Seminar (S)	2	Andreas Geyer-Schulz
SS 2018	2550493	Hospital Management	Block (B)	2	Martin Ludwig Hansis
SS 2018	2573011	Seminar Human Resource Management	Seminar (S)	2	Mitarbeiter, Petra Nieken
SS 2018	2579904	Seminar Management Accounting	Seminar (S)	2	N.N., Marcus Wouters
SS 2018	2579905	Special Topics in Management Accounting	Seminar (S)	2	Ana Mickovic
SS 2018	2579908	Innovation in Management Accounting	Seminar (S)	2	Markus Kirchberger
SS 2018	2581030		Seminar (S)	2	Fritz Braeuer, Russell McKenna, Jann Michael Weinand
SS 2018	2581977		Seminar (S)	2	Frank Schultmann
WS 18/19	2400013	Seminar: Energy Informatics	Seminar (S)	2	Lukas Barth, Wolf Fichtner, Sascha Gritzbach, Veit Hagenmeyer, Patrick Jochem, Dorothea Wagner, Franziska Wegner, Matthias Wolf
WS 18/19	2500002	Automated Financial Advisory	Seminar (S)	2	Maxim Ulrich

WS 18/19	2530293		Seminar (S)	2	Andreas Benz, Daniel Hoang, Torsten Luedecke, Martin Ruckes, Meik Scholz-Daneshgari, Richard Schubert, Jan-Oliver Strych
WS 18/19	2530374	Applied Risk and Asset Management	Seminar (S)	2	Maxim Ulrich
WS 18/19	2540510	Master Seminar in Information Engineering and Management	Seminar (S)	2	Fabian Ball, Andreas Geyer-Schulz, Victoria-Anne Schweigert, Marvin Schweizer
WS 18/19	2572181		Seminar (S)		Martin Klarmann
WS 18/19	2573010	Seminar Human Resources and Organizations	Seminar (S)	2	Mitarbeiter, Petra Nieken
WS 18/19	2573011	Seminar Human Resource Management	Seminar (S)	2	Mitarbeiter, Petra Nieken
WS 18/19	2581976	Seminar in Production and Operations Management I	Seminar (S)	2	Simon Glöser-Chahoud, Frank Schultmann
WS 18/19	2581977	Seminar in Production and Operations Management II	Seminar (S)	2	Frank Schultmann, Rebekka Volk
WS 18/19	2581978	Seminar in Production and Operations Management III	Seminar (S)	2	Frank Schultmann, Marcus Wiens
WS 18/19	2581980		Seminar (S)	2	Dogan Keles
WS 18/19	2581981		Seminar (S)	2	Armin Ardone

Learning Control / Examinations
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Seminar Human Resource Management (WS 18/19)

Aim
The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.

- cultivates the discussion of research approaches.

Workload
The total workload for this course is approximately 90 hours.
Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Event excerpt: Special Topics in Management Accounting (SS 2018)

Aim
Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: Automated Financial Advisory (SS 2018)

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

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

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

Literature
Literature will be distributed during the first lecture.

V Event excerpt: Master Seminar in Information Engineering and Management (WS 18/19)

Aim
The student is able to

- to perform a literature search for a given topic, to identify, find, value and evaluate the relevant literature.
- to commit to a topic (pr.n., in teamwork); this may include technical conceptinal work and implementation.
- to write his seminar thesis of 15-20 pages in a structured scientific manner.
- to communicate his results in a presentation with discussion afterwards.

Content
The seminar servers on one hand to improve the scientific working skills. On the other hand, the student should work intensively on a given topic and develop a scientific work, that is based on a profound literature research.
The seminar can also be a implementation of software for a scientific problem (e.g. Business Games/dynamic systems) according to the individual focus in the current semester. The software has to be well documented. The written elaboration covers a description and explanation of the software as well as a discussion about limits and extensibility. Furthermore the software must be deployable und shall be presented on the infrastructure stack of the chair. An implementation of a software has to examine the scientific state of the art in a critical way, too.
A concrete description of the current topics is announced in time for the begin of the application stage.

Workload
The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

V Event excerpt: Seminar Human Resources and Organizations (WS 18/19)

Aim
The student

- looks critically into current research topics in the fields of Human Resources an Organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.
Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Event excerpt: Seminar: Energy Informatics (WS 18/19)

Aim
Der/die Studierende besitzt einen vertieften Einblick in Themenbereiche der Energieinformatik und hat grundlegende Kenntnisse in den Bereichen der Modellierung, Simulation und Algorithmen in Energienetzen. Ausgehend von einem vorgegebenen Thema kann er/sie mithilfe einer Literaturrecherche relevante Literatur identifizieren, auffinden, bewerten und schließlich auswerten. Er/sie kann das Thema in den Themenkomplex einordnen und in einen Gesamtzusammenhang bringen.
Er/sie ist in der Lage eine Seminararbeit (und später die Bachelor-/Masterarbeit) mit minimalem Einarbeitungsaufwand anzufertigen und dabei Formatvorgaben zu berücksichtigen, wie sie von allen Verlagen bei der Veröffentlichung von Dokumenten vorgegeben werden. Außerdem versteht er/sie das vorgegebene Thema in Form einer wissenschaftlichen Präsentation auszuarbeiten und kennt Techniken um die vorzustellenden Inhalte auditoriumsgerecht aufzuarbeiten und vorzutragen. Somit besitzt er/sie die Kenntnis wissenschaftliche Ergebnisse der Recherche in schriftlicher Form derart zu präsentieren, wie es in wissenschaftlichen Publikationen der Fall ist.

Content
Energieinformatik ist eine junges Forschungsgebiet, welches verschiedene Bereiche ausserhalb der Informatik beinhaltet wie der Wirtschaftswissenschaft, Elektrotechnik und Rechtswissenschaften. Bedingt durch die Energiewende wird vermehrt Strom aus erneuerbaren Erzeugern in das Netz eingespeist. Der Trend hin zu dezentralen und volatilen Stromerzeugung führt jedoch schon heute zu Engpässen in Stromnetzen, da diese für ein bidirektionales Szenario nicht ausgelegt wurden. Mithilfe der Energieinformatik und der dazugehörigen Vernetzung der verschiedenen Kompetenzen soll eine intelligente Steuerung der Netzinfrastruktur—von Stromverbrauchern, -erzeugern, -speichern und Netzkomponenten—zu einer umweltfreundlichen, nachhaltigen, effizienten und verlässlichen Energieversorgung beitragen.
Daher sollen im Rahmen des Seminars „Seminar: Energieinformatik“, unterschiedliche Algorithmen, Simulationen und Modellierungen bzgl. ihrer Vor- und Nachteile in den verschiedenen Bereichen der Netzinfrastruktur untersucht werden.

Workload
4 LP entspricht ca. 120 Stunden
ca. 21 Std. Besuch des Seminars,
ca. 45 Std. Analyse und Bearbeitung des Themas,
ca. 27 Std. Vorbereitung und Erstellung der Präsentation, und
ca. 27 Std. Schreiben der Ausarbeitung.

V Event excerpt: Seminar in Finance (Master, Prof. Uhrig-Homburg) (SS 2018)

Aim
The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.
Through the presentations in this seminar the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.
The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

V Event excerpt: Automated Financial Advisory (WS 18/19)

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

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

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

Literature
Literature will be distributed during the first lecture.

V Event excerpt: Hospital Management (SS 2018)

Aim
The student

- knows the scope of duties and decisions of a hospital manager and
- is able to give profound guidance.

Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.
Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

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

V Event excerpt: Seminar Management Accounting (SS 2018)

Aim
Students

▪ are largely independently able to identify a distinct topic in Management Accounting,
▪ are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
▪ can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.
Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.
Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.
Meeting 4: In the third week we are going to present and discuss the final papers.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V Event excerpt: (WS 18/19)

Aim
Students

- can exploit a literature field systematically
- are able to write an academic paper in a formally correct way
- can assess the relevance and quality of sources
- are able to get an overview of sources very quickly
- know how to find relevant sources for a literature field
- are capable to write a convincing outline
- know how to categorize a subject under a research field
- understand how to systematize literature fields theoretically and empirically with the help of literature tables
- can identify the most important findings in a huge number of sources
- are able to present a research field
- can discuss the theoretical and practical implications of a topic
- are capable to identify interesting research gaps

Content
The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
will be announced in the seminary.

T Course: Seminar in 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-102736] Seminar Module Economic Sciences
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch/englisch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2521310	Advanced Topics in Econometrics	Seminar (S)	2	Rebekka Buse, Chong Liang, Melanie Schienle
SS 2018	2560282		Seminar (S)	2	Assistenten, Ingrid Ott
WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	Seminar / Praktikum (S/P)	3	David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller
WS 18/19	2560140	Topics on Political Economics	Seminar (S)	2	David Huber, Nora Szech
WS 18/19	2560141		Seminar (S)	2	Jeroen Jannis Engel, Nora Szech
WS 18/19	2560400	Seminar in Macroeconomics	Seminar (S)	2	Johannes Brumm, Christopher Krause, Luca Pegorari
WS 18/19	2561208		Seminar (S)	1	Eckhard Szimba

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

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

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V Event excerpt: Topics on Political Economics (WS 18/19)

Aim
The student develops an own idea for an economic experiment in this research direction.

Workload
About 90 hours.

T Course: Seminar in Informatics B (Master) [T-WIWI-103480]

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

Contained in: [M-WIWI-101457] Semantic Technologies
[M-INFO-102822] Seminar Module Informatics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch/englisch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2512300		Seminar / Praktikum (S/P)	3	Aditya Mogadala, Achim Rettinger, York Sure-Vetter, Steffen Thoma
SS 2018	2513200		Seminar (S)	2	Sascha Alpers, Andreas Fritsch, Andreas Oberweis, Oliver Raabe, Gunther Schiefer, Melanie Volkamer, Manuela Wagner
SS 2018	2513300	Technology-enhanced Learning	Seminar (S)	2	Jürgen Beyerer, Klemens Böhm, Matthias Frank, Gerd Gidion, Martin Mandausch, Wolfgang Roller, Alexander Streicher, York Sure-Vetter, Daniel Szentes
SS 2018	2513306	Data Science & Real-time Big Data Analytics	Seminar / Praktikum (S/P)	2	Dominik Riemer, Suad Sejdovic, York Sure-Vetter
SS 2018	2513400		Seminar (S)	2	Sebastian Lins, Ali Sunyaev, Scott Thiebes
SS 2018	2595470	Seminar Service Science, Management & Engineering	Seminar (S)	2	Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt
WS 18/19	2400125		Seminar (S)	2	Franziska Boehm, Nina Gerber, Melanie Volkamer
WS 18/19	2512301	Linked Data and the Semantic Web	Seminar / Praktikum (S/P)	3	Maribel Acosta Deibe, Lars Heling, Tobias Christof Käfer, York Sure-Vetter, Tobias Weller
WS 18/19	2512311	Data Science with Open Data	Seminar / Praktikum (S/P)	3	Matthias Frank, York Sure-Vetter

WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	Seminar / Praktikum (S/P)	3	David Bälz, Ingrid Ott, York Sure-Vetter, Tobias Weller
WS 18/19	2513400		Seminar (S)	2	Sebastian Lins, Ali Sunyaev, Scott Thiebes
WS 18/19	2595470	Seminar Service Science, Management & Engineering	Seminar (S)	2	Wolf Fichtner, Hansjörg Fromm, Stefan Nickel, Gerhard Satzger, York Sure-Vetter, Christof Weinhardt

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
Placeholder for seminars offered by the Institute AIFB.
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Linked Data and the Semantic Web (WS 18/19)

Workload
Topics of interest include, but are not limited to:

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

V Event excerpt: Seminar Service Science, Management & Engineering (WS 18/19)

Aim
The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.
See the KSRI website for more information about this seminar: www.ksri.kit.edu

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.

V Event excerpt: Technology-enhanced Learning (SS 2018)

Content
Die Liste der Seminarthemen finden Sie unter https://portal.wiwi.kit.edu/ys/1868

Literature
Werden im Seminar bekanntgegeben

V Event excerpt: (SS 2018)

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

- Medicine
- Social Media
- Finance Market

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

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

V Event excerpt: Cooperation seminar: Innovative applications on single board computers as well as their economic relevance (WS 18/19)

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

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V Event excerpt: (WS 18/19)

Aim
Students (1) independently analyze current questions in the field of information systems; (2) work on the respective scientific question with recognized scientific methods and write a seminar thesis on it; (3) can combine already learned theoretical and practical lecture contents of the respective question.

T Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

Responsibility: Stefan Nickel, Steffen Rebennack, Oliver Stein
Contained in: [M-WIWI-102736] Seminar Module Economic Sciences
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550132		Seminar (S)	2	Robert Mohr, Christoph Neumann, Oliver Stein
SS 2018	2550473		Seminar (S)	2	Peter Kirst, Steffen Rebennack
SS 2018	2550491	Seminar: Recent Topics in OR	Block (B)		Mitarbeiter, Stefan Nickel
WS 18/19	2550491	Seminar: Recent Topics in OR	Seminar (S)		Mitarbeiter, Stefan Nickel

Learning Control / Examinations
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

V Event excerpt: Seminar: Recent Topics in OR (WS 18/19)

Aim
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

T Course: Seminar in Statistics A (Master) [T-WIWI-103483]

Responsibility: Oliver Grothe, Melanie Schienle
Contained in: [M-WIWI-102736] Seminar Module Economic Sciences
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	englisch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2521310	Advanced Topics in Econometrics	Seminar (S)	2	Rebekka Buse, Chong Liang, Melanie Schienle

Learning Control / Examinations
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

T Course: Seminar Informatics A [T-INFO-104336]

Responsibility: Sebastian Abeck
Contained in: [M-INFO-102822] Seminar Module Informatics
[M-INFO-102233] Further Examinations

ECTS	Language	Exam type	Version
3	deutsch	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400054	Seminar: Designing and Conducting Experimental Studies	Seminar (S)	2	Michael Beigl, Anja Exler, Erik Pescara, Andrea Schankin
WS 18/19	2400091	Seminar: Designing and Conducting Experimental Studies	Seminar (S)	2	Michael Beigl, Anja Exler, Erik Pescara, Andrea Schankin
WS 18/19	24146		Vorlesung / Übung (VÜ)	2+1	Michael Beigl
WS 18/19	24844	Seminar: Ubiquitous Systems	Seminar (S)	2	Michael Beigl, Erik Pescara

V Event excerpt: Seminar: Designing and Conducting Experimental Studies (WS 18/19)

Aim
Planung und Durchführung einer Studie zu einem aktuellen Forschungsthema aus dem Bereich "Mensch Maschine Interaktion", "Ubiquitäre Systeme" und "Kontextsensitive Systeme". Nach Abschluss des Seminars können die Studierenden

- geeignete Literatur selbständig suchen, identifizieren, analysieren und bewerten
- aus der Literatur Rahmendaten und Parameter für Nutzerstudien und Experimente ableiten
- zu einer Forschungsfrage eine Studie entwerfen, durchführen und auswerten
- wissenschaftliche Ergebnisse strukturiert darstellen und einem Fachpublikum im Rahmen eines kurzen Vortrags präsentieren
- Techniken des wissenschaftlichen Schreibens dazu anzuwenden, einen wissenschaftlichen Artikel über die Planung, Durchführung und Ergebnisse der Studie zu verfassen

Content
Spezifische Forschungsfragen sind im Rahmen einer Nutzerstudie zu untersuchen. Im Fokus des Seminars steht das Entwerfen einer Nutzerstudie, um eine spezifische Fragestellung zu untersuchen. Einhergeht damit dann eine anschließende Durchführung der Nutzerstudie und Auswertung der gesammelten Daten. Je nach Fragestellung kann der Aufwand pro Teilleistung variieren.
Vermittelt werden sollen im Rahmen des Seminars theoretisches und praktisches Wissen zum Planen, Durchführen und Auswerten von Nutzerstudien. Dies kann eine nützliche Vorbereitung auf die Bachelorarbeit sein.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).
Aktivität
Arbeitsaufwand
Präsenzzeit: Kickoff, Präsentation und Diskussion und Treffen mit Betreuern
10 h
Studienplanung, Durchführung, Analyse und Dokumentation
106 h
Vorbereiten der Präsentation
4 h

SUMME
120 h 00 min

V Event excerpt: Seminar: Ubiquitous Systems (WS 18/19)

Aim
Aktuelle Forschungsergebnisse aus dem Bereich ubiquitärer Systeme sollen erarbeitet und kritisch diskutiert werden. Nach Abschluss des Seminars können die Studierenden

- selbständig eine strukturierte Literaturrecherche zu einem gegebenen Thema durchführen und geeignete Literatur selbständig suchen, identifizieren, analysieren und bewerten
- den Stand der Technik bzw. Wissenshaft zu einem Themenbereich darstellen, differenziert bewerten und Schlüsse draus ziehen
- wissenschaftliche Ergebnisse zu einem Thema strukturiert darstellen und einem Fachpublikum im Rahmen eines Vortrags präsentieren
- Techniken des wissenschaftlichen Schreibens dazu anzuwenden, einen wissenschaftlichen Übersichtsartikel zu einem Thema zu verfassen
- Wissenschaftliche Texte anderer kritisch bewerten und einordnen

Content
In dieser Seminarreihe wird in jedem Semester ein Schwerpunktthema aufgegriffen, zu dem von den Veranstaltungsteilnehmern einzelne Beiträge aufzuarbeiten sind. Ziel ist die Erfassung des Stands der Entwicklung bzgl. Technologien und deren Anwendungen im Bereich Ubiquitous Computing. Themen werden in der ersten Veranstaltung und auf der Web-Seite des Instituts bekannt gegeben.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).
Aktivität
Arbeitsaufwand
Präsenzzeit: Kickoff, Präsentation und Diskussion und Treffen mit Betreuern
10 h
10 h 00 min
Literaturrecherche und Schreiben der Ausarbeitung
106 h
106 h 00 min
Vorbereiten der Präsentation
4 h
4 h 00 min
SUMME
120 h 00 min
Arbeitsaufwand für die Lerneinheit "Seminar: ubiquitäre Systeme

V Event excerpt: (WS 18/19)

Aim
Ziel der Vorlesung ist es, Kenntnisse über Grundlagen und weitergehende Methoden und Techniken des Ubiquitous Computing zu vermitteln. Nach Abschluss der Vorlesung können die Studierenden

- das erlernte Wissen über existierende Ubiquitous Computing Systeme wiedergeben und erörtern.
- die allgemeinen Kenntnisse zu Ubiquitären Systemen bewerten und Aussagen und Gesetzmäßigkeiten auf Sonderfälle übertragen.
- unterschiedliche Methoden zu Design-Prozessen und Nutzerstudien bewerten und beurteilen sowie geeignete Methoden für die Entwicklung neuer Lösungen auswählen.
- selbst neue ubiquitäre Systeme für den Einsatz in Alltags- oder industriellen Prozessumgebungen erfinden, planen, entwerfen und bewerten sowie Aufwände und technische Implikationen bemessen.

Content
Die Vorlesung gibt einen Überblick über Konzepte, Theorien und Methoden der Ubiquitären Informationstechnologie (Ubiquitous Computing). Anhand des Appliance-Konzepts werden dann in der Übung von den Studierenden eigene

Appliances entworfen, die Konstruktion geplant und dann entwickelt. Die notwendigen technischen und methodischen Grundlagen wie Hardware für Ubiquitäre Systeme, Software für Ubiquitäre Systeme, Prinzipien der Kontexterkennung für Ubiquitäre Systeme, Vernetzung Ubiquitärerer Systeme und Entwurf von Ubiquitären Systemen und insbesondere Information Appliances werden thematisiert. In Ubiquitous Computing entwickelte Methoden des Entwurfs und Testens für Mensch-Maschine Interaktion und Mensch-Maschine Schnittstellen werden ausführlich erklärt. Es findet auch eine Einführung findet in die wirtschaftlichen Aspekte eines Ubiquitären Systems statt.
Im Übungsteil der Vorlesung wird durch praktische Anwendung der Wissensgrundlage der Vorlesung das Verständnis in Ubiquitäre Systeme vertieft. Die Studierenden entwerfen und entwickeln dazu eine eigene Appliance und testen diese. Ziel ist es die Schritte hin zu einer prototypischen und eventuell marktfähigen Appliance durchlaufen zu haben.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 150 Stunden (5.0 Credits).
Aktivität
Arbeitsaufwand
Präsenzzeit: Besuch der Vorlesung
15 x 90 min
22 h 30 min
Präsenzzeit: Besuch der Übung
15 x 45 min
11 h 15 min
Vor- / Nachbereitung der Vorlesung und Übung
15 x 90 min
22 h 30 min
Selbstentwickeltes Konzept für eine Information Appliance entwickeln
33 h 45 min
Foliensatz 2x durchgehen
2 x 12 h
24 h 00 min
Prüfung vorbereiten
36 h 00 min
SUMME
150 h 00 min
Arbeitsaufwand für die Lerneinheit "Ubiquitäre Informationstechnologien"

V Event excerpt: Seminar: Designing and Conducting Experimental Studies (SS 2018)

Aim
Planung und Durchführung einer Studie zu einem aktuellen Forschungsthema aus dem Bereich “Mensch Maschine Interaktion”, “Ubiquitäre Systeme” und “Kontextsensitive Systeme”. Nach Abschluss des Seminars können die Studierenden

- geeignete Literatur selbständig suchen, identifizieren, analysieren und bewerten
- aus der Literatur Rahmendaten und Parameter für Nutzerstudien und Experimente ableiten
- zu einer Forschungsfrage eine Studie entwerfen, durchführen und auswerten
- wissenschaftliche Ergebnisse strukturiert darstellen und einem Fachpublikum im Rahmen eines kurzen Vortrags präsentieren
- Techniken des wissenschaftlichen Schreibens dazu anzuwenden, einen wissenschaftlichen Artikel über die Planung, Durchführung und Ergebnisse der Studie zu verfassen

Content
Spezifische Forschungsfragen sind im Rahmen einer Nutzerstudie zu untersuchen. Im Fokus des Seminars steht das Entwerfen einer Nutzerstudie, um eine spezifische Fragestellung zu untersuchen. Einhergeht damit dann eine anschließende Durchführung der Nutzerstudie und Auswertung der gesammelten Daten. Je nach Fragestellung kann der Aufwand pro Teilleistung variieren.
Vermittelt werden sollen im Rahmen des Seminars theoretisches und praktisches Wissen zum Planen, Durchführen und Auswerten von Nutzerstudien. Dies kann eine nützliche Vorbereitung auf die Bachelorarbeit sein.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 120 Stunden (4.0 Credits).
Aktivität

Arbeitsaufwand
Präsenzzeit: Kickoff, Präsentation und Diskussion und Treffen mit Betreuern
10 h
Studienplanung, Durchführung, Analyse und Dokumentation
106 h
Vorbereiten der Präsentation
4 h
SUMME
120 h 00 min

T Course: Seminar: Legal Studies I [T-INFO-101997]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-101218] Seminar Module Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2400041	Governance, Risk & Compliance	Seminar (S)	2	Andreas Herzig
SS 2018	2400088		Seminar (S)	2	Franziska Boehm, Alexander Mädche, Martina Zitterbart
SS 2018	24820	Current Issues in Patent Law	Seminar (S)	2	Klaus-Jürgen Melullis
WS 18/19	24389		Seminar (S)	2	Martin Schallbruch

V Event excerpt: Governance, Risk & Compliance (SS 2018)

Aim
Der/die Studierende hat vertiefte Kenntnisse hinsichtlich der Thematik "Governance, Risk & Compliance"sowohl auf regulatorischer Ebene als auch auf betriebswirtschaftlicher Ebene. Er/sie ist in der Lage, eine konkrete Fragestellung schriftlich in Form einer Seminararbeit auszuarbeiten sowie anschließend im mündlichen Vortrag zu präsentieren.

Content
Das Seminar beinhaltet neben der Einordnung der Thematik in den rechtlichen wie betriebswirtschaftlichen Kontext die Begrifflichkeiten, gesetzlichen Grundlagen und Haftungsaspekte. Darüber hinaus werden sowohl das Risikomanagementsystem als auch das Compliance-Management-System näher erläutert sowie die Relevanz dieser Systeme für das Unternehmen dargestellt. Den Abschluss bildet ein Blick in die Praxis hinsichtlich der Aufdeckung und dem adäquaten Umgang mit Verstößen. Die Themen werden zudem durch die Ausarbeitung einer konkreten Fragestellung in Form von Seminararbeiten sowie der anschließenden Präsentation abgerundet.

Workload
21 h Präsenzzeit, 60 h schriftliche Ausarbeitung, 9h Vortrag vorbereiten.

V Event excerpt: Current Issues in Patent Law (SS 2018)

Aim
Ziel der Veranstaltung ist es, Studenten aller Fachrichtungen an das Patentrecht heranzuführen, und ihnen vertiefte Kenntnisse des Patentrechts zu vermitteln. Sie sollen die rechtspolitischen Anliegen und die wirtschaftlichen Hintergründe dieses Rechts anhand der Interessenlage typischer Fallgestaltungen erarbeiten und über einen Vergleich mit den gesetzlichen Regelungen Einblick in die gesetzlichen Regelungen gewinnen, die ihnen in ihrer späteren beruflichen Tätigkeit als Naturwissenschaftler oder Techniker ebenso wie als juristischer Berater umfangreich begegnen können. Dabei sollen sie an die Regelungen des nationalen, europäischen und internationalen Patentrechts, wie auch des Know-How-Schutzes herangeführt werden. Auch der Konflikt zwischen Patent als einem Monopolrecht und den Anforderungen einer freien Marktwirtschaft sowie deren Schutz durch das Kartellrecht wird mit den Studenten erörtert werden.

Workload
Der gesamte Arbeitsaufwand beträgt ca. 75-100 h, davon sind 22,5 h Präsenzzeit.

V Event excerpt: (WS 18/19)

Aim
Das Seminar soll ausgehend von den Schutzzielen des IT-Sicherheitsrechts und der Bedrohungslage einen Überblick über die Entwicklung des IT-Sicherheitsrechts geben und seine Weiterentwicklung, auch vor dem Hintergrund des vom Bundesverfassungsgericht entwickelten Rechts auf den Schutz der Integrität und Vertraulichkeit informationstechnischer Systeme diskutieren.

Content
Die Sicherheit der Informationstechnik ist zu einer Schlüsselfrage der Gestaltung der Informationsgesellschaft geworden. Die Abhängigkeit der Wirtschaft und des Staates vom Funktionieren von IT-Systemen und Internet, die zunehmende Komplexität der IT-Systeme, die Verteilung der Verantwortung auf unterschiedliche Beteiligte und die steigende Zahl von Cyberangriffen durch verschiedenste Akteure erschweren die IT-Sicherheit.
Rechtsfragen der IT- und Cybersicherheit berühren unterschiedliche Rechtsgebiete. Hierbei spielen klassische Fragen des Strafrechts und des Polizei- und Ordnungsrechts ebenso eine Rolle wie besondere Verwaltungsrechte, etwa für kritische Infrastrukturen, oder spezielle Rechtsvorschriften der öffentlichen Verwaltung für die Gestaltung der Informationstechnik. Daneben sind zivilrechtliche Fragen der Verantwortungsverteilung und der Produktsicherheit von Belang.
Der rasanten technischen Entwicklung folgend hat das IT-Sicherheitsrecht in den letzten Jahren durch die Grundgesetzänderung im Rahmen der Förderalismusreform, querschnittliche Regelungen wie die Novellierung des BSI-Gesetzes, das Personalausweis- und das De-Mail-Gesetz sowie Spezialvorschriften in Fachrechten eine stetige Weiterentwicklung erfahren. Zuletzt hat der Deutsche Bundestag im Juni 2015 ein "IT-Sicherheitsgesetz" verabschiedet, das Neuregelungen vor allem für den Bereich der kritischen Infrastrukturen erfährt. Weitere Veränderungen zeichnen sich durch die Beratung der Europäischen Richtlinie für Netzwerk- und Informationssicherheit ab.
Das Seminar im WS 2015/16 soll ausgehend von den Schutzzielen des IT-Sicherheitsrechts und der Cybersicherheitslage einen Überblick über die unterschiedlichen Materien des IT-Sicherheitsrechts geben und seine Weiterentwicklung, auch vor dem Hintergrund des vom Bundesverfassungsgericht entwickelten Rechts auf den Schutz der Integrität und Vertraulichkeit informationstechnischer Systeme, diskutieren.
Themen für Seminararbeiten:

1. Das Recht auf Gewährleistung der Integrität und Vertraulichkeit informationstechnischer Systeme als "IT-Sicherheitsgrundrecht"
2. Datenschutz und Datensicherheit - IT-Sicherheit als Hilfsmittel zum Schutz des Persönlichkeitsrechts
3. Deutsches Computerstrafrecht und die Umsetzung der Cybercrime-Konvention des Europarats
4. IT-Sicherheit im Zivilrecht - wer haftet für Sicherheitsvorfälle?
5. Online-Shopping und seine Tücken (Fernabsatzrecht)
6. Schutz des Verbrauchers gegen unlautere Methoden im Internet (Spam, Abofallen)
7. IT-Sicherheit kritischer Infrastrukturen - rechtliche Absicherung unter besonderer Berücksichtigung des IT-Sicherheitsgesetzes
8. Das Bundesamt für Sicherheit in der Informationstechnik und seine rechtlichen Grundlagen nach Verabschiedung des IT-Sicherheitsgesetzes
9. Pässe und Personalausweise als gesicherte elektronische Identitäten
10. Elektronische Signaturen - praxisgerecht und überreguliert?
11. De-Mail und das De-Mail-Gesetz - ein sicherer elektronischer Kommunikationsraum?
12. IT-Sicherheit in der öffentlichen Verwaltung - Art. 91c GG und der IT-Planungsrat
13. Cyberabwehr als Aufgabe der Bundeswehr?
14. Europäische IT-Sicherheitsstrukturen - die IT-Sicherheitsagentur ENISA und die Diskussion über eine EU-Richtlinie für Netzwerk und Informationssicherheit
15. Behördenverantwortung für Cybersicherheit in Deutschland - Zuständigkeiten, Zusammenarbeitsformen, Trennungsgebote

Die Seminararbeiten sind bis zum 31. Dezember 2015 in elektronischer Form beim Lehrstuhlbeauftragten sowie in schriftlicher Form im Sekretariat des ZAR abzugeben. Bitte beachten Sie die Formvorgaben im Leitfaden zur Erstellung juristischer Seminararbeiten (www.zar.kit.edu/497.php).
Bitte melden Sie sich elektronisch an unter helga.scherer@kit.edu. Bitte geben Sie der Anmeldung drei Wunschthemen an. Die Plätze werden in der Reihenfolge der Anmeldungen verteilt.
Die Verteilung der Themen erfolgt rechtzeitig vor Semesterbeginn. Die Teilnahme an der Vorbesprechung ist verpflichtend.

Workload
ca. 100 - 120 h (2 - 4 Credits)

T Course: Service Analytics A [T-WIWI-105778]

Responsibility: Hansjörg Fromm, Thomas Setzer
Contained in: [M-WIWI-103117] Data Science: Data-Driven Information Systems
[M-WIWI-101470] Data Science: Advanced CRM
[M-WIWI-101506] Service Analytics
[M-WIWI-101448] Service Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2595501	Service Analytics A	Vorlesung (V)	2	Hansjörg Fromm, Niklas Kühl, Thomas Setzer
SS 2018	2595502		Übung (Ü)	1	Lucas Baier, Niklas Kühl

Learning Control / Examinations
The assessment consists of a written exam (60 min) according to §4(2), 1 of the examination regulations.

Conditions
None

Recommendations
The lecture is addresed to students with interests and basic knowledge in the topics of Operations Research, decritptive and inductive statistics.

V Event excerpt: Service Analytics A (SS 2018)

Aim
Participants are able to structure large sets of available data and to use that data for planning, operation, personalization of complex services, in particular for IT services. They learn a step-by-step approach starting with analyzing possibly incomplete data, techniques of multivariate statistics to filter data and to extract data features, forecast techniques, and robust planning and control procedures for enterprise decision support.

Content
Today's service-oriented companies are starting to optimize the way services are planned, operated, and personalized by analyzing vast amounts of data from customers, IT-systems, or sensors. As the statistical learning and business optimization world continues to progress, skills and expertise in advanced data analytics and data and fact-based optimization become vital for companies to be competitive. In this lecture, relevant methods and tools will be considered as a package, with a strong focus on their inter-relations. Students will learn to analyze and structure large amounts of potentially incomplete and unreliable data, to apply multivariate statistics to filter data and to extract key features, to predict future behavior and system dynamics, and finally to formulate data and fact-based service planning and decision models.
More specifically, the lessons of this lecture will include:

- Co-Creation of Value Across Enterprises
- Instrumentation, Measurement, Monitoring of Service Systems
- Descriptive, predictive, and prescriptive Analytics
- Usage Characteristics and Customer Dynamics
- Big Data, Dimensionality Reduction, and Real-Time Analytics
- System Models and What-If-Analysis
- Robust Mechanisms for Service Management

- Industry Applications of Service Analytics

Tutorials
Students will conduct lecture accompanying, guided exercises throughout the semester.

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

Literature

- Business Forecasting, Wilson, J. H., Keating, B., McGraw-Hill, 2002
- Multivariate Data Analysis, Hair, J. F., Black, B., Babin, B., Anderson, R. E., 2008
- Analytics at Work, Davenport, T. H., Harris, J. G., Morion, R., Harward Business Press, 2010
- Business Analytics for Managers, Jank, W., Springer, 2011

Online Sources:

- The data deluge, The Economist, Feb. 2010
- Competing on Analytics, T. Davenport in Harward Business Review, Feb. 2007
- Mit Advanced Analytics können Händler Kundendaten optimal nutzen, McKinsey Handelsmarketing, Feb. 2011

Further readings will be provided in the lecture.

T Course: Service Analytics B - Enterprise Data Reduction and Prediction [T-WIWI-105779]

Responsibility: Thomas Setzer
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	2

Learning Control / Examinations
The lecture is no longer offered. There will be a final repeat examination in the winter semester 2018/2019 (only for rewriters).
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). Grading is based on the points achieved in the written exam.

Conditions
None

Recommendations
None

Remarks
Limited number of slots. The course is not offered regularly.

T Course: Service Design Thinking [T-WIWI-102849]

Responsibility: Gerhard Satzger, Christof Weinhardt
Contained in: [M-WIWI-101503] Service Design Thinking
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
9	englisch	Unregelmäßig	Prüfungsleistung anderer Art	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2595600	Service Design Thinking	Vorlesung (V)	6	Niels Feldmann, Gerhard Satzger, Christof Weinhardt

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
The course is compulsory and must be examined.

Recommendations
This course is held in English – proficiency in writing and communication is required.
Our past students recommend to take this course at the beginning of the masters program.

Remarks
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems". For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

V Event excerpt: Service Design Thinking (SS 2018)

Aim

- Deep knowledge of the innovation method "Design Thinking", as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Communicate, work and present in an interdisciplinary and international project setting

Content

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges.
- Design Space Exploration: Exploring the problem space through customer and user observation.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions.

- Funky Prototype: Integration of the individually tested and successful functions to a complete solution, which is further tested and developed.
- Functional Prototype: Further selection and convergence of existing ideas. Building a higher resolution prototype that can be tested by customers.
- Final Prototype: Preparing and presenting the final solution to the customer.

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

Literature
Lewrick/Link/Leifer:

- The Design Thinking Playbook
- The Design Thinking Toolbook

T Course: Service Innovation [T-WIWI-102641]

Responsibility: Gerhard Satzger
Contained in: [M-WIWI-102806] Service Innovation, Design & Engineering
[M-WIWI-101410] Business & Service Engineering
[M-WIWI-101448] Service Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2595468	Service Innovation	Vorlesung (V)	2	Gerhard Satzger

Learning Control / Examinations
The assessment consists of an 1h written exam (following §4(2) 1 of the examination regulations) and of assignments during the course as an non exam assessment (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Conditions
None

Recommendations
None

V Event excerpt: Service Innovation (SS 2018)

Aim
Understand the difference between innovation and invention and gain an overview of different types of innovations. Understand particular challenges of innovation in services. Know the ambidexterity challenge for service organizations and ways to deal with it. Know examples for innovation in processes, organization and business models; understand how service and product innovation differ. Get to know several methods and tools that support service innovation (service design thinking, open innovation, technolgy and strategic foresight, etc.)

Content
While innovation in manufacturing can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice, while many organizations have a well-understood process for innovating in the product business, innovating in services is often still a fuzzy and complex undertaking. In this lecture we will discuss the state of research, compare product and service innovation and understand how innovation diffusion works. We examine case studies on service innovation, compare open vs. closed innovation and learn how to apply different innovation tools, methods and strategies (e.g. service design thinking as a human-centered approach to innovation or technology and strategic foresight, as methods supporting the generation of assumptions on the impact of technology).

Workload
Total workload: approximately 136 hours
Attendance time: 30 hours
Self-study: 105 hours

Literature

- Barras, Richard (1986) Towards a theory of innovation in services. Research Policy 15, 161-173
- Hauschildt, Jürgen und Salomo, Sören (2007) Innovationsmanagement. 4. Auflage, München: Vahlen.
- von Hippel, Erich (2007) Horizontal innovation networks - by and for users. Industrial and Corporate Change, 16:2
- Sundbo, Jon (1997) Management of Innovation in Services. The Service Industries Journal, Vo. 17, No. 3, pp. 432-455

Elective literature:

- Benkler, Yochai (2006) The Wealth of Networks: How Social Production Transforms Markets and Freedom. Yale University Press. (Online: http://www.benkler.org)
- Christensen, Clayton M. (2003) The Innovator's Dilemma, Harper Collins.
- Kanerva, M.; Hollanders, H. & Arundel, A. (2006) TrendChart Report: Can we Measure and Compare Innovation in Services?
- von Hippel, Erich (2005) Democratizing Innovation. The MIT Press, Cambridge, MA. (Online: http://web.mit.edu/evhippel/www/books/DI/DemocInn.pdf)
- Howells, Jeremy & Tether, Bruce (2004) Innovation in Services: Issues at Stake and Trends. Commission of the European Communities, Brussels/Luxembourg. (Online: http://www.isi.fhg.de/publ/downloads/isi04b25/inno-3.pdf)
- Miles, I. (2008) Patterns of innovation in service industries. IBM Systems Journal, Vol. 47, No 1
- Morison, Eltling E. (1966) Gunfire at Sea: A Case Study of Innovation. In: Men, Machines and Modern Times. The MIT Press, pp. 17-44.
- Fundamentals of Service Systems: http://primo.bibliothek.kit.edu/primo_library/libweb/action/display.do;jsessionid=EB30837

T Course: Service Oriented Computing [T-WIWI-105801]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-102827] Service Computing
[M-WIWI-101456] Intelligent Systems and Services
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Sommersemester	Prüfungsleistung schriftlich	2

Learning Control / Examinations
Please note that the exam will be offered to first-time applicants in the winter semester 2018/2019. A last examination possibility exists in the summer semester 2019 (only for repeaters).
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

Conditions
None

T Course: Services Marketing [T-WIWI-103140]

Responsibility: Ju-Young Kim
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2572202		Vorlesung (V)	2	Ju-Young Kim

Learning Control / Examinations
The assessment consists of semester-accompanying tasks, oral participation, a short presentation as well as a final examination. The grade consists of:

- written papers and oral participation during the semester (weighting 40%)
- a written final examination (weighting 60%).

Conditions
None

Recommendations
None

Remarks
new course starting summer term 2016

V Event excerpt: (SS 2018)

Aim
Students

- understand the importance of a customer relationship management
- learn the standards of service design
- learn about the 4ps in the service context
- gain knowledge about content and strategies of services marketing
- learn about methods and models to measure service quality

Content
The aim of this lecture is to provide an overview of marketing management in the service context. The lecture starts with foundations for service marketing such as consumer behavior and expectations in services. Then students learn about the importance of the customer relationship for services. They also learn about the 4ps in the service context and gain knowledge about content and strategies of services marketing. They further learn about methods and models for services marketing.

Workload
Gesamtaufwand bei 3 Leistungspunkten: ca. 90 Stunden Präsenzzeit: 30 Stunden Vor – und Nachbereitung der LV: 45.0 Stunden Prüfung und Prüfungsvorbereitung: 15.0 Stunden

Literature
Fitzsimmons, J. A., & Fitzsimmons, M. J. (2010). Service management: operations, strategy, and information technology. Singapore: McGraw-Hill.
Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2006). Services marketing: Integrating customer focus across the firm.
Weitere Literaturempfehlungen (Research Papers) finden Sie direkt in den Vorlesungsfolien.

T Course: Signals and Codes [T-INFO-101360]

Responsibility: Jörn Müller-Quade
Contained in: [M-INFO-101197] Computer Security
[M-INFO-101198] Advanced Topics in Cryptography
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24137	Signals and Codes	Vorlesung (V)	2	Willi Geiselmann, Jörn Müller-Quade

V Event excerpt: Signals and Codes (WS 18/19)

Aim
The student

- knows and understands methods of signal- and coding theory,
- assesses different properties and parameters of codes,
- assesses the relevance of theoretical bounds to practical applications of codes,
- analyzes given systems and adapts them to different environments.

Content
The course covers essentially the question of how the exchange of information can be realized reliably and efficiently. The lecture gives an overview of how to secure signals against random errors. In signal theory, source coding and the Theorem of Shannon will be covered. In the coding theory part, bounds for codes (Hamming, Gilbert-Varshamov, Singleton) are presented. Coding and decoding for classical algebraic codes (linear, cyclic, Reed Solomon-, Goppa- und Reed Muller-codes) will be presented as well as concatanated codes.

Workload
1. Präsenzzeit in Vorlesungen, Übungen: 24 h
2. Vor-/Nachbereitung der selbigen: 16 h
3. Klausurvorbereitung und Präsenz in selbiger: 50 h

Literature
Shu Lin, Daniel Costello, 'Error Control Coding', 2nd Ed., Pearson Prentice Hall, 2004
Todd Moon, 'Error Correction Coding', Wiley, 2005
Weitere Literatur wird in der Vorlesung bekannt gegeben.
Weiterführende Literatur
Wird in der Vorlesung bekannt gegeben.

T Course: Simulation Game in Energy Economics [T-WIWI-108016]

Responsibility: Massimo Genoese
Contained in: [M-WIWI-101451] Energy Economics and Energy Markets

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581025	Simulation Game in Energy Economics	Vorlesung / Übung (VÜ)	2	Massimo Genoese

Learning Control / Examinations
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-102693] *Simulation Game in Energy Economics* must not have been started.

Recommendations
Visiting the course "Introduction to Energy Economics"

Remarks
See German version.

V Event excerpt: Simulation Game in Energy Economics (SS 2018)

Aim
Students

- understand market mechanisms, pricing and investment decisions in a liberalised electricity market,
- apply methods and instruments in a subarea of "Energy Economics",
- choose the appropriate methods to solve given problems (unit dispatch, investment planning) and apply them,
- find and discuss arguments for solution approaches.

Content

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:
Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

T Course: Simulation Game in Energy Economics [T-WIWI-102693]

Responsibility: Massimo Genoese
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	3

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581025	Simulation Game in Energy Economics	Vorlesung / Übung (VÜ)	2	Massimo Genoese

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Conditions
None

Modeled Conditions
The following conditions must be met:

- The course [T-WIWI-108016] *Simulation Game in Energy Economics* must not have been started.

Recommendations
Visiting the course "Introduction to Energy Economics"

Remarks
See German version.

V Event excerpt: Simulation Game in Energy Economics (SS 2018)

Aim
Students

- understand market mechanisms, pricing and investment decisions in a liberalised electricity market,
- apply methods and instruments in a subarea of "Energy Economics",
- choose the appropriate methods to solve given problems (unit dispatch, investment planning) and apply them,
- find and discuss arguments for solution approaches.

Content

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:
Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

T Course: Simulation I [T-WIWI-102627]

Responsibility: Karl-Heinz Waldmann
Contained in: [M-WIWI-101657] Stochastic Modelling and Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	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-101657] Stochastic Modelling and Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Semester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The examination T-WIWI-102703 Simulation II will be offered latest until summer term 2017 (for beginners).
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Conditions
None

Recommendations
Foundations in the field of *Simulation I* [2550662] are desired.

Remarks
The course will be offered in the winter term 2015/2016.

T Course: Simulation of Stochastic Systems [T-WIWI-106552]

Responsibility: Oliver Grothe, Steffen Rebennack
Contained in: [M-WIWI-103289] Stochastic Optimization
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Sommersemester	Prüfungsleistung schriftlich	1

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

Conditions
None.

T Course: Smart Energy Infrastructure [T-WIWI-107464]

Responsibility: Armin Ardone, Andrej Marko Pustisek
Contained in: [M-WIWI-101452] Energy Economics and Technology
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581023		Vorlesung (V)	2	Armin Ardone, Andrej Marko Pustisek

Learning Control / Examinations
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Conditions
None.

Remarks
New course starting winter term 2017/2018.

V Event excerpt: (WS 18/19)

Aim
Der/die Studierende

- kennt die Grundzüge von Infrastruktur im Kontext von Energietransport (insbesondere von Gas- und Stromnetzen sowie Erdgasspeichern) und
- versteht deren (energie-)wirtschaftliche Bedeutung.

Workload
Gesamtaufwand bei 3 Leistungspunkten: ca. 90 Stunden
Präsenzzeit: 30 Stunden
Selbststudium: 60 Stunden

T Course: Smart Grid Applications [T-WIWI-107504]

Responsibility: Johannes Gärttner, Christof Weinhardt
Contained in: [M-WIWI-103720] eEnergy: Markets, Services and Systems

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2540452	Smart Grid Applications	Vorlesung (V)	2	Philipp Staudt, Clemens van Dinther
WS 18/19	2540453	Übung zu Smart Grid Applications	Vorlesung (V)	2	Esther Marie Mengelkamp, Philipp Staudt

Learning Control / Examinations
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

Recommendations
None

Remarks
The lecture will be read for the first time in winter term 2018/19.

T Course: Social Choice Theory [T-WIWI-102859]

Responsibility: Clemens Puppe
Contained in: [M-WIWI-101500] Microeconomic Theory
[M-WIWI-101504] Collective Decision Making
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2520537	Social Choice Theory	Vorlesung (V)	2	Michael Müller, Clemens Puppe
SS 2018	2520539		Übung (Ü)	1	Michael Müller, Clemens Puppe

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

Conditions
None

V Event excerpt: Social Choice Theory (SS 2018)

Aim
The student should acquire knowledge of formal theories of collective decision making and learn to apply them to real life situations.

Content
The course provides a comprehensive treatment of preference and judgement aggregation, including proofs of general results that have Arrow's famous impossibility theorem and Gibbard's oligarchy theorem as corollaries. The second part of the course is devoted to voting theory. Among other things, we prove the Gibbard-Satterthwaite theorem.

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

Literature
Main texts:

- Hervé Moulin: Axioms of Cooperative Decision Making, Cambridge University Press, 1988
- Christian List and Clemens Puppe: Judgement Aggregation. A survey, in: Handbook of rational & social choice, P.Anand, P.Pattanaik, C.Puppe (Eds.), Oxford University Press 2009.

Secondary texts:

- Amartya Sen: Collective Choice and Social Welfare, Holden-Day, 1970
- Wulf Gaertner: A Primer in Social Choice Theory, revised edition, Oxford University Press, 2009
- Wulf Gaertner: Domain Conditions in Social Choice Theory, Oxford University Press, 2001

T Course: Social Network Analysis in CRM [T-WIWI-102642]

Responsibility: Andreas Geyer-Schulz
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation (versions prior 2015) or following §4 (3) of the examination regulation (version 2015), respectively. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Conditions
None

Recommendations
None

Remarks
The course is currently not offered.

T Course: Sociotechnical Information Systems Development [T-WIWI-109249]

Responsibility: Ali Sunyaev
Contained in: [M-WIWI-104403] Critical Digital Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4	deutsch/englisch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2512400		Praktikum (P)		Theresa Kromat, Ali Sunyaev

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of an implementation and a final thesis documenting the development and use of the application.

Conditions
None.

V Event excerpt: (WS 18/19)

Aim

- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

Workload
4 ECTS = approx. 120 h

T Course: Software Architecture and Quality [T-INFO-101381]

Responsibility: Ralf Reussner
Contained in: [M-INFO-101202] Software Methods
[M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24667	Software Architecture and Quality	Vorlesung (V)	2	Ralf Reussner

V Event excerpt: Software Architecture and Quality (SS 2018)

Content
Die Software-Architektur ist in vielen Software-Entwicklungsprojekten der wesentlich bestimmende Faktor für die Software-Qualität. Laufzeiteigenschaften wie Performance oder Zuverlässigkeit hängen, ebenso wie Wartbarkeit, im Wesentlichen von der Architektur eines Software-Systems ab.
In der Vorlesung lernen Studierende moderne Ansätze zur Software-Architektur-Modellierung und -Analyse kennen und anwenden, mit denen zur Entwurfszeit Qualitätseigenschaften des Systems vorhergesagt werden können. Damit legt die Vorlesung die wissenschaftlichen Grundlagen für den Software-Entwurf als Ingenieursdisziplin, da mit den erlernten Methoden ein Verständnis der Auswirkungen von Architekturentwurfsentscheidungen auf die Software-Qualität möglich ist. Dabei werden insbesondere die Software-Qualitäten, wie z.B. Performanz, Zuverlässigkeit und Wartbarkeit thematisiert.
In Zusammenhang mit der Software-Architektur werden auch Software-Komponenten als "Software-Bausteine" eingeführt. Besonders wird auf Techniken der Wiederverwendung von Architekturwissen wie Muster, Stile und Referenzarchitekturen und Produktlinien eingegangen.
Die Vorlesung behandelt das Palladio-Komponentenmodell als Beschreibungssprache für Software-Komponenten und -Architekturen. Anhand des Palladio-Komponentenmodells werden neben der Qualitätsvorhersage auch Rollenmodelle für Entwurf und Entwicklung von komponentenbasierter Software vorgestellt. Dessen Einsatz wird anhand industrienaher Fallstudien demonstriert und dabei Techniken zur Evaluation der Qualität ihrer Softwarearchitektur veranschaulicht.
Dabei werden in der Vorlesung Technologien wie MOF, OCL und auch architekturzentrierte, modellgetriebene Softwareentwicklung (AC-MDSD) behandelt. Moderne Middleware aus der Praxis wie z.B. Java EE / EJB wird ebenfalls vorgestellt.

Workload
(2 SWS + 1,5 x 2 SWS) x 15 + 15 h Prüfungsvorbereitung = 90 h

T Course: Software Development for Modern, Parallel Platforms [T-INFO-101339]

Responsibility: Walter Tichy
Contained in: [M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24660		Vorlesung (V)	2	Philip Pfaffe, Walter Tichy

V Event excerpt: (SS 2018)

Aim
Der Studierende

- kann Grundbegriffe der Softwaretechnik für parallele Systeme wiedergeben, Metriken zum Vermessen paralleler Software anwenden und parallele Systeme nach Kontroll- & Datenfluss sowie Organisation des physikalischen Speichers klassifizieren.
- kann Strategien zum Auffinden von Parallelität anwenden und geeignete Architektur-Muster (Fließband, Auftraggeber-Arbeiter, Work Pool, Work Stealing, Erzeuger-Verbraucher) auswählen.
- versteht Implementierungs-Muster (Array-Zugriffsmuster, Reduktion, Leader/Followers, Mutex Wrapper Facade, Scoped Locking, Thread-Safe Interface, Resource Ordering) und kann diese anwenden.
- kann das .NET-Framework beschreiben und die Besonderheiten der Laufzeitumgebung, insbesondere der Just-In-Time Übersetzung, nennen.
- beherrscht es parallele Programme in Java und C++ entwerfen. Er versteht es Fäden zu erzeugen, kritischer Abschnitte abzuleiten und Konstrukte für Warten und Benachrichtigung anzuwenden.
- kann die Ansätze zur Parallelisierung von Bibliotheken (STL, pThreads, TBB, OpenMP) unterscheiden.
- kann die Allzweck-Berechnung auf GPUs erläutern und die Anwendbarkeit in gegebenen Situation bewerten.
- kennt typische Fehler und Messeffekte in parallelen Programmen. Er kennt die Problematik von Wettlaufsituationen und kann Lösungsansätze ableiten. Er versteht Happens-before Beziehungen und kann diese mit logischen Uhren ermitteln.
- versteht und kann die Bedingungen für Verklemmungen erläutern. Er kann die Ursache von Verklemmungen ableiten und Methoden zur Behandlung oder Verhinderung von Verklemmungen auswählen.
- hat die Fähigkeit aktuelle Forschungsthemen im Bereich Multikernrechner zu erklären.

Content
Multikern-Prozessoren (Prozessoren mit mehreren parallelen Rechenkernen auf einem Chip) werden zum üblichen Standard. Die Vorlesung befasst sich mit aktuellen Themen im Bereich der Softwareentwicklung für Multikernrechner. Vorgestellt werden in diesem Kontext Entwurfsmuster, Parallelität in aktuellen Programmiersprachen, Multicore-Bibliotheken, Compiler-Interna von OpenMP sowie Fehlerfindungsmethoden für parallele Programme. Darüber hinaus werden auch Googles MapReduce-Ansatz und Programmiermodelle für GPGPUs (General-Purpose computations on Graphics Processing Units) besprochen, mit denen handelsübliche Grafikkarten als allgemeine datenparallele Rechner benutzt werden können.

Workload
3 LP entspricht ca. 90 Arbeitsstunden, davon
ca. 30 Std. Vorlesungsbesuch
ca. 45 Std. Vor- und Nachbereitung
ca. 15 Std. Prüfungsvorbereitung

Literature
Wird in der Vorlesung bekannt gegeben.
Weiterführende Literatur
Wird in der Vorlesung bekannt gegeben.

T Course: Software Quality Management [T-WIWI-102895]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101477] Development of Business Information Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2511208	Software Quality Management	Vorlesung (V)	2	Andreas Oberweis
SS 2018	2511209		Übung (Ü)	1	Susan Hickl, Andreas Oberweis

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

Conditions
None

Remarks
This course was formely named "Software Technology: Quality Management".

V Event excerpt: Software Quality Management (SS 2018)

Aim
Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of sofware certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

Literature

- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 2008

- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Further literature is given in lectures.

T Course: Software-Evolution [T-INFO-101256]

Responsibility: Ralf Reussner
Contained in: [M-INFO-101202] Software Methods
[M-INFO-101201] Software Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24164	Software Evolution	Vorlesung (V)	2	Robert Heinrich

V Event excerpt: Software Evolution (WS 18/19)

Aim
Die Studierenden lernen die besonderen Herausforderungen langlebiger Software-Systeme kennen sowie Möglichkeiten über eine gezielte Software-Evolution die zukünftige Entwicklung eines Software-Systems zu beeinflussen. Den Studenten wird klar, welche Mittel und Konzepte Sie im Rahmen der Software-Evolution einsetzen können und welche Faktoren sich auf den Software-Entwicklungsprozess auswirken. Neben den theoretischen Grundlagen erhalten die Studenten Einblick in Praxisbeispiele und geeignete Werkzeuge, die den Umgang mit Software-Evolution vereinfachen. Den Teilnehmern der Vorlesung wird ein Querschnitt aus Implementierungsaspekten, Techniken, Management und Konzepten vermittelt. Die Studierenden werden in die Lage versetzt Software-Systeme zu analysieren, bewerten und verbessern.

Content
Die Vorlesung Software-Evolution behandelt: Software-Entwicklungsprozesse, Besonderheiten langlebiger Software-Systeme, Evolutionsszenarien für Software-Systeme, Software-Architekturentwicklung, Software-Sanierung, Implementierungstechniken, Architekturmuster, Traceability, Software-Bewertungsverfahren, Wartbarkeitsanalysen und Werkzeuge zur Unterstützung von Software-Evolution.

Workload
(2 SWS + 1,5 x 2 SWS) x 15 + 15 h Prüfungsvorbereitung = 90 h

T Course: Special Topics in Information Engineering & Management [T-WIWI-102706]

Responsibility: Christof Weinhardt
Contained in: [M-WIWI-101506] Service Analytics
[M-WIWI-101410] Business & Service Engineering
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Semester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.
The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Conditions
None

Recommendations
None

Remarks
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Engineering & Management course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre
The Special Topics Information Engineering and Management is equivalent to the practical seminar, as it was only offered for the major in "Information Management and Engineering" so far. With this course students majoring in "Industrial Engineering and Management" and "Economics Engineering" also have the chance of getting practical experience and enhance their scientific capabilities.
The Special Topics Information Engineering and Managementcan be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T Course: Special Topics of Efficient Algorithms [T-WIWI-102657]

Responsibility: Hartmut Schmeck
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Semester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The assessment consists of assignments or of a bonus exam (wrt §4 (2), 3 SPO), and a written exam (60 min.) in the week after the end of the lecturing periodwrt (§4 (2), 1 SPO). The exam will be offered in every semester and can be repeated on regular examination dates.
If the mark obtained in the written exam is in between 1.3 and 4.0, a successful completion of the assignments or the bonus exam will improve the mark by one level (i.e. by 0.3 or 0.4).

Conditions
None

Remarks
This course can be particularly used for recognising the external courses with the topics in the area of algorithms, data-structures and computer infrastructures but are not associated in other courses in this subject area.

T Course: Special Topics of Enterprise Information Systems [T-WIWI-102676]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101477] Development of Business Information Systems
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511228		Vorlesung (V)	2	Agnes Koschmider

Learning Control / Examinations
The assessment of this course is a written examination (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Conditions
None

T Course: Special Topics of Web Science [T-WIWI-108751]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-101456] Intelligent Systems and Services

ECTS	Recurrence	Exam type	Version
5	Jedes Semester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
Assesment is provided by a written exam of 60 minutes or an oral exam during the first few weeks after the lecturing period (acc. to §4(2), 1 or 2 SPO). The exam is offered each semester and may be repeated at the regular examination day.

Conditions
None

Remarks
see german version

T Course: 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
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2521350		Vorlesung (V)	2	Wolf-Dieter Heller

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

Conditions
None

Recommendations
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

V Event excerpt: (WS 18/19)

Aim
The student

- shows comprehensive knowledge of regression techniques

Workload
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours

T Course: Stochastic Calculus and Finance [T-WIWI-103129]

Responsibility: Mher Safarian
Contained in: [M-WIWI-101639] Econometrics and Statistics II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2521331	Stochastic Calculus and Finance	Vorlesung (V)	2	Mher Safarian

Learning Control / Examinations
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.) and of possibble additional assignments during the course (§4 (3) SPO).

Conditions
None

Remarks
For more information see http://statistik.econ.kit.edu/

V Event excerpt: Stochastic Calculus and Finance (WS 18/19)

Aim
After successful completion of the course students will be familiar with many common methods of pricing and portfolio models in finance. Emphasis we be put on both finance and the theory behind it.

Content
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus. Stochastic Processes, Brownian Motion and Martingales, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes. Stable and tempered stable processes. Levy processes.
2. Mathematical Finance: Pricing Models. The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Option pricing with tempered stable and Levy-Processes and volatility clustering, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem), Equilibrium models, Consumption-Based CAPM, Numerical Methods.

Stochastic processes (Poisson-process, Brownian motion, martingales), stochastic Integral (Integral, quadratic und co-variation, Ito-formula), stochastic differential equation for price-processes, trading strategies, option pricing(Feynman-Kac), neutral risk rating(equivalent martingale measure, Girsanov theorem), term structure models

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

Literature
To be announced in lecture.
Elective literature:

- Dynamic Asset Pricing Theory, Third Edition. by Darrell Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models, by Steven E. Shreve , Springer, 2003

- An Introduction to Stochastic Integration (Probability and its Applications) by Kai L. Chung , Ruth J. Williams , Birkhaueser,
- Methods of Mathematical Finance by Ioannis Karatzas , Steven E. Shreve , Springer 1998
- Kim Y.S. ,Rachev S.T. ,Bianchi M-L, Fabozzi F. Financial market models with Levy processes and time-varying volatility, Journal of Banking and Finance, 32/7,1363-1378, 2008.
- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, Sixth Edition, (2005).

T Course: Strategic Brand Management [T-WIWI-102842]

Responsibility: Joachim Blickhäuser, Martin Klarmann
Contained in: [M-WIWI-101490] Marketing Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
1.5	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2571185	Strategic Brand Management	Block (B)		Joachim Blickhäuser, Martin Klarmann

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of group presentation with a subsequent round of questions totalling about 30 minutes.

Conditions
None

Recommendations
None

Remarks
Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.
In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

V Event excerpt: Strategic Brand Management (SS 2018)

Aim
See German version.

Content
Die Veranstaltung konzentriert sich auf das strategische Markenmanagement. Der Fokus liegt dabei auf zentralen Branding-Elementen wie z.B. Markenpositionierungen und –identitäten. Gehalten wird die Veranstaltung von Herrn Blickhäuser, einem langjährigen Manager der BMW Group, der aktuell für das Brand Management des Automobilherstellers zuständig ist.

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T Course: Strategic Management of Information Technology [T-WIWI-102669]

Responsibility: Thomas Wolf
Contained in: [M-WIWI-101477] Development of Business Information Systems
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2511602	Strategic Management of Information Technology	Vorlesung (V)	2	Thomas Wolf
SS 2018	2511603		Übung (Ü)	1	Thomas Wolf

Learning Control / Examinations
The assessment of this course is a written (60 min.) or (if necessary) oral examination according (30 min.) to §4(2) of the examination regulation.

Conditions
None

V Event excerpt: Strategic Management of Information Technology (SS 2018)

Aim
Students know the outer frame of IT in an enterprise and know which functions IT has within an enterprise. They unterstand the organization and the content of these functions.

Content
The following topics will be covered: strategic planing of ICT, architecture of ICT, overall planning of ICT, outsourcing, operation and controlling of ICT.

Literature

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995
- Heinrich, L. J., Burgholzer, P.: Informationsmanagement, Planung, Überwachung, Steuerung d. Inform.-Infrastruktur. Oldenbourg, München 1990
- Nolan, R.: Managing the crises in data processing. Harvard Business Review, Vol. 57, Nr. 2 1979
- Österle, H. et al.: Unternehmensführung und Informationssystem. Teubner, Stuttgart 1992
- Thome, R.: Wirtschaftliche Informationsverarbeitung. Verlag Franz Vahlen, München 1990

T Course: Strategy and Management Theory: Developments and "Classics" [T-WIWI-106190]

Responsibility: Hagen Lindstädt
Contained in: [M-WIWI-103119] Advanced Topics in Strategy and Management

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Unregelmäßig	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2577923	Strategy and Management Theory: Developments and "Classics"	Seminar (S)	2	Kerstin Fehre, Alexander Klopfer, Hagen Lindstädt
WS 18/19	2577922	Strategy and Management Theory: Developments and "Classics"	Seminar (S)	2	Assistenten, Hagen Lindstädt

Learning Control / Examinations
Non exam assessment (following §4(2) 3 of the examination regulation).

Conditions
None

Recommendations
Basic knowledge as conveyed in the bachelor module „Strategy and Organization" is recommended.

Remarks
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

V Event excerpt: Strategy and Management Theory: Developments and "Classics" (WS 18/19)

Aim
Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

V Event excerpt: Strategy and Management Theory: Developments and "Classics" (SS 2018)

Aim
Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

T Course: Subdivision Algorithms [T-INFO-103550]

Responsibility: Hartmut Prautzsch
Contained in: [M-INFO-101214] Algorithms in Computer Graphics
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Unregelmäßig	Prüfungsleistung mündlich	1

T Course: Supply Chain Management in the Automotive Industry [T-WIWI-102828]

Responsibility: Tilman Heupel, Hendrik Lang
Contained in: [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2581957	Supply Chain Management in the automotive industry	Vorlesung (V)	2	Tilman Heupel, Hendrik Lang

Learning Control / Examinations
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: Supply Chain Management in the automotive industry (WS 18/19)

Aim
Students are taught knowledge, methods and tools in the field of automotive supply chain management. With the help of concrete examples of a global automotive company, they acquire a basic understanding of challenges in the implementation of those solutions. Students learn about theoretic concepts and their transfer to practice in designing value-added structures, procurement logistics, risk management, quality engineering, cost engineering, and purchasing. They are able to identify, analyze and assess problems and to design adequate solutions within those aspects. In the end of the lecture, students can integrate the aspects into the general context of automotive supply chain management and development process.

Content

- Automotive industry significance
- The automotive supply chain
- Adding value structures of the automotive supply chain and mastering of the production systems as factors of success in the SCM
- Strategic procurement logistics
- Risk management
- Quality engineering and management in the automotive supply chain
- Cost engineering and management in the automotive supply chain
- Purchasing (Supplier selection, contract management)
- Performance measurement of the supply chain / organization

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be announced in the course.

T Course: Supply Chain Management in the Process Industry [T-WIWI-102860]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102805] Service Operations
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2550494	Supply Chain Management in the Process Industry	Vorlesung / Übung (VÜ)	3	Robert Blackburn

Learning Control / Examinations
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation) (individual grading), case study presentation by student teams (team grading) and classroom participation (individual grading). The examination is held in the term of the lecture.

Conditions
None

Recommendations
Basic knowledge as conveyed in the module Introduction to Operations Research is assumed.
Advanced knowledge of Operations Research (e.g., as conveyed in the lectures Facility Location and Strategic SCM, Tactical and operational SCM) is recommended.

Remarks
The number of participants is restricted due to the execution of interactive case studies and the resulting examination effort. Due to these capacity restrictions, registration before course start is required according to the information on the course website. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

V Event excerpt: Supply Chain Management in the Process Industry (WS 18/19)

Aim
The student

- knows and classifies state-of-the art approaches for designing, planning and managing global supply chains in the process industry
- distingusihes quality in supply chains and identifies important building blocks, repeating patterns and concepts crucial to supply chain strategy, design and planning,
- explains specific challenges and approaches towards supply chain operations within the process industry with regards to transportation and warehousing, and describes the interdisciplinary linkage of SCM with information systems, performance management, project management, risk management and sustainability management,
- transfers gained knowledge into practice by using SCM case studies and SCM real life project documentations.

Content
The course "Supply Chain Management in the Process Industry" covers fundamental concepts in the field of supply chain management with special focus on process industry. Strategic, planning and operational topics within the end-to-end supply chain are examined, covering relevant approaches in design, processes and performance measurement. Additional focus within the course is on showing the interdisciplinary linkages SCM has with information systems, performance management, project management, risk management and sustainability management. The course is enriched by various insights from the world´s leading chemical company BASF, provided by executive management as real life examples and cases.

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

Literature

- Chopra, S./Meindl, P.: Supply Chain Management – Strategy, Planning, & Operations, 4th edition, Upper Saddle River, 2009.
- Various case studies, which will be provided during the course

T Course: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]

Responsibility: Claus J. Bosch, Mathias Göbelt
Contained in: [M-WIWI-101412] Industrial Production III
[M-WIWI-101471] Industrial Production II
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3.5	englisch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2581961	Supply Chain Management with Advanced Planning Systems	Vorlesung (V)	2	Claus J. Bosch, Mathias Göbelt

Learning Control / Examinations
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None

Recommendations
None

V Event excerpt: Supply Chain Management with Advanced Planning Systems (SS 2018)

Aim
This lecture deals with supply chain management from a practitioner's perspective with a special emphasis on the software solution SAP SCM and the planning domain. First, the term supply chain management is defined and its scope is determined. Methods to analyze supply chains as well as indicators to measure supply chains are derived. Second, the structure of an APS (advanced planning system) is discussed in a generic way. Later in the lecture, the software solution SAP SCM is mapped to this generic structure. The individual planning tasks and software modules (demand planning, supply network planning, production planning / detailed scheduling, transportation planning / vehicle scheduling, global available-to-promise) are presented by discussing the relevant business processes, providing academic background, describing planning processes for a fictive company and showing the user interface and user-related processes in the software solution.
The lecture is supported by a self-explanatory tutorial, in which students can explore the software solution for the fictive company offline on their own.

Content
1. **Introduction to Supply Chain Management**
1.1. Supply Chain Management Fundamentals
1.2. Supply Chain Management Analytics
2. Structure of Advanced Planning Systems
3. SAP SCM
3.1. Introduction / SCM Solution Map
3.2. Demand Planning
3.3. Supply Network Planning
3.4. Production Planning and Detailed Scheduling
3.5. Deployment
3.6. Transportation Planning and Vehicle Scheduling
3.7. [Optional] Global Available to Promise
4. SAP SCM in Practice
4.1. Success Stories

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course

T Course: Symmetric Encryption [T-INFO-101390]

Responsibility: Jörn Müller-Quade
Contained in: [M-INFO-101197] Computer Security
[M-INFO-101198] Advanced Topics in Cryptography
[M-INFO-101207] Networking Security - Theory and Praxis
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24629	Symmetric encryption	Vorlesung (V)	2	Willi Geiselmann, Jörn Müller-Quade

Learning Control / Examinations
Es wird empfohlen, das Modul Sicherheit zu belegen.

V Event excerpt: Symmetric encryption (SS 2018)

Aim
The student

- knows the most important algorithms and primitives of symmetric encryption,
- knows and understands the most important attacks on symmetric encryption schemes,
- evaluates the security of given algorithms and recognizes security problems.

Content
This lecture provides the theoretical and practical aspects of symmetric cryptography. The most important topics are:

- Historical ciphers, if they are useful for assessing the security of current ciphers,
- block ciphers and the most important types of attacks (differential and linear cryptanalysis, meet-in-the-middle attacks, slide attacks),
- hash functions - the focus is on attacks and techniques to forge meaningful messages through the use of "meaningless collisions",
- security definitions for symmetric encryption schemes and their modes of operation.

Workload

1. Präsenzzeit in Vorlesungen: 22,5 h
2. Vor-/Nachbereitung derselbigen: 40 h
3. Prüfungsvorbereitung und Präsenz in selbiger: 27 h

T Course: Systems and Software Engineering [T-ETIT-100675]

Responsibility: Eric Sax
Contained in: [M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2311605		Vorlesung (V)	2	Eric Sax
WS 18/19	2311607		Übung (Ü)	1	Marco Stang

Learning Control / Examinations
Written (see actual document "Studienplan" and notice of the examination office ETIT).

Conditions
none

Recommendations
Participation in the lectures Digital System Design (23615) and Information Technology (23622) is advised

T Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsibility: Stefan Nickel
Contained in: [M-WIWI-102832] Operations Research in Supply Chain Management
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2550486		Vorlesung (V)	2	Stefan Nickel
SS 2018	2550487		Übung (Ü)	1	Mitarbeiter, Stefan Nickel

Learning Control / Examinations
The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.
Prerequisite for admission to examination is the succesful completion of the online assessments.

Conditions
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendations
None

Remarks
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

V Event excerpt: (SS 2018)

Aim
The student

- gathers expertise in fundamental techniques from procurement and distribution logistics, methods from inventory management and lot sizing,
- acquires the ability to efficiently utilize quantitative models from transportation planning (long-distance and distribution planning), inventory management and lot sizing in production,
- applies the introduced methods in more detail and in industry-relevant case-studies.

Content
The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models).The exercisesaccompanying the lecture offer the possibility to apply the considered models to practical problems.

Literature
Elective Literature

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T Course: Tax Law I [T-INFO-101315]

Responsibility: Thomas Dreier
Contained in: [M-INFO-101242] Governance, Risk & Compliance
[M-INFO-101216] Private Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24168	Tax Law I	Vorlesung (V)	2	Detlef Dietrich

V Event excerpt: Tax Law I (WS 18/19)

Aim
Ziel der Vorlesung ist eine Einführung in das nationale Unternehmenssteuerrecht. Die auf mehrere Einzelsteuergesetzte verteilten Rechtsnormen , die für die Besteuerung der Unternehmen und deren Inhaber maßgebend sind, werden behandelt. Praktisch verwertbares steuerliches Grundlagenwissen als Bestandteil der modernen Betriebswirtschaftslehre steht im Vordergrund.

Content
Außer einem Grundwissen über die existierenden deutschen Unternehmensformen und den Jahresabschluss (Bilanz, Gewinn- und Verlustrechnung) werden keine steuerrechtlichen Vorkenntnisse benötigt. Die Vorlesung soll einen aktuellen Gesamtüberblick über die wichtigsten Elemente des Rechtsstoffs verschaffen. Der Schwerpunkt liegt bei gewerblich tätigen Betrieben in den gängigen Rechtsformen der Einzelunternehmen, der Personengesellschaft und der Kapitalgesellschaft.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

Literature

- Grashoff Steuerrecht, Verlag C. H. Beck, in der neuesten Auflage
- Tipke/Lang Steuerrecht, Verlag C. H. Beck, in der neuesten Auflage

Weiterführende Literatur

T Course: Tax Law II [T-INFO-101314]

Responsibility: Detlef Dietrich, Thomas Dreier
Contained in: [M-INFO-101216] Private Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24646	Tax Law II	Vorlesung (V)	2	Detlef Dietrich

V Event excerpt: Tax Law II (SS 2018)

Aim
Ziel der Vorlesung ist es, auf den Gebieten der Wirtschafts- und Rechtswissenschaft, aufbauend auf der Überblicksvorlesung 'Einführung in das Unternehmenssteuerrecht' vertiefte Kenntnisse in der betriebswirtschaftlichen Steuerlehre zu verschaffen. Die Studenten erhalten die Grundlage für eine wissenschaftliche Auseinandersetzung mit den steuerlichen Vorschriften und können die Wirkung auf unternehmerische Entscheidungen einschätzen. Hervorgehoben werden solche Steuerrechtsregelungen, die dem Steuerpflichtigen Handlungs- und Entscheidungsmöglichkeiten eröffnen.

Content
Ziel der Vorlesung ist es, auf den Gebieten der Wirtschafts- und Rechtswissenschaft, aufbauend auf der Überblicksvorlesung 'Einführung in das Unternehmenssteuerrecht' vertiefte Kenntnisse in der betriebswirtschaftlichen Steuerlehre zu verschaffen. Die Studenten erhalten die Grundlage für eine wissenschaftliche Auseinandersetzung mit den steuerlichen Vorschriften und können die Wirkung auf unternehmerische Entscheidungen einschätzen. Hervorgehoben werden solche Steuerrechtsregelungen, die dem Steuerpflichtigen Handlungs- und Entscheidungsmöglichkeiten eröffnen.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

Literature

- Grashoff, Steuerrecht,Verlag C.H. Beck, in der neuesten Auflage.
- Spangemacher, Gewerbesteuer, Band 5, Grüne Reihe, Erich Fleischer Verlag
- Falterbaum/Bolk/Reiß/Eberhart, Buchführung und Bilanz, Band 10, Grüne Reihe, Erich Fleischer Verlag
- Tipke, K./Lang, J., Steuerrecht,Köln, in der neuesten Auflage.
- Jäger/Lang Körperschaftsteuer, Band 6, Grüne Reihe, Erich Fleischer Verlag
- Lippross Umsatzsteuer, Band 11, Grüne Reihe, Erich Fleischer Verlag
- Plückebaum/Wendt/ Niemeier/Schlierenkämper Einkommensteuer, Band 3, Grüne Reihe, Erich Fleischer Verlag

Weiterführende Literatur

T Course: Technical conditions met [T-WIWI-106623]

Responsibility:
Contained in: [M-WIWI-101453] Applied Strategic Decisions

ECTS	Recurrence	Exam type	Version
0	Jedes Semester	Studienleistung	1

Learning Control / Examinations
This module element is intended to record the Bachelor-examination "Introduction to Game Theory". In the master module M-WIWI-101453 "Applied Strategic Decisions", this means that the obligatory course "Advanced Game Theory" is not required.

Conditions
None

T Course: Technological Change in Energy Economics [T-WIWI-102694]

Responsibility: Martin Wietschel
Contained in: [M-WIWI-101452] Energy Economics and Technology
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The examination will be offered latest until summer term 2018 (repeaters only).
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation).

Recommendations
None

T Course: Technologies for Innovation Management [T-WIWI-102854]

Responsibility: Daniel Jeffrey Koch
Contained in: [M-WIWI-101507] Innovation Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung anderer Art	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2545106		Block (B)	2	Daniel Jeffrey Koch

Learning Control / Examinations
Presentation and individual paper (ca. 15 pages) as Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
None

Recommendations
Prior attendance of the course Innovationsmanagement: Konzepte, Strategien und Methoden [2545015] is recommended.

V Event excerpt: (WS 18/19)

Aim
Application of a method to analyze technologies in the early ohase of innovation management.

Content
The seminar "Technologies for Innovation Management" will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

Literature
Will be announced in the first session.

T Course: Technology Assessment [T-WIWI-102858]

Responsibility: Daniel Jeffrey Koch
Contained in: [M-WIWI-101507] Innovation Management
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
3	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2545101		Seminar (S)		Daniel Jeffrey Koch

Learning Control / Examinations
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015).

Conditions
None

Recommendations
Prior attendance of the course*Innovation Management*[2545015] is recommended.

Remarks
See German version.

T Course: Telecommunication and Internet Economics [T-WIWI-102713]

Responsibility: Kay Mitusch
Contained in: [M-WIWI-101409] Electronic Markets
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2561232	Telecommunication and Internet Economics	Vorlesung (V)	2	Kay Mitusch
WS 18/19	2561233		Übung (Ü)	1	Kay Mitusch, Christina Wisotzky

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

Conditions
None

Recommendations
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.
Particularly helpful but not necessary: Industrial Economics. Prior attendance of the lecture „Competition in Networks" [26240] or "Industrial Organisation" is helpful in any case but not considered a formal precondition. The english taught course "Communications Economics" is complementary and recommendet for anyone interested in the sector.

V Event excerpt: Telecommunication and Internet Economics (WS 18/19)

Aim
The students

- will know economically relevant technological and organization characteristics of telecommunication networks - fixed and mobile - as well as of the internet
- will understand the complex competition processes in the telecommunication and internet sector
- will be able to analyse these competitive processes by means of analytic instruments and to assess current debates on economic and regulation policies

The lecture is suited for all students who will deal with these sectors in their professional life.

Content
Among the network sectors the telecommunication and internet sector is the most dynamic one and the one with and highest variety of phenomena. Problems of natural monopoly still exist in some parts. But there is also competition, not only at the service level but also at the infrastructural level. Both levels are characterized by (vertical) quality differentiations and by high technology dynamics. What should the regulation of this sector look like? How should the mutual network access prices of two telecommunication providers be regulated and how can regulators set incentives for infrastructure investments?
The internet is a free market par excellence, because everybody can open internet businesses without high entry costs. Why then can a company like ebay dominate the market for internet-auction platforms so strongly? The causes of market concentration on the internet will be analyzed. So will be the economic implications of the Next Generations Networks.

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

Literature
J.-J. Laffont, J. Tirole (2000): Competition in Telecommunications, MIT Press.

Zarnekow, Wulf, Bronstaedt (2013): Internetwirtschaft: Das Geschäft des Datentransports im Internet.
Further literature will be provided during the lecture

T Course: Telecommunications Law [T-INFO-101309]

Responsibility: Nikolaus Marsch
Contained in: [M-INFO-101217] Public Business Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24632		Vorlesung (V)	2	Nikolaus Marsch

V Event excerpt: (SS 2018)

Aim
Die Telekommunikation ist die technische Grundlage der Informationswirtschaft. In welcher Art und Weise beispielsweise UMTS reguliert wird, ist von maßgeblicher Bedeutung für die Bereitstellung von Diensten in der Welt der mobilen Inhaltsdienste. Die zentralen Vorgaben der Telekommunikationsregulierung finden sich im Telekommunikationsgesetz (TKG). Dieses ist infolge gemeinschaftsrechtlicher Vorgaben 2004 vollständig novelliert worden. Die Vorlesung vermittelt dem Studenten die für das Verstehen der Rahmenbedingungen der Informationsgesellschaft unablässigen telekommunikationsrechtlichen Kenntnisse.

Content
Die Vorlesung bietet einen Überblick über das neue TKG. Dabei wird die ganze Bandbreite der Regulierung behandelt: Von den materiellrechtlichen Instrumenten der wettbewerbsschaffenden ökonomischen Regulierung (Markt-, Zugangs-, Entgeltregulierung sowie besondere Missbrauchsaufsicht) und der nicht-ökonomischen Regulierung (Kundenschutz; Rundfunkübertragung; Vergabe von Frequenzen, Nummern und Wegerechten; Fernmeldegeheimnis; Datenschutz und öffentliche Sicherheit) bis hin zur institutionellen Ausgestaltung der Regulierung. Zum besseren Verständnis werden zu Beginn der Vorlesung die technischen und ökonomischen Grundlagen sowie die gemeinschafts- und verfassungsrechtlichen Vorgaben geklärt.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt bei 3 Leistungspunkten 90 h, davon 22,5 Präsenz.

Literature
Da der Rechtsstoff teilweise im Diskurs mit den Studierenden erarbeitet werden soll, ist eine aktuelle Version des TKG zu der Vorlesung mitzubringen.
Weitere Literatur wird in der Vorlesung angegeben.
Weiterführende Literatur
Erweiterte Literaturangaben werden in der Vorlesung bekannt gegeben.

T Course: Telematics [T-INFO-101338]

Responsibility: Martina Zitterbart
Contained in: [M-INFO-101205] Future Networking
[M-INFO-101206] Networking
[M-INFO-100801] Telematics
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
6	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24128	Telematics	Vorlesung (V)	3	Robert Bauer, Sebastian Friebe, Hauke Alexander Heseding, Mario Hock, Martina Zitterbart

V Event excerpt: Telematics (WS 18/19)

Aim
Studierende

- beherrschen Protokolle, Architekturen, sowie Verfahren und Algorithmen, die im Internet für die Wegewahl und für das Zustandekommen einer zuverlässigen Ende-zu-Ende-Verbindung zum Einsatz kommen, sowie verschiedenen Medienzuteilungsverfahren in lokalen Netzen und weitere Kommunikationssysteme wie das leitungsvermittelte ISDN.
- besitzen ein Systemverständnis sowie Verständnis für die in einem weltumspannenden, dynamischen Netz auftretenden Probleme und der zur Abhilfe eingesetzten Mechanismen.
- sind mit aktuellen Entwicklungen wie z.B. SDN und Datacenter-Networking vertraut.
- kennen Möglichkeiten zur Verwaltung und Administration von Netzen.

Studierende beherrschen die grundlegenden Protokollmechanismen zur Etablierung zuverlässiger Ende-zu-Ende-Kommunikation. Studierende besitzen detailliertes Wissen über die bei TCP verwendeten Mechanismen zur Stau- und Flusskontrolle und können die Problematik der Fairness bei mehreren parallelen Transportströmen erörtern. Studierende können die Leistung von Transportprotokollen analytisch bestimmen und kennen Verfahren zur Erfüllung besonderer Rahmenbedingungen mit TCP, wie z.B. hohe Datenraten und kurze Latenzen. Studierende sind mit aktuellen Themen, wie der Problematik von Middleboxen im Internet, dem Einsatz von TCP in Datacentern und Multipath-TCP, vertraut. Studierende können Transportprotokolle in der Praxis verwenden und kennen praktische Möglichkeiten zu Überwindung der Heterogenität bei der Entwicklung verteilter Anwendungen, z.B. mithilfe von ASN.1 und BER.
Studierende kennen die Funktionen von Routern im Internet und können gängige Routing-Algorithmen wiedergeben und anwenden. Studierende können die Architektur eines Routers wiedergeben und kennen verschiedene Ansätze zur Platzierung von Puffern sowie deren Vor- und Nachteile. Studierende verstehen die Aufteilung von Routing-Protokolle in Interior und Exterior Gateway Protokolle und besitzen detaillierte Kenntnisse über die Funktionalität und die Eigenschaften von gängigen Protokollen wie RIP, OSPF und BGP. Die Studierenden sind mit aktuellen Themen wie IPv6 und SDN vertraut.
Studierende kennen die Funktion von Medienzuteilung und können Medienzuteilungsverfahren klassifizieren und analytisch bewerten. Studierende besitzen vertiefte Kenntnisse zu Ethernet und kennen verschiedene Ethernet-Ausprägungen und deren Unterschiede, insbesondere auch aktuelle Entwicklungen wie Echtzeit-Ethernet und Datacenter-Ethernet. Studierende können das Spanning-Tree-Protocol wiedergeben und anwenden. Studierende kennen die grundlegende Funktionsweise der Hilfsprotokolle LLC und PPP.
Studierende kennen die physikalischen Grundlagen, die bei dem Entwurf und die Bewertung von digitalen Leitungscodes relevant sind. Studierende können verbreitete Kodierungen anwenden und kennen deren Eigenschaften.

Studierende kennen die Architektur von ISDN und können insbesondere die Besonderheiten beim Aufbau des ISDN-Teilnehmeranschlusses wiedergeben. Studierende besitzen grundlegende Kenntnisse über das weltweite Telefonnetz SS7. Studierende können die technischen Besonderheiten von DSL wiedergeben. Studierende sind mit dem Konzept des Label Switching vertraut und können existierende Ansätze wie ATM und MPLS miteinander vergleichen. Studierende sind mit den grundlegenden Herausforderungen bei dem Entwurf optischer Transportnetze vertraut und kennen die grundlegenden Techniken, die bei SDH und DWDM angewendet werden.

Content
Die Vorlesung behandelt Protokolle, Architekturen, sowie Verfahren und Algorithmen, die u.a. im Internet für die Wegewahl und für das Zustandekommen einer zuverlässigen Ende-zu-Ende-Verbindung zum Einsatz kommen. Neben verschiedenen Medienzuteilungsverfahren in lokalen Netzen werden auch weitere Kommunikationssysteme, wie z.B. das leitungsvermittelte ISDN behandelt. Die Teilnehmer sollten ebenfalls verstanden haben, welche Möglichkeiten zur Verwaltung und Administration von Netzen zur Verfügung stehen.

Workload
Vorlesung mit 3 SWS plus Nachbereitung/Prüfungsvorbereitung, 6 LP.
6 LP entspricht ca. 180 Arbeitsstunden, davon
ca. 60 Std. Vorlesungsbesuch
ca. 60 Std. Vor-/Nachbereitung
ca. 60 Std. Prüfungsvorbereitung

Literature
S. Keshav. An Engineering Approach to Computer Networking. Addison-Wesley, 1997 J.F. Kurose, K.W. Ross. Computer Networking: A Top-Down Approach Featuring the Internet. 4rd Edition, Addison-Wesley, 2007 W. Stallings. Data and Computer Communications. 8th Edition, Prentice Hall, 2006 Weiterführende Literatur ▪ D. Bertsekas, R. Gallager. Data Networks. 2nd Edition, Prentice-Hall, 1991 ▪ F. Halsall. Data Communications, Computer Networks and Open Systems. 4th Edition, Addison-Wesley Publishing Company, 1996 ▪ W. Haaß. Handbuch der Kommunikationsnetze. Springer, 1997 ▪ A.S. Tanenbaum. Computer-Networks. 4th Edition, Prentice-Hall, 2004 ▪ Internet-Standards ▪ Artikel in Fachzeitschriften

T Course: Theory of Business Cycles [T-WIWI-102824]

Responsibility: Marten Hillebrand
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
Please note: There are no further examination dates for this course.
The assessment consists of 60 min. written exam (according to Section 4 (2), 1 of the examination regulation).
Exams are confined to the following dates: Beginning of the recess period (mid February) and beginning of the summer semester (early April).

Recommendations
Basic knowledge in micro- and macroeconomics, as conveyed in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014], is assumed.
Participants are expected to bring a strong interest in mathematical economics and quantitative model building.

Remarks
All classes will be held in English.

T Course: Theory of Endogenous Growth [T-WIWI-102785]

Responsibility: Ingrid Ott
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Conditions
None

Recommendations
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Remarks
Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

T Course: Topics in Experimental Economics [T-WIWI-102863]

Responsibility: Johannes Philipp Reiß
Contained in: [M-WIWI-101505] Experimental Economics
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4.5	Unregelmäßig	Prüfungsleistung schriftlich	1

Learning Control / Examinations
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

Remarks
The course is offered in summer 2020 for the next time, not in summer 2018.

T Course: Trademark and Unfair Competition Law [T-INFO-101313]

Responsibility: Yvonne Matz
Contained in: [M-INFO-101215] Intellectual Property Law
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24136	Trademark and Unfair Competition Law	Vorlesung (V)	2	Yvonne Matz

V Event excerpt: Trademark and Unfair Competition Law (WS 18/19)

Aim
Der/die Studierende kennt die strukturellen Grundlagen des nationalen sowie des europäischen Kennzeichenrechts. Er/sie kennt insbesondere die Schutzvoraussetzungen der eingetragenen Marke ebenso wie der Benutzungsmarke. Er/sie ist vertraut sowohl mit dem nationalen als auch mit dem europäischen markenrechtlichen Anmeldeverfahren, Er/sie weiß, welche Schutzansprüche ihm/ihr aus der Verletzung seines/ihres Kennzeichenrechts zustehen und welche Rechte anderer Kennzeicheninhaber zu beachten sind. Ferner ist er/sie vertraut mit dem Recht der geschäftlichen Bezeichnungen, der Werktitel und der geographischen Herkunftsangaben.
Am Ende der Vorlesung besitzt der/die Studierende die Fähigkeit, sich in kennzeichenrechtliche Problematiken einzuarbeiten und Lösungen zu entwickeln.

Content
Die Vorlesung befasst sich mit den Grundfragen des Markenrechts: was ist eine Marke, wie erhalte ich Markenschutz, welche Rechte habe ich als Markeninhaber, welche Rechte anderer Markeninhaber muss ich beachten, welche anderen Kennzeichenrechte gibt es, etc. Die Studenten werden auch in die Grundlagen des europäischen und internationalen Kennzeichenrechts eingeführt.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt 90 h, davon 22,5 h Präsenz, 45 h Vor- und Nachbereitungszeit sowie 22,5 h für die Klausurvorbereitung.

Literature

- Berlit, Wolfgang: Markenrecht, Verlag C.H.Beck, ISBN 3-406-53782-0, neueste Auflage.

T Course: Ubiquitous Computing [T-INFO-101326]

Responsibility: Michael Beigl
Contained in: [M-INFO-100789] Ubiquitous Computing
[M-WIWI-101458] Ubiquitous Computing
[M-INFO-101203] Wireless Networking
[M-INFO-101210] Dynamic IT-Infrastructures
[M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
5	Jedes Wintersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	24146		Vorlesung / Übung (VÜ)	2+1	Michael Beigl

V Event excerpt: (WS 18/19)

Aim
Ziel der Vorlesung ist es, Kenntnisse über Grundlagen und weitergehende Methoden und Techniken des Ubiquitous Computing zu vermitteln. Nach Abschluss der Vorlesung können die Studierenden

- das erlernte Wissen über existierende Ubiquitous Computing Systeme wiedergeben und erörtern.
- die allgemeinen Kenntnisse zu Ubiquitären Systemen bewerten und Aussagen und Gesetzmäßigkeiten auf Sonderfälle übertragen.
- unterschiedliche Methoden zu Design-Prozessen und Nutzerstudien bewerten und beurteilen sowie geeignete Methoden für die Entwicklung neuer Lösungen auswählen.
- selbst neue ubiquitäre Systeme für den Einsatz in Alltags- oder industriellen Prozessumgebungen erfinden, planen, entwerfen und bewerten sowie Aufwände und technische Implikationen bemessen.

Content
Die Vorlesung gibt einen Überblick über Konzepte, Theorien und Methoden der Ubiquitären Informationstechnologie (Ubiquitous Computing). Anhand des Appliance-Konzepts werden dann in der Übung von den Studierenden eigene Appliances entworfen, die Konstruktion geplant und dann entwickelt. Die notwendigen technischen und methodischen Grundlagen wie Hardware für Ubiquitäre Systeme, Software für Ubiquitäre Systeme, Prinzipien der Kontexterkennung für Ubiquitäre Systeme, Vernetzung Ubiquitärerer Systeme und Entwurf von Ubiquitären Systemen und insbesondere Information Appliances werden thematisiert. In Ubiquitous Computing entwickelte Methoden des Entwurfs und Testens für Mensch-Maschine Interaktion und Mensch-Maschine Schnittstellen werden ausführlich erklärt. Es findet auch eine Einführung findet in die wirtschaftlichen Aspekte eines Ubiquitären Systems statt.
Im Übungsteil der Vorlesung wird durch praktische Anwendung der Wissensgrundlage der Vorlesung das Verständnis in Ubiquitäre Systeme vertieft. Die Studierenden entwerfen und entwickeln dazu eine eigene Appliance und testen diese. Ziel ist es die Schritte hin zu einer prototypischen und eventuell marktfähigen Appliance durchlaufen zu haben.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 150 Stunden (5.0 Credits).
Aktivität
Arbeitsaufwand
Präsenzzeit: Besuch der Vorlesung
15 x 90 min
22 h 30 min
Präsenzzeit: Besuch der Übung
15 x 45 min
11 h 15 min

Vor- / Nachbereitung der Vorlesung und Übung
15 x 90 min
22 h 30 min
Selbstentwickeltes Konzept für eine Information Appliance entwickeln
33 h 45 min
Foliensatz 2x durchgehen
2 x 12 h
24 h 00 min
Prüfung vorbereiten
36 h 00 min
SUMME
150 h 00 min
Arbeitsaufwand für die Lerneinheit "Ubiquitäre Informationstechnologien"

T Course: Valuation [T-WIWI-102621]

Responsibility: Martin Ruckes
Contained in: [M-WIWI-101482] Finance 1
[M-WIWI-101483] Finance 2
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
4.5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2530212	Valuation	Vorlesung (V)	2	Martin Ruckes
WS 18/19	2530213		Übung (Ü)	1	Martin Ruckes, Meik Scholz-Daneshgari

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

V Event excerpt: Valuation (WS 18/19)

Aim
Students are able to

- evaluate complex investment projects by taking a financial view,
- value firms,
- assess the advantageousness of potential merger and acquisitions.

Content
Topics:

- Projections of cash flows
- Estimation of the cost of capital
- Valuation of the firm
- Mergers and acquisitions
- Real options

Literature
Elective Literature
Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T Course: Web Applications and Service-Oriented Architectures (II) [T-INFO-101271]

Responsibility: Sebastian Abeck
Contained in: [M-INFO-104061] Microservice-Based Web Applications

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Sommersemester	Prüfungsleistung mündlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	24677	Web Applications and Service oriented Architectures (II)	Vorlesung (V)	2	Sebastian Abeck

V Event excerpt: Web Applications and Service oriented Architectures (II) (SS 2018)

Aim

- Die Studierenden können die Inhalte der wichtigsten Konzepte und Technologien, die zur Entwicklung von serviceorientierten Web-Anwendungen erforderlich sind, wiedergeben. (Wissen und Verstehen).
- Die Studierenden können die Softwarearchitektur einer serviceorientierten Web-Anwendung modellieren (Anwenden).
- Die Studierenden können die vermittelten Web-Technologien an einem ausgewählten Ausschnitt einer serviceorientierten Web-Anwendung anwenden (Anwenden).
- Die Studierenden können die Qualität gewisser Service-Eigenschaften einer Web-Anwendung durch den Einsatz von Metriken bestimmen (Beurteilen).

Content
Fortgeschrittene Webanwendungen folgen dem Paradigma der Serviceorientierung, indem diese Funktionalität in Form von Webservices über das Internet bereitstellen. Die Webservice-Technologie und die dazu bestehenden wichtigsten Standards werden eingeführt und deren Einsatz wird anhand des Beispiels aufgezeigt.

Workload
120h
Präsenzzeit Vorlesung 22,5 (15 x 1,5 Std)
Vor- und Nachbereitung Vorlesung 75 (15 x 5)
Vorbereitung Prüfung 22,5

Literature

- Wolfgang Dostal, Mario Jaeckle, Ingo Melzer, Barbara Zengler: Service-orientierte Architekturen mit Web Services, Elsevier Spektrum Akademischer Verlag, 2005.
- Thomas Erl, Anish Karmarkar et al.: Web Service Contract Design and Versioning or SOA, Prentice Hall, 2009.
- Michael P. Papazoglou: Web Services: Principles and Technology, Pearson Education, 2008.

T Course: Web Science [T-WIWI-103112]

Responsibility: York Sure-Vetter
Contained in: [M-WIWI-102827] Service Computing
[M-WIWI-101455] Web Data Management
[M-WIWI-101457] Semantic Technologies
[M-INFO-102233] Further Examinations

ECTS	Language	Recurrence	Exam type	Version
5	englisch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2511312	Web Science	Vorlesung (V)	2	York Sure-Vetter
WS 18/19	2511313	Exercises to Web Science	Übung (Ü)	1	Lars Heling, York Sure-Vetter

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None

Remarks
New course starting winter term 2015/2016.

V Event excerpt: Web Science (WS 18/19)

Aim
The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.

Content
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Workload

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World, by David Easley and Jon Kleinberg, 2010 (free online book: http://www.cs.cornell.edu/home/kleinber/networks-book/)

- Thelwall, M. (2009). Social network sites: Users and uses. In: M. Zelkowitz (Ed.), Advances in Computers 76. Amsterdam: Elsevier (pp. 19-73)

T Course: Wildcard Additional Examinations 1 [T-INFO-103926]

Responsibility:
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
1	Jedes Semester	Studienleistung	1

Conditions
none

T Course: Wildcard Additional Examinations 11 [T-INFO-103980]

Responsibility:
Contained in: [M-INFO-102233] Further Examinations

ECTS	Exam type	Version
2	Prüfungsleistung anderer Art	1

T Course: Wildcard Additional Examinations 21 [T-WIWI-103825]

Responsibility:
Contained in: [M-INFO-102233] Further Examinations

ECTS	Exam type	Version
5	Prüfungsleistung anderer Art	1

T Course: Wildcard Additional Examinations 30 [T-INFO-108306]

Responsibility:
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Semester	Prüfungsleistung schriftlich	1

T Course: Wildcard Additional Examinations 31 [T-WIWI-108305]

Responsibility:
Contained in: [M-INFO-102233] Further Examinations

ECTS	Recurrence	Exam type	Version
4	Jedes Semester	Prüfungsleistung schriftlich	1

T Course: Wildcard Additional Examinations 4 [T-WIWI-103808]

Responsibility:
Contained in: [M-INFO-102233] Further Examinations

ECTS	Exam type	Version
2	Studienleistung	1

T Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

Responsibility: Hagen Lindstädt
Contained in: [M-WIWI-103119] Advanced Topics in Strategy and Management

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2018	2577912	Workshop Business Wargaming - Analyzinig Strategic Interactions	Seminar (S)	2	Nicolas Burkardt, Hagen Lindstädt

Learning Control / Examinations
Non exam assessment (following §4(2) 3 of the examination regulation).

Conditions
None

Recommendations
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Remarks
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

V Event excerpt: Workshop Business Wargaming - Analyzinig Strategic Interactions (SS 2018)

Aim
Der/die Studierende

- können selbstständig und strukturiert strategische Konfliktsituationen analysieren und Empfehlungen ableiten
- können ihre Position durch eine durchdachte Argumentationsweise in strukturierten Diskussionen überzeugend darlegen

Content
In this course, students simulate and analyze real-life conflict situations using Business Wargaming methods. The students will be able to understand the underlying structure and dynamics of various conflicts, this includes making own conclusions as well as deriving strategic recommendations.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

T Course: Workshop Current Topics in Strategy and Management [T-WIWI-106188]

Responsibility: Hagen Lindstädt
Contained in: [M-WIWI-103119] Advanced Topics in Strategy and Management

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Unregelmäßig	Prüfungsleistung anderer Art	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 18/19	2577921	Workshop Current Topics in Strategy and Management	Seminar (S)	2	Assistenten, Hagen Lindstädt

Learning Control / Examinations
Non exam assessment (following §4(2) 3 of the examination regulation).

Conditions
None

Recommendations
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Remarks
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.
The course is planned to be held for the first time in the winter term 2017/18.

V Event excerpt: Workshop Current Topics in Strategy and Management (WS 18/19)

Aim
Students

- are able to analyze business strategies and derive recommendations for the management
- learn to express their position through compelling reasoning in structured discussions

Content
In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Masterstudiengang Informationswirtschaft

vom 24. September 2015

Aufgrund von § 10 Absatz 2 Ziff. 5 und § 20 des Gesetzes über das Karlsruher Institut für Technologie (KIT-Gesetz - KITG) in der Fassung vom 14. Juli 2009 (GBl. S. 317 f), zuletzt geändert durch Artikel 5 des Dritten Gesetzes zur Änderung hochschulrechtlicher Vorschriften (3. Hochschulrechtsänderungsgesetz – 3. HRÄG) vom 01. April 2014 (GBl. S. 99, 167) und § 8 Absatz 5 des Gesetzes über die Hochschulen in Baden-Württemberg (Landeshochschulgesetz - LHG) in der Fassung vom 1. Januar 2005 (GBl. S. 1 f), zuletzt geändert durch Artikel 1 des 3. HRÄG vom 01. April 2014 (GBl. S. 99 ff.), hat der Senat des KIT am 21. September 2015 die folgende Studien- und Prüfungsordnung für den Masterstudiengang Informationswirtschaft beschlossen.

Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 KITG iVm. § 32 Absatz 3 Satz 1 LHG am 24. September 2015 erteilt.

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Präambel

Das KIT hat sich im Rahmen der Umsetzung des Bolognaprozesses zum Aufbau eines Europäischen Hochschulraumes zum Ziel gesetzt, dass am Abschluss des Studiums am KIT der Mastergrad stehen soll. Das KIT sieht daher die am KIT angebotenen konsekutiven Bachelor- und Masterstudiengänge als Gesamtkonzept mit konsekutivem Curriculum.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich

Diese Masterprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Masterstudiengang Informationswirtschaft 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 Informationswirtschaft verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Die Regelstudienzeit beträgt vier Semester.

(2) Das Lehrangebot des Studiengangs ist in Fächer, die Fächer sind in Module, die jeweiligen Module in Lehrveranstaltungen gegliedert. Die Fächer und ihr Umfang werden in § 19 festgelegt. Näheres beschreibt das Modulhandbuch.

(3) Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (LP) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem European Credit Transfer System (ECTS). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Zeitstunden. Die Verteilung der Leistungspunkte auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(4) Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studien- und Prüfungsleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 120 Leistungspunkte.

(5) Lehrveranstaltungen können nach vorheriger Ankündigung auch in englischer Sprache angeboten werden.

§ 4 Modulprüfungen, Studien- und Prüfungsleistungen

(1) Die Masterprüfung besteht aus Modulprüfungen. Modulprüfungen bestehen aus einer oder mehreren Erfolgskontrollen.

Erfolgskontrollen gliedern sich in Studien- oder Prüfungsleistungen.

(2) Prüfungsleistungen sind:

1. schriftliche Prüfungen,
2. mündliche Prüfungen oder
3. Prüfungsleistungen anderer Art.

(3) Studienleistungen sind schriftliche, mündliche oder praktische Leistungen, die von den Studierenden in der Regel lehrveranstaltungsbegleitend erbracht werden. Die Masterprüfung darf nicht mit einer Studienleistung abgeschlossen werden.

(4) Von den Modulprüfungen sollen mindestens 70 % benotet sein.

(5) Bei sich ergänzenden Inhalten können die Modulprüfungen mehrerer Module durch eine auch modulübergreifende Prüfungsleistung (Absatz 2 Nr.1 bis 3) ersetzt werden.

§ 5 Anmeldung und Zulassung zu den Modulprüfungen und Lehrveranstaltungen

(1) Um an den Modulprüfungen teilnehmen zu können, müssen sich die Studierenden online im Studierendenportal zu den jeweiligen Erfolgskontrollen anmelden. In Ausnahmefällen kann eine Anmeldung schriftlich im Studierendenservice oder in einer anderen vom Studierendenservice autorisierten Einrichtung erfolgen. Für die Erfolgskontrollen können durch die Prüfenden Anmeldefristen festgelegt werden. Die Anmeldung der Masterarbeit ist im Modulhandbuch geregelt.

(2) Sofern Wahlmöglichkeiten bestehen, müssen Studierende, um zu einer Prüfung in einem bestimmten Modul zugelassen zu werden, vor der ersten Prüfung in diesem Modul mit der Anmeldung zu der Prüfung eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach abgeben. Auf Antrag des/der Studierenden an den Prüfungsausschuss kann die Wahl oder die Zuordnung nachträglich geändert werden. Sofern bereits ein Prüfungsverfahren in einem Modul begonnen wurde, ist die Änderung der Wahl oder der Zuordnung erst nach Beendigung des Prüfungsverfahrens zulässig.

(3) Zu einer Erfolgskontrolle ist zuzulassen, wer

1. in den Masterstudiengang Informationswirtschaft 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 Informationswirtschaft den Prüfungsanspruch nicht verloren hat.

(4) Nach Maßgabe von § 30 Abs. 5 LHG kann die Zulassung zu einzelnen Pflichtveranstaltungen beschränkt werden. Der/die Prüfende entscheidet über die Auswahl unter den Studierenden, die sich rechtzeitig bis zu dem von dem/der Prüfenden festgesetzten Termin angemeldet haben unter Berücksichtigung des Studienfortschritts dieser Studierenden und unter Beachtung von § 13 Abs. 1 Satz 1 und 2, sofern ein Abbau des Überhangs durch andere oder zusätzliche Veranstaltungen nicht möglich ist. Für den Fall gleichen Studienfortschritts sind durch die KIT-Fakultäten weitere Kriterien festzulegen. Das Ergebnis wird den Studierenden rechtzeitig bekannt gegeben.

(5) Die Zulassung ist zu versagen, wenn die in Absatz 3 und 4 genannten Voraussetzungen nicht erfüllt sind. Die Zulassung kann versagt werden, wenn die betreffende Erfolgskontrolle bereits in einem grundständigen Bachelorstudiengang am KIT erbracht wurde, der Zulassungsvoraussetzung für diesen Masterstudiengang gewesen ist. Dies gilt nicht für Mastervorzugsleistungen. Zu diesen ist eine Zulassung nach Maßgabe von Satz 1 ausdrücklich zu genehmigen.

§ 6 Durchführung von Erfolgskontrollen

(1) Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

(2) Die Art der Erfolgskontrolle (§ 4 Abs. 2 Nr. 1 bis 3, Abs. 3) wird von der/dem Prüfenden der betreffenden Lehrveranstaltung in Bezug auf die Lerninhalte der Lehrveranstaltung und die

Lernziele des Moduls festgelegt. Die Art der Erfolgskontrolle, ihre Häufigkeit, Reihenfolge und Gewichtung sowie gegebenenfalls die Bildung der Modulnote müssen mindestens sechs Wochen vor Vorlesungsbeginn im Modulhandbuch bekannt gemacht werden. Im Einvernehmen von Prüfendem und Studierender bzw. Studierendem können die Art der Prüfungsleistung sowie die Prüfungssprache auch nachträglich geändert werden; im ersten Fall ist jedoch § 4 Abs. 4 zu berücksichtigen. Bei der Prüfungsorganisation sind die Belange Studierender mit Behinderung oder chronischer Erkrankung gemäß § 13 Abs. 1 zu berücksichtigen. § 13 Abs. 1 Satz 3 und 4 gelten entsprechend.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfungsleistung auch mündlich, oder eine mündlich durchzuführende Prüfungsleistung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfungsleistung bekannt gegeben werden.

(4) Bei Lehrveranstaltungen in englischer Sprache (§ 3 Abs. 6) können die entsprechenden Erfolgskontrollen in dieser Sprache abgenommen werden. § 6 Abs. 2 gilt entsprechend.

(5) *Schriftliche Prüfungen* (§ 4 Abs. 2 Nr. 1) sind in der Regel von einer/einem Prüfenden nach § 18 Abs. 2 oder 3 zu bewerten. Sofern eine Bewertung durch mehrere Prüfende erfolgt, ergibt sich die Note aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 7 Abs. 2 Satz 2 definierten Notenstufen, so ist auf die nächstliegende Notenstufe auf- oder abzurunden. Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Prüfungen dauern mindestens 60 und höchstens 300 Minuten.

(6) *Mündliche Prüfungen* (§ 4 Abs. 2 Nr. 2) sind von mehreren Prüfenden (Kollegialprüfung) oder von einer/einem Prüfenden in Gegenwart einer oder eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört die/der Prüfende die anderen an der Kollegialprüfung mitwirkenden Prüfenden an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 60 Minuten pro Studierenden.

Die wesentlichen Gegenstände und Ergebnisse der *mündlichen Prüfung* sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist den Studierenden im Anschluss an die mündliche Prüfung bekannt zu geben.

Studierende, die sich in einem späteren Semester der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen und nach Zustimmung des Prüflings als Zuhörerinnen und Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse.

(7) Für *Prüfungsleistungen anderer Art* (§ 4 Abs. 2 Nr. 3) sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Prüfungsleistung dem/der Studierenden zurechenbar ist. Die wesentlichen Gegenstände und Ergebnisse der Erfolgskontrolle sind in einem Protokoll festzuhalten.

Bei *mündlich* durchgeführten *Prüfungsleistungen anderer Art* muss neben der/dem Prüfenden ein/e Beisitzende/r anwesend sein, die/der zusätzlich zum/zur Prüfenden das Protokoll zeichnet.

Schriftliche Arbeiten im Rahmen einer *Prüfungsleistung anderer Art* haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde.“ Trägt die Arbeit diese Erklärung nicht, wird sie nicht angenommen. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

§ 6 a Erfolgskontrollen im Antwort-Wahl-Verfahren

Das Modulhandbuch regelt, ob und in welchem Umfang Erfolgskontrollen im Wege des *Antwort-Wahl-Verfahrens* abgelegt werden können

§ 6 b Computergestützte Erfolgskontrollen

(1) Erfolgskontrollen können computergestützt durchgeführt werden. Dabei wird die Antwort bzw. Lösung der/des Studierenden elektronisch übermittelt und, sofern möglich, automatisiert ausgewertet. Die Prüfungsinhalte sind von einer/einem Prüfenden zu erstellen.
(2) Vor der computergestützten Erfolgskontrolle hat die/der Prüfende sicherzustellen, dass die elektronischen Daten eindeutig identifiziert und unverwechselbar und dauerhaft den Studierenden zugeordnet werden können. Der störungsfreie Verlauf einer computergestützten Erfolgskontrolle ist durch entsprechende technische Betreuung zu gewährleisten, insbesondere ist die Erfolgskontrolle in Anwesenheit einer fachlich sachkundigen Person durchzuführen. Alle Prüfungsaufgaben müssen während der gesamten Bearbeitungszeit zur Bearbeitung zur Verfügung stehen.

(3) Im Übrigen gelten für die Durchführung von computergestützten Erfolgskontrollen die §§ 6 bzw. 6 a.

§ 7 Bewertung von Studien- und Prüfungsleistungen

(1) Das Ergebnis einer Prüfungsleistung wird von den jeweiligen Prüfenden in Form einer Note festgesetzt.

(2) Folgende Noten sollen verwendet werden:

sehr gut (very good)	:	hervorragende Leistung,
gut (good)	:	eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt,
befriedigend (satisfactory)	:	eine Leistung, die durchschnittlichen Anforderungen entspricht,
ausreichend (sufficient)	:	eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt,
nicht ausreichend (failed)	:	eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt.

Zur differenzierten Bewertung einzelner Prüfungsleistungen sind nur folgende Noten zugelassen:

1,0; 1,3	:	sehr gut
1,7; 2,0; 2,3	:	gut
2,7; 3,0; 3,3	:	befriedigend
3,7; 4,0	:	ausreichend
5,0	:	nicht ausreichend

(3) Studienleistungen werden mit „bestanden“ oder mit „nicht bestanden“ gewertet.

(4) Bei der Bildung der gewichteten Durchschnitte der Modulnoten, der Fachnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

(5) Jedes Modul und jede Erfolgskontrolle darf in demselben Studiengang nur einmal gewertet werden.

(6) Eine Prüfungsleistung ist bestanden, wenn die Note mindestens „ausreichend“ (4,0) ist.

(7) Die Modulprüfung ist bestanden, wenn alle erforderlichen Erfolgskontrollen bestanden sind. Die Modulprüfung und die Bildung der Modulnote sollen im Modulhandbuch geregelt werden.

Sofern das Modulhandbuch keine Regelung über die Bildung der Modulnote enthält, errechnet sich die Modulnote aus einem nach den Leistungspunkten der einzelnen Teilmodule gewichteter Notendurchschnitt. Die differenzierten Noten (Absatz 2) sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden.

(8) Die Ergebnisse der Erfolgskontrollen sowie die erworbenen Leistungspunkte werden durch den Studierendenservice des KIT verwaltet.

(9) Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

(10) Die Gesamtnote der Masterprüfung, die Fachnoten und die Modulnoten lauten:

		bis	1,5	=	sehr gut
von	1,6	bis	2,5	=	gut
von	2,6	bis	3,5	=	befriedigend
von	3,6	bis	4,0	=	ausreichend

§ 8 Wiederholung von Erfolgskontrollen, endgültiges Nichtbestehen

(1) Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nr. 1) einmal wiederholen. Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend“ (5,0) bewertet, so findet eine mündliche Nachprüfung im zeitlichen Zusammenhang mit dem Termin der nicht bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als „ausreichend“ (4,0) sein.

(2) Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nr. 2) einmal wiederholen.

(3) Wiederholungsprüfungen nach Absatz 1 und 2 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten entsprechen. Ausnahmen kann der zuständige Prüfungsausschuss auf Antrag zulassen.

(4) Prüfungsleistungen anderer Art (§ 4 Absatz 2 Nr. 3) können einmal wiederholt werden.

(5) Studienleistungen können mehrfach wiederholt werden.

(6) Die Wiederholung von Prüfungsleistungen hat spätestens bis zum Ende des Prüfungszeitraumes des vierten Semesters, das auf das Semester, in dem die Prüfung erstmals nicht bestanden wurde, folgt, zu erfolgen. Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

(7) Die Prüfungsleistung ist endgültig nicht bestanden, wenn die mündliche Nachprüfung im Sinne des Absatzes 1 mit „nicht ausreichend“ (5,0) bewertet wurde. Die Prüfungsleistung ist ferner endgültig nicht bestanden, wenn die mündliche Prüfung im Sinne des Absatzes 2 oder die Prüfungsleistung anderer Art gemäß Absatz 4 zweimal mit „nicht bestanden“ bewertet wurde.

(8) Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

(9) Eine zweite Wiederholung derselben Prüfungsleistung gemäß § 4 Abs. 2 ist nur in Ausnahmefällen auf Antrag des/der Studierenden zulässig („Antrag auf Zweitwiederholung“). Der Antrag ist schriftlich beim Prüfungsausschuss in der Regel bis zwei Monate nach Bekanntgabe der Note zu stellen.

Über den ersten Antrag eines/einer Studierenden auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet ein Mitglied des Präsidiums. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses ein Mitglied des Präsidiums. Wird

der Antrag genehmigt, hat die Zweitwiederholung spätestens zum übernächsten Prüfungstermin zu erfolgen. Absatz 1 Satz 2 und 3 gelten entsprechend.

(10) Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

(11) Die Masterarbeit kann bei einer Bewertung mit „nicht ausreichend“ (5,0) einmal wiederholt werden. Eine zweite Wiederholung der Masterarbeit ist ausgeschlossen.

§ 9 Verlust des Prüfungsanspruchs

Ist eine nach dieser Studien- und Prüfungsordnung erforderliche Studien- oder Prüfungsleistung endgültig nicht bestanden oder eine Wiederholungsprüfung nach § 8 Abs. 6 nicht rechtzeitig erbracht oder die Masterprüfung bis zum Ende des Prüfungszeitraums des siebten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Masterstudiengang Informationswirtschaft, 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 Anmeldung gegenüber dem/der Prüfenden hat diese/r Sorge zu tragen, dass die Abmeldung im Campus Management System verbucht wird.

(2) Bei *mündlichen Prüfungen* muss die Abmeldung spätestens drei Werktage vor dem betreffenden Prüfungstermin gegenüber dem/der Prüfenden erklärt werden. Der Rücktritt von einer mündlichen Prüfung weniger als drei Werktage vor dem betreffenden Prüfungstermin ist nur unter den Voraussetzungen des Absatzes 5 möglich. Der Rücktritt von mündlichen Nachprüfungen im Sinne von § 9 Abs. 1 ist grundsätzlich nur unter den Voraussetzungen von Absatz 5 möglich.

(3) Die Abmeldung von *Prüfungsleistungen anderer Art* sowie von *Studienleistungen* ist im Modulhandbuch geregelt.

(4) Eine Erfolgskontrolle gilt als mit „nicht ausreichend“ (5,0) bewertet, wenn die Studierenden einen Prüfungstermin ohne triftigen Grund versäumen oder wenn sie nach Beginn der Erfolgskontrolle ohne triftigen Grund von dieser zurücktreten. Dasselbe gilt, wenn die Masterarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der/die Studierende hat die Fristüberschreitung nicht zu vertreten.

(5) Der für den Rücktritt nach Beginn der Erfolgskontrolle oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des/der Studierenden oder eines allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes verlangt werden.

§ 11 Täuschung, Ordnungsverstoß

(1) Versuchen Studierende das Ergebnis ihrer Erfolgskontrolle durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend“ (5,0) bewertet.

(2) Studierende, die den ordnungsgemäßen Ablauf einer Erfolgskontrolle stören, können von der/dem Prüfenden oder der Aufsicht führenden Person von der Fortsetzung der Erfolgskontrolle ausgeschlossen werden. In diesem Fall gilt die betreffende Erfolgskontrolle als mit „nicht ausrei-

chend“ (5,0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss diese Studierenden von der Erbringung weiterer Erfolgskontrollen ausschließen.

(3) Näheres regelt die Allgemeine Satzung des KIT zur Redlichkeit bei Prüfungen und Praktika in der jeweils gültigen Fassung.

§ 12 Mutterschutz, Elternzeit, Wahrnehmung von Familienpflichten

(1) Auf Antrag sind die Mutterschutzfristen, wie sie im jeweils gültigen Gesetz zum Schutz der erwerbstätigen Mutter (Mutterschutzgesetz - MuSchG) festgelegt sind, entsprechend zu berücksichtigen. Dem Antrag sind die erforderlichen Nachweise beizufügen. Die Mutterschutzfristen unterbrechen jede Frist nach dieser Prüfungsordnung. Die Dauer des Mutterschutzes wird nicht in die Frist eingerechnet.

(2) Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweils gültigen Gesetzes (Bundeselterngeld- und Elternzeitgesetz - BEEG) auf Antrag zu berücksichtigen. Der/die Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem an die Elternzeit angetreten werden soll, dem Prüfungsausschuss, unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum die Elternzeit in Anspruch genommen werden soll. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einer Arbeitnehmerin bzw. einem Arbeitnehmer den Anspruch auf Elternzeit auslösen würden, und teilt dem/der Studierenden das Ergebnis sowie die neu festgesetzten Prüfungszeiten unverzüglich mit. Die Bearbeitungszeit der Masterarbeit kann nicht durch Elternzeit unterbrochen werden. Die gestellte Arbeit gilt als nicht vergeben. Nach Ablauf der Elternzeit erhält der/die Studierende ein neues Thema, das innerhalb der in § 14 festgelegten Bearbeitungszeit zu bearbeiten ist.

(3) Der Prüfungsausschuss entscheidet auf Antrag über die flexible Handhabung von Prüfungsfristen entsprechend den Bestimmungen des Landeshochschulgesetzes, wenn Studierende Familienpflichten wahrzunehmen haben. Absatz 2 Satz 4 bis 6 gelten entsprechend.

§ 13 Studierende mit Behinderung oder chronischer Erkrankung

(1) Bei der Gestaltung und Organisation des Studiums sowie der Prüfungen sind die Belange von Studierenden mit Behinderung oder chronischer Erkrankung zu berücksichtigen. Insbesondere ist Studierenden mit Behinderung oder chronischer Erkrankung bevorzugter Zugang zu teilnahmebegrenzten Lehrveranstaltungen zu gewähren und die Reihenfolge für das Absolvieren bestimmter Lehrveranstaltungen entsprechend ihrer Bedürfnisse anzupassen. Studierende sind gemäß Bundesgleichstellungsgesetz (BGG) und Sozialgesetzbuch Neuntes Buch (SGB IX) behindert, wenn ihre körperliche Funktion, geistige Fähigkeit oder seelische Gesundheit mit hoher Wahrscheinlichkeit länger als sechs Monate von dem für das Lebensalter typischen Zustand abweichen und daher ihre Teilhabe am Leben in der Gesellschaft beeinträchtigt ist. Der Prüfungsausschuss entscheidet auf Antrag der/des Studierenden über das Vorliegen der Voraussetzungen nach Satz 2 und 3. Die/der Studierende hat die entsprechenden Nachweise vorzulegen.

(2) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen Zeit oder Form abzulegen, kann der Prüfungsausschuss gestatten, die Erfolgskontrollen in einem anderen Zeitraum oder einer anderen Form zu erbringen. Insbesondere ist behinderten Studierenden zu gestatten, notwendige Hilfsmittel zu benutzen.

(3) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, die Lehrveranstaltungen regelmäßig zu besuchen oder die gemäß § 19 erforderlichen Studien- und Prüfungsleistungen zu erbringen, kann der Prüfungsausschuss auf Antrag gestatten, dass einzelne Studien- und Prüfungsleistungen nach Ablauf der in dieser Studien- und Prüfungsordnung vorgesehenen Fristen absolviert werden können.

§ 14 Modul Masterarbeit

(1) Voraussetzung für die Zulassung zum Modul Masterarbeit ist, dass die/der Studierende Modulprüfungen im Umfang von mindestens 60 LP erfolgreich abgelegt hat.

Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

(2) Die Masterarbeit kann von Hochschullehrer/innen und leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG vergeben werden. Darüber hinaus kann der Prüfungsausschuss weitere Prüfende gemäß § 17 Abs. 2 bis 4 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 Informatik 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 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 Informationswirtschaft wird ein Prüfungsausschuss gebildet. Er besteht aus sechs stimmberechtigten Mitgliedern, die jeweils zur Hälfte Mitglieder der KIT-Fakultät für Informatik und der KIT-Fakultät für Wirtschaftswissenschaft sind: 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. Im Falle der Einrichtung eines gemeinsamen Prüfungsausschusses für den Bachelor- und den Masterstudiengang Informationswirtschaft erhöht sich die Anzahl der Studierenden auf zwei Mitglieder mit beratender Stimme, wobei je eine bzw. einer dieser beiden aus dem Bachelor- und aus dem Masterstudiengang stammt. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Die/der Vorsitzende, ihre/sein Stellvertreter/in, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter/innen werden von den beiden KIT-Fakultätsräten beider KIT-Fakultäten 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. Der Vorsitz wechselt zwischen der KIT-Fakultät für Informatik und KIT-Fakultät für Wirtschaftswissenschaften alle zwei Jahre. 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 für Informatik bzw. der KIT-Fakultät für Wirtschaftswissenschaften regelmäßig über die Entwicklung der Prüfungs- und Studienzeiten, einschließlich der Bearbeitungszeiten für die Masterarbeiten und die Verteilung der Modul- und Gesamtnoten. Er ist zuständig für Anregungen zur Reform der Studien- und Prüfungsordnung und zu Modulbeschreibungen. Der Prüfungsausschuss entscheidet mit der Mehrheit seiner Stimmen. Bei Stimmengleichheit entscheidet der Vorsitzende des Prüfungsausschusses.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben für alle Regelfälle auf die/den Vorsitzende/n des Prüfungsausschusses übertragen. In dringenden Angelegenheiten, deren Erledigung nicht bis zu der nächsten Sitzung des Prüfungsausschusses warten kann, entscheidet die/der Vorsitzende des Prüfungsausschusses.

(5) Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. Die Mitglieder des Prüfungsausschusses, die Prüfenden und die Beisitzenden unterliegen der Verschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch die/den Vorsitzende/n zur Verschwiegenheit zu verpflichten.

(6) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen KIT-Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses eine fachlich zuständige und von der betroffenen KIT-Fakultät zu nennende prüfungsberechtigte Person hinzuzuziehen.

(7) Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben. Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung schriftlich oder zur Niederschrift beim Präsidium des KIT einzulegen.

§ 17 Prüfende und Beisitzende

(1) Der Prüfungsausschuss bestellt die Prüfenden. Er kann die Bestellung der/dem Vorsitzenden übertragen.

(2) Prüfende sind Hochschullehr/innen sowie leitende Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG, habilitierte Mitglieder und akademische Mitarbeiter/innen gemäß § 52 LHG, welche einer KIT-Fakultät angehören und denen die Prüfungsbefugnis übertragen wurde; desgleichen kann wissenschaftlichen Mitarbeitern gemäß § 14 Abs. 3 Ziff. 2 KITG die Prüfungsbefugnis übertragen werden. Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat.

(3) Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zu Prüfenden bestellt werden, sofern eine KIT-Fakultät eine Prüfungsbefugnis erteilt hat und sie die gemäß Absatz 2 Satz 2 vorausgesetzte Qualifikation nachweisen können.

(4) Abweichend von Absatz 2 und 3 können zur Bewertung der Masterarbeit ausnahmsweise auch externe Prüfer bestellt werden.

(5) Die Beisitzenden werden durch die Prüfenden benannt. Zu Beisitzenden darf nur bestellt werden, wer einen akademischen Abschluss in einem Masterstudiengang der Informationswirtschaft 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 Informationswirtschaft 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 der Modul Masterarbeit (§ 14).

(2) Es sind Modulprüfungen in folgenden Pflichtfächern abzulegen:

1. Fach Informatik: Modul(e) im Umfang von 33 LP,
2. Fach Wirtschaftswissenschaften: Modul(e) im Umfang von 33 LP,
3. Fach Recht: Modul(e) im Umfang von 18 LP,
4. Forschungsfach: Modul(e) im Umfang von 6 LP,

Die Festlegung der zur Auswahl stehenden Module und deren Fachzuordnung werden im Modulhandbuch getroffen.

§ 20 Bestehen der Masterprüfung, Bildung der Gesamtnote

(1) Die Masterprüfung ist bestanden, wenn alle in § 19 genannten Modulprüfungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Masterprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt der Fachnoten und dem Modul Masterarbeit.

(3) Haben Studierende die Masterarbeit mit der Note 1,0 und die Masterprüfung mit einem Durchschnitt von 1,1 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen.

§ 21 Masterzeugnis, Masterurkunde, Diploma Supplement und Transcript of Records

(1) Über die Masterprüfung werden nach Bewertung der letzten Prüfungsleistung eine Masterurkunde und ein Zeugnis erstellt. Die Ausfertigung von Masterurkunde und Zeugnis soll nicht später als drei Monate nach Ablegen der letzten Prüfungsleistung erfolgen. Masterurkunde und

Masterzeugnis werden in deutscher und englischer Sprache ausgestellt. Masterurkunde und Zeugnis tragen das Datum der erfolgreichen Erbringung der letzten Prüfungsleistung. Diese Dokumente werden den Studierenden zusammen ausgehändigt. In der Masterurkunde wird die Verleihung des akademischen Mastergrades beurkundet. Die Masterurkunde wird von dem Präsidenten und den KIT-Dekaninnen/ den KIT-Dekanen der KIT-Fakultät für Informatik 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 Informatik 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. Oktober 2015 in Kraft.

(2) Gleichzeitig tritt die Studien- und Prüfungsordnung des KIT für den Masterstudiengang Informationswirtschaft vom 15. April 2009 (Amtliche Bekanntmachung des KIT Nr. 14 vom 15. April 2009), zuletzt geändert durch Satzung vom 27. März 2014 (Amtliche Bekanntmachung des KIT Nr. 19 vom 28. März 2014) außer Kraft.

(3) Studierende, die auf Grundlage der Studien- und Prüfungsordnung für den Masterstudiengang Informationswirtschaft vom 15. April 2009 (Amtliche Bekanntmachung des KIT Nr. 14 vom 15. April 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 Wintersemesters 2019/20 ablegen.

(4) Studierende, die auf Grundlage der Studien- und Prüfungsordnung für den Masterstudiengang Informationswirtschaft vom 15. April 2009 (Amtliche Bekanntmachung des KIT Nr. 14 vom 15. April 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 auf Antrag ihr Studium nach dieser Studien- und Prüfungsordnung fortsetzen.

Karlsruhe, den 24. September 2015

Professor Dr.-Ing. Holger Hanselka
(Präsident)

Studien- und Prüfungsordnung der Universität Karlsruhe (TH) für den Masterstudiengang Informationswirtschaft

vom 15. April 2009

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 Informationswirtschaft beschlossen.

Der Rektor hat seine Zustimmung am 15. April 2009 erteilt.

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§ 22 In-Kraft-Treten

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.

Aus Gründen der Lesbarkeit ist in dieser Satzung nur die männliche Sprachform gewählt worden. Alle personenbezogenen Aussagen gelten jedoch stets für Frauen und Männer gleichermaßen.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich, Zweck der Prüfung

(1) Diese Masterprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Masterstudiengang Informationswirtschaft an der Universität Karlsruhe (TH).

(2) Die Masterprüfung (§ 16 – 18) bildet den Abschluss dieses Studiengangs, der gemeinsam von der Fakultät für Informatik und der Fakultät für Wirtschaftswissenschaften an der Universität Karlsruhe (TH) angeboten wird. Durch die Masterprüfung soll festgestellt werden, ob der Studierende die für den Übergang in die Berufspraxis grundlegenden wissenschaftlichen Fachkenntnisse besitzt, die Zusammenhänge des Faches Informationswirtschaft überblickt und die Fähigkeit besitzt, nach wissenschaftlichen Methoden und Grundsätzen selbstständig zu arbeiten.

§ 2 Akademischer Grad

Aufgrund der bestandenen Masterprüfung wird der akademische Grad „Master of Science“ (abgekürzt: „M.Sc.“) für den Studiengang Informationswirtschaft (englischsprachig: Information Engineering and Management) 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. Der Studienplan beschreibt Art, Umfang und Zuordnung der Module zu einem Fach sowie die Möglichkeiten, Module untereinander zu kombinieren. Die Fächer und ihr Umfang werden in § 16 definiert.

(3) Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (Credits) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem ECTS (European Credit Transfer System). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Stunden.

(4) Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studienleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 120 Leistungspunkte.

(5) Die Verteilung der Leistungspunkte im Studienplan auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(6) Lehrveranstaltungen können in englischer Sprache angeboten werden.

(7) Profilmodule dienen der Profilbildung im Studiengang und der transparenten Darstellung der Lehrziele des Studiengangs durch eine Lehrzielhierarchie. Profilmodule werden durch die Module nach § 16 Abs. 2 Satz 2 gebildet. Jeweils beim Abschluss eines Moduls des Profilmoduls werden die Leistungspunkte dem Profilmodul angerechnet. Die Zuordnung der Module und Seminare zu Profilmodulen beschreibt der Studienplan.

§ 4 Aufbau der Prüfungen

(1) Die Masterprüfung besteht aus einer Masterarbeit und Fachprüfungen, jede Fachprüfung aus einer oder mehreren 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, Marktstudien, Projekte, Fallstudien, Experimente, schriftliche Arbeiten, Berichte, Seminararbeiten und Klausuren, sofern sie nicht als schriftliche oder mündliche Prüfung in der Modul- oder Lehrveranstaltungsbeschreibung im Studienplan ausgewiesen sind.

(3) Mindestens 50 % einer Modulprüfung sind in Form von schriftlichen oder mündlichen Prüfungen (§ 4 Abs. 2, Nr. 1 und 2) abzulegen, die restlichen Prüfungen erfolgen durch Erfolgskontrollen anderer Art (§ 4 Abs. 2, Nr. 3). Ausgenommen hiervon ist die Prüfung nach § 16 Abs. 3.

§ 5 Anmeldung und Zulassung zu den Prüfungen

(1) Um an schriftlichen und/oder mündlichen Prüfungen (§ 4 Abs. 2, Nr. 1 und 2) teilnehmen zu können, muss sich der Studierende schriftlich oder per Online-Anmeldung beim Studienbüro anmelden. Hierbei sind die gemäß dem Studienplan für die jeweilige Modulprüfung notwendigen Studienleistungen nachzuweisen. 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 der Studierende 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 der Studierende in einem mit der Informationswirtschaft 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 - 3) der einzelnen Lehrveranstaltungen wird vom Prüfer der betreffenden Lehrveranstaltung in Bezug auf die Lehrinhalte der Lehrveranstaltung und die Lehrziele des Moduls festgelegt. Die Art der Erfolgskontrollen, ihre Häufigkeit, Reihenfolge und Gewichtung, die Bildung der Lehrveranstaltungsnote und der Modulnote sowie Prüfer müssen mindestens sechs Wochen vor Semesterbeginn bekannt gegeben werden. Im Einvernehmen von Prüfer und Studierendem kann in begründeten Ausnahmefällen die Art der

Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch § 4 Abs. 3 zu berücksichtigen. Hierüber entscheidet der Prüfungsausschuss auf Antrag.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfung auch mündlich oder eine mündlich durchzuführende Prüfung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfung bekannt gegeben werden.

(4) Weist ein Studierender nach, dass er 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 Vorsitzender – gestatten, Erfolgskontrollen in einer anderen Form zu erbringen.

(5) Bei Lehrveranstaltungen in englischer Sprache können mit Zustimmung des Studierenden die entsprechenden Erfolgskontrollen in englischer Sprache abgenommen werden.

(6) Schriftliche Prüfungen (§ 4 Abs. 2, Nr. 1) sind in der Regel von zwei Prüfern nach § 14 Abs. 2 oder 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 Prüfern (Kollegialprüfung) oder von einem Prüfer in Gegenwart eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört der Prüfer die anderen an der Kollegialprüfung mitwirkenden Prüfer an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 45 Minuten pro Studierenden. Dies gilt auch für die mündliche Nachprüfung gemäß § 8 Abs. 3.

(8) Die wesentlichen Gegenstände und Ergebnisse der mündlichen Prüfung in den einzelnen Fächern sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist dem Studierenden im Anschluss an die mündliche Prüfung bekannt zu geben.

(9) Studierende, die sich in einem späteren Prüfungszeitraum der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen als Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse. Aus wichtigen Gründen oder auf Antrag des zu prüfenden Studierenden ist die Zulassung zu versagen.

(10) Für Erfolgskontrollen anderer Art sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Studienleistung dem Studierenden zurechenbar ist. 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 neben dem Prüfer ein Beisitzer anwesend sein, der zusätzlich zum Prüfer die Protokolle zeichnet.

§ 7 Bewertung von Prüfungen und Erfolgskontrollen

(1) Das Ergebnis einer Erfolgskontrolle wird von den jeweiligen Prüfern in Form einer Note festgesetzt.

(2) Im Masterzeugnis dürfen nur folgende Noten verwendet werden:

1	:	sehr gut (very good)	:	hervorragende Leistung,
2	:	gut (good)	:	eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt,
3	:	befriedigend (satisfactory)	:	eine Leistung, die durchschnittlichen Anforderungen entspricht,
4	:	ausreichend (sufficient)	:	eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt,
5	:	nicht ausreichend (failed)	:	eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt.

Für die Masterarbeit, Modulprüfungen, Modulteilprüfungen und Profilmodule sind zur differenzierten Bewertung 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
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 Fachnoten, Modulnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

(5) Jedes Modul, jede Lehrveranstaltung und jede Erfolgskontrolle darf jeweils nur einmal angerechnet werden. 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 Modulprüfungen oder Modulteilprüfungen 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 über die im Studienplan definierten Modulprüfungen nachgewiesen wird.

(11) Die Gesamtnote der Masterprüfung, die Fachnoten und die Modulnoten lauten:

		bis	1.5	:	sehr gut (very good)
von	1.6	bis	2.5	:	gut (good)
von	2.6	bis	3.5	:	befriedigend (satisfactory)
von	3.6	bis	4.0	:	ausreichend (sufficient)

(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	10	gehört zu den besten 10% der Studierenden, die die Erfolgskontrolle bestanden haben,
B	25	gehört zu den nächsten 25% der Studierenden, die die Erfolgskontrolle bestanden haben,
C	30	gehört zu den nächsten 30% der Studierenden, die die Erfolgskontrolle bestanden haben,
D	25	gehört zu den nächsten 25% der Studierenden, die die Erfolgskontrolle bestanden haben,
E	10	gehört zu den letzten 10% der Studierenden, die die Erfolgskontrolle bestanden haben,
FX		*nicht bestanden* (failed) - es sind Verbesserungen erforderlich, bevor die Leistungen anerkannt werden,
F		*nicht bestanden* (failed) - es sind erhebliche Verbesserungen erforderlich.

Die Quote ist als der Prozentsatz der erfolgreichen Studierenden definiert, die diese Note in der Regel erhalten. Dabei ist von einer mindestens fünfjährigen Datenbasis über mindestens 30 Studierende auszugehen. Für die Ermittlung der Notenverteilungen, die für die ECTS-Noten erforderlich sind, ist das Studienbüro der Universität zuständig.

(13) Bis zum Aufbau einer entsprechenden Datenbasis wird als Übergangsregel die Verteilung der Hauptdiplomsnoten des Diplomstudiengangs Informationswirtschaft per 31. Juli 2005 zur Bildung dieser Skala für alle Module des Masterstudiengangs Informationswirtschaft herangezogen. Diese Verteilung wird jährlich gleitend über mindestens fünf Jahre mit mindestens 30 Studierenden jeweils zu Beginn des Studienjahres für jedes Modul, die Fachnoten und die Gesamtnote angepasst und in diesem Studienjahr für die Festsetzung der ECTS-Note verwendet.

§ 8 Wiederholung von Prüfungen und Erfolgskontrollen, Erlöschen des Prüfungsanspruchs

(1) Studierende 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“ sein.

(2) Studierende 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 der Studierende schriftlich beim Prüfungsausschuss zu stellen. Über den ersten Antrag eines Studierenden auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet der Rektor. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses der Rektor. Absatz 1 Satz 2 und 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 der Studierende 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) Der Studierende kann bei schriftlichen Prüfungen ohne Angabe von Gründen bis einen Tag (24 Uhr) vor dem Prüfungstermin zurücktreten (Abmeldung). Bei mündlichen Prüfungen 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 Voraussetzung des Absatzes 3 möglich. Die Abmeldung kann schriftlich beim Prüfer 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 Prüfung gilt als mit „nicht ausreichend“ (5.0) bewertet, wenn der Studierende einen Prüfungstermin ohne triftigen Grund versäumt oder wenn er nach Beginn der Prüfung ohne triftigen Grund von der Prüfung zurücktritt. Dasselbe gilt, wenn die Masterarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der Studierende hat die Fristüberschreitung nicht zu vertreten.

(3) Der für den Rücktritt nach Beginn der Prüfung oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des Studierenden oder eines von ihm allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann 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. Werden die Gründe anerkannt, wird ein neuer Termin anberaumt. Die bereits vorliegenden Prüfungsergebnisse sind in diesem Fall anzurechnen. Bei Modulprüfungen, die aus mehreren Prüfungen bestehen, werden die Prüfungsleistungen dieses Moduls, die bis zu einem anerkannten Rücktritt bzw. einem anerkannten Versäumnis einer Prüfungsleistung dieses Moduls erbracht worden sind, angerechnet.

(4) Versucht der Studierende, das Ergebnis einer mündlichen oder schriftlichen Prüfung (§ 4 Abs. 2, Nr. 1 und 2) durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Prüfung als mit „nicht ausreichend“ (5.0) bewertet.

(5) Ein Studierender, der den ordnungsgemäßen Ablauf der Prüfung stört, kann von dem jeweiligen Prüfer oder der Aufsicht führenden Person von der Fortsetzung der Prüfung ausgeschlossen werden; in diesem Fall gilt die betreffende Prüfung als mit „nicht ausreichend“ (5.0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss den Studierenden von der Erbringung weiterer Prüfungen ausschließen.

(6) Der Studierende kann innerhalb von einem Monat verlangen, dass die Entscheidung gemäß Absatz 4 und 5 vom Prüfungsausschuss überprüft wird. Belastende Entscheidungen des Prüfungsausschusses sind dem Studierenden unverzüglich schriftlich mitzuteilen, zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist dem Studierenden Gelegenheit zur Äußerung zu geben.

(7) Absatz 1 - 6 gelten für Erfolgskontrollen anderer Art (§ 4 Abs. 2, Nr. 3) entsprechend.

(8) Näheres regelt die Allgemeine Satzung der Universität Karlsruhe (TH) zur Redlichkeit bei Prüfungen und Praktika.

§ 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 Studien- und Prüfungsordnung. Die Dauer des Mutterschutzes wird nicht in die Frist eingerechnet.

(2) Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweiligen gültigen Gesetzes (BErzGG) auf Antrag zu berücksichtigen. Der Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem an er die Elternzeit antreten will, dem Prüfungsausschuss unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum er Elternzeit in Anspruch nehmen will. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einem Arbeitnehmer den Anspruch auf Elternzeit auslösen würden, und teilt dem Studierenden das Ergebnis sowie die neu festgesetzten Prüfungszeiten unverzüglich mit. Die Bearbeitungszeit der Masterarbeit kann nicht durch Elternzeit unterbrochen werden. Die gestellte Arbeit gilt als nicht vergeben. Nach Ablauf der Elternzeit erhält der Studierende ein neues Thema.

(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. Der Studierende erhält ein neues Thema, das innerhalb der in § 11 festgelegten Bearbeitungszeit zu bearbeiten ist.

§ 11 Masterarbeit

(1) Vor Zulassung der Masterarbeit sind Betreuer, Thema und Anmeldedatum dem Prüfungsausschuss bekannt zu geben. Auf Antrag des Studierenden sorgt ausnahmsweise der Vorsitzende des Prüfungsausschusses dafür, dass der Studierende innerhalb von vier Wochen nach Antragstellung von einem Betreuer ein Thema für die Masterarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über den Vorsitzenden des Prüfungsausschusses.

(2) Thema, Aufgabenstellung und Umfang der Masterarbeit sind vom Betreuer so zu begrenzen, dass sie mit dem in Absatz 3 festgelegten Arbeitsaufwand bearbeitet werden kann.

(3) Die Masterarbeit soll zeigen, dass der Studierende in der Lage ist, ein Problem aus seinem Fach selbstständig und in der vorgegebenen Zeit nach wissenschaftlichen Methoden, die dem

Stand der Forschung entsprechen, zu bearbeiten. Der Masterarbeit werden 30 Leistungspunkte zugeordnet. Die Bearbeitungsdauer beträgt sechs Monate. Die Masterarbeit kann auch in englischer Sprache geschrieben werden.

(4) Die Masterarbeit kann von jedem Prüfer nach § 14 Abs. 2 vergeben werden. Soll die Masterarbeit außerhalb der beiden nach § 1 Abs. 2 Satz 1 beteiligten Fakultäten angefertigt werden, so bedarf dies der Genehmigung des Prüfungsausschusses. Dem Studierenden ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. Die Masterarbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag des einzelnen Studierenden aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach Absatz 1 erfüllt.

(5) Bei der Abgabe der Masterarbeit hat der Studierende schriftlich zu versichern, dass er die Arbeit selbstständig verfasst hat und keine anderen als die von ihm angegebenen Quellen und Hilfsmittel benutzt hat, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht und die Satzung der Universität Karlsruhe (TH) zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet hat. Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen. Bei Abgabe einer unwahren Versicherung wird die Masterarbeit mit „nicht ausreichend“ (5.0) bewertet.

(6) Der Zeitpunkt der Ausgabe des Themas der Masterarbeit und der Zeitpunkt der Abgabe der Masterarbeit sind beim Prüfungsausschuss aktenkundig zu machen. Der Studierende kann das Thema der Masterarbeit nur einmal und nur innerhalb der ersten zwei Monate der Bearbeitungszeit zurückgeben. Auf begründeten Antrag des Studierenden kann der Prüfungsausschuss die in Absatz 1 festgelegte Bearbeitungszeit um höchstens drei Monate verlängern. Wird die Masterarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend“ bewertet, es sei denn, dass der Studierende dieses Versäumnis nicht zu vertreten hat. § 8 gilt entsprechend.

(7) Die Masterarbeit wird von einem Betreuer sowie in der Regel von einem weiteren Prüfer aus der jeweils anderen Fakultät der beiden nach § 1 Abs. 2 Satz 1 beteiligten Fakultäten begutachtet und bewertet. Einer der beiden muss Juniorprofessor oder Professor sein. Bei nicht übereinstimmender Beurteilung der beiden Prüfer setzt der Prüfungsausschuss im Rahmen der Bewertung der beiden Prüfer die Note der Masterarbeit fest. Der Bewertungszeitraum soll acht Wochen nicht überschreiten.

§ 12 Zusatzleistungen und Zusatzmodule

(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 erworben werden, als für das Bestehen der Modul- bzw. Fachprüfung erforderlich sind. § 3, § 4 und § 8 Abs. 9 der Studien- und Prüfungsordnung bleiben davon unberührt. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein. Soweit Zusatzleistungen erbracht wurden, werden auf Antrag des Studierenden bei der Festlegung der Modul- bzw. Fachnote nur die Noten berücksichtigt, die unter Abdeckung der erforderlichen Leistungspunkte die beste Modul- bzw. Fachnote ergeben. 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) Der Studierende 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 des Studierenden in das Masterzeugnis als Zusatzmodule aufgenommen und als solche gekennzeichnet. Zusatzmodule werden bei der Festsetzung der Gesamt-, Fach- und Modulnoten 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 im Studienplan definierten fachwissenschaftlichen Modulen und Leistungen können die Zusatzleistungen nach Absatz 1 - 3 auch aus dem Lehrangebot anderer Fakultäten und Einrichtungen gewählt werden.

§ 13 Prüfungsausschuss

(1) Für den Masterstudiengang Informationswirtschaft wird ein Prüfungsausschuss gebildet. Er besteht aus sechs stimmberechtigten Mitgliedern, die jeweils zur Hälfte von der Fakultät für Informatik und der Fakultät für Wirtschaftswissenschaften bestellt werden: vier Professoren, Juniorprofessoren, Hochschul- oder Privatdozenten, zwei Vertretern der Gruppe der akademischen Mitarbeiter nach § 10 Abs. 1 Satz 2 Nr. 2 LHG und einem Vertreter der Studierenden mit beratender Stimme. Im Falle der Einrichtung eines gemeinsamen Prüfungsausschusses für den Bachelor- und den Masterstudiengang Informationswirtschaft erhöht sich die Anzahl der Vertreter der Studierenden auf zwei Mitglieder mit beratender Stimme, wobei je ein Vertreter aus dem Bachelor- und aus dem Masterstudiengang stammt. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Der Vorsitzende, sein Stellvertreter, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter werden von den jeweiligen Fakultätsräten bestellt, die Mitglieder der Gruppe der akademischen Mitarbeiter nach § 10 Abs. 1 Satz 2 Nr. 2 LHG und der Vertreter der Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Der Vorsitzende und dessen Stellvertreter müssen Professor oder Juniorprofessor aus einer der beteiligten Fakultäten sein. Der Vorsitz wechselt zwischen den Fakultäten alle zwei Jahre. Der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch die Prüfungssekretariate unterstützt.

(3) Der Prüfungsausschuss regelt die Auslegung und die Umsetzung der Studien- und Prüfungsordnung in die Prüfungspraxis der Fakultäten. Er achtet darauf, dass die Bestimmungen der Prüfungsordnung eingehalten werden. Er entscheidet über die Anrechnung von Studienzeiten, Studien- und Prüfungsleistungen und übernimmt die Gleichwertigkeitsfeststellung. Er berichtet regelmäßig den Fakultätsräten über die Entwicklung der Prüfungen und Studienzeiten sowie über die Verteilung der Fach- und Gesamtnoten und gibt Anregungen zur Reform des Studienplans und der Studien- und Prüfungsordnung.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben in dringenden Angelegenheiten und für alle Regelfälle auf den Vorsitzenden des Prüfungsausschusses übertragen.

(5) Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. Die Mitglieder des Prüfungsausschusses, die Prüfer und die Beisitzenden unterliegen der Amtsverschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch den Vorsitzenden zur Verschwiegenheit zu verpflichten.

(6) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses ein fachlich zuständiger und von der betroffenen Fakultät zu nennender Professor, Juniorprofessor, Hochschul- oder Privatdozent hinzuziehen. Er hat in diesem Punkt Stimmrecht.

(7) Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung schriftlich oder zur Niederschrift beim Rektorat der Universität Karlsruhe (TH) einzulegen.

§ 14 Prüfer und Beisitzer

(1) Der Prüfungsausschuss bestellt die Prüfer und die Beisitzenden. Er kann die Bestellung dem Vorsitzenden übertragen.

(2) Prüfer sind Hochschullehrer und habilitierte Mitglieder sowie akademische Mitarbeiter der jeweiligen Fakultät, denen die Prüfungsbefugnis übertragen wurde. Bestellt werden darf nur, wer mindestens

die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat. Bei der Bewertung der Masterarbeit muss ein Prüfer Hochschullehrer sein.

(3) Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zum Prüfer bestellt werden, wenn die jeweilige Fakultät ihnen eine diesbezügliche Prüfungsbefugnis erteilt hat.

(4) Zum Beisitzenden darf nur bestellt werden, wer einen akademischen Abschluss in einem Studiengang der Informationswirtschaft, Informatik, Rechtswissenschaften, Wirtschaftswissenschaften oder einen gleichwertigen akademischen Abschluss erworben hat.

§ 15 Anrechnung von Studienzeiten, Anerkennung von Studien- und Prüfungsleistungen

(1) Studienzeiten im gleichen Studiengang werden angerechnet. Studien- und Prüfungsleistungen, 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 Studien- und Prüfungsleistung 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. Der Studierende hat die für die Anrechnung erforderlichen Unterlagen vorzulegen.

(3) Bei der Anrechnung von Studienzeiten und der Anerkennung von Studien- und Prüfungsleistungen, 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, Studien- und Prüfungsleistungen, die in staatlich anerkannten Fernstudien- und an anderen Bildungseinrichtungen, insbesondere an staatlichen oder staatlich anerkannten Berufsakademien sowie an Fach- und Ingenieurschulen erworben wurden.

(5) Die Anerkennung von Teilen der Masterprüfung kann versagt werden, wenn in einem Studiengang mehr als 45 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 Fachvertreter zu hören. Der Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.

(7) Erbringt ein Studierender Studienleistungen an einer ausländischen Universität, soll die Gleichwertigkeit vorab durch einen Studienvertrag nach den ECTS-Richtlinien festgestellt und nach diesem verfahren werden.

(8) Zusatzleistungen, die ein Studierender für den Bachelorstudiengang Informationswirtschaft erbracht hat und die im Studienplan des Masterstudiengangs Informationswirtschaft vorgesehen sind, werden auf Antrag des Studierenden an den Prüfungsausschuss anerkannt.

II. Masterprüfung

§ 16 Umfang und Art der Masterprüfung

(1) Die Masterprüfung besteht aus den Fachprüfungen nach Absatz 2, dem interdisziplinären Seminarmodul nach Absatz 3 sowie der Masterarbeit nach § 11.

(2) In den ersten beiden Studienjahren sind Fachprüfungen aus folgenden Fächern durch den Nachweis von Leistungspunkten in einem oder mehreren Modulen abzulegen:

1. aus dem Fach Betriebswirtschaftslehre im Umfang von 10 Leistungspunkten,
2. aus dem Fach Operations Research im Umfang von 5 Leistungspunkten.

Des Weiteren sind Fachprüfungen

1. aus wirtschaftswissenschaftlichen Fächern durch Module im Umfang von 18 Leistungspunkten,
2. aus dem Fach Informatik durch Module im Umfang von 33 Leistungspunkten,
3. aus dem Fach Recht durch Module im Umfang von 18 Leistungspunkten

abzulegen. Wirtschaftswissenschaftliche Fächer sind Betriebswirtschaftslehre, Operations Research, Statistik und Volkswirtschaftslehre. Dabei sind im Fach Betriebswirtschaftslehre mindestens 9 Leistungspunkte abzulegen. Die Module, die ihnen zugeordneten Leistungspunkte und die Zuordnung der Module zu den Fächern sind im Studienplan festgelegt. Zur entsprechenden Modulprüfung kann nur zugelassen werden, wer die Anforderungen nach § 5 erfüllt.

(3) Ferner muss ein interdisziplinäres Seminarmodul im Umfang von 6 Leistungspunkten absolviert werden, das von je einem Prüfer nach § 14 Abs. 2 aus der Informatik, dem Recht und den Wirtschaftswissenschaften betreut wird.

(4) Als eine weitere Prüfungsleistung ist eine Masterarbeit gemäß § 11 anzufertigen.

§ 17 Bestehen der Masterprüfung, Bildung der Gesamtnote

(1) Die Masterprüfung ist bestanden, wenn alle in § 16 genannten Prüfungsleistungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Masterprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt. Dabei werden alle Prüfungsleistungen nach § 16 mit ihren Leistungspunkten gewichtet.

(3) Hat der Studierende die Masterarbeit mit der Note 1.0 und die Masterprüfung mit einer Gesamtnote von 1.0 abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen. Mit einer Masterarbeit mit der Note 1.0 und bis zu einer Gesamtnote von 1.3 kann auf Antrag an den Prüfungsausschuss das Prädikat „mit Auszeichnung“ (with distinction) verliehen werden.

§ 18 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 Zeugnis werden in deutscher und englischer Sprache ausgestellt. Masterurkunde und Zeugnis tragen das Datum der letzten erfolgreich nachgewiesenen Prüfungsleistung. Sie werden dem Studierenden gleichzeitig ausgehändigt. In der Masterurkunde wird die Verleihung des akademischen Mastergrades beurkundet. Die Masterurkunde wird vom Rektor und den Dekanen der beteiligten Fakultäten unterzeichnet und mit dem Siegel der Universität versehen.

(2) Das Zeugnis enthält die in den Fachprüfungen, den zugeordneten Modulprüfungen, im interdisziplinären Seminarmodul 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 Dekanen der beteiligten Fakultäten und vom Vorsitzenden des Prüfungsausschusses zu unterzeichnen.

(3) Weiterhin erhält der Studierende als Anhang ein Diploma Supplement in deutscher und englischer Sprache, das den Vorgaben des jeweils gültigen ECTS User's Guide entspricht. Das Diploma Supplement enthält eine Abschrift der Studiendaten des Studierenden (Transcript of Records).

(4) Die Abschrift der Studiendaten (Transcript of Records) enthält in strukturierter Form alle vom Studierenden erbrachten Prüfungsleistungen. Dies beinhaltet alle Fächer, Fachnoten und ihre entsprechende ECTS-Note samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten, entsprechender ECTS-Note und zugeordneten Leistungspunkten sowie die den Modulen zugeordneten Lehrveranstaltungen samt Noten und zugeordneten Leistungspunkten. Aus der Abschrift der Studiendaten sollen die Zugehörigkeit von Lehrverantaltungen 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

§ 19 Bescheid über Nicht-Bestehen, Bescheinigung von Prüfungsleistungen

(1) Der Bescheid über die endgültig nicht bestandene Masterprüfung wird dem Studierenden durch den Prüfungsausschuss in schriftlicher Form erteilt. Der Bescheid ist mit einer Rechtsbehelfsbelehrung zu versehen.

(2) Hat der Studierende die Masterprüfung endgültig nicht bestanden, wird ihm auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Prüfungsleistungen und deren Noten enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 20 Ungültigkeit der Masterprüfung, Aberkennung des Mastergrades

(1) Hat der Studierende bei einer Prüfung getäuscht und wird diese Tatsache erst nach der Aushändigung des Zeugnisses bekannt, so kann der Prüfungsausschuss nachträglich die Noten für diejenigen Prüfungsleistungen, bei deren Erbringung der Studierende getäuscht hat, entsprechend berichtigen und die Prüfung ganz oder teilweise für „nicht bestanden" erklären.

(2) Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass der Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat der Kandidat die Zulassung vorsätzlich zu Unrecht erwirkt, so kann die Modulprüfung für „nicht ausreichend" (5.0) und die Masterprüfung für „nicht bestanden" erklärt werden.

(3) Dem Studierenden ist vor einer Entscheidung nach Absatz 1 und Absatz 2 Satz 2 Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Dies bezieht sich auch auf alle davon betroffenen Anlagen (Transcript of Records und Diploma Supplement). Mit dem unrichtigen Zeugnis sind auch die Masterurkunde, das Masterzeugnis und alle

Anlagen (Transcript of Records und Diploma Supplement) einzuziehen, wenn die Prüfung aufgrund einer Täuschung für „nicht bestanden“ erklärt wurde.

(5) Eine Entscheidung nach Absatz 1 oder Absatz 2 Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Prüfungszeugnisses ausgeschlossen.

(6) Die Aberkennung des akademischen Mastergrades richtet sich nach den gesetzlichen Bestimmungen.

§ 21 Einsicht in die Prüfungsakten

(1) Nach Abschluss der Masterprüfung wird dem Studierenden auf Antrag innerhalb eines Jahres Einsicht in seine Masterarbeit, die darauf bezogenen Gutachten und in die Prüfungsprotokolle gewährt.

(2) Für die Einsichtnahme in die schriftlichen Modulprüfungen, schriftlichen Modulteilprüfungen bzw. Prüfungsprotokolle gilt eine Frist von einem Monat nach Bekanntgabe des Prüfungsergebnisses.

(3) Der Prüfer bestimmt Ort und Zeit der Einsichtnahme.

(4) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 22 In-Kraft-Treten

(1) Diese Satzung tritt am 1. Oktober 2009 in Kraft.

(2) Studierende, die auf Grundlage der Prüfungsordnung für den Masterstudiengang Informationswirtschaft vom 30. April 2006 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 9 vom 07. Oktober 2006) ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, können einen Antrag auf Zulassung zur Prüfung letztmalig am 30. März 2013 stellen.

(3) Auf Antrag können Studierende, die ihr Studium an der Universität Karlsruhe (TH) auf Grundlage der Prüfungsordnung für den Masterstudiengang Informationswirtschaft vom 30. April 2006 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 9 vom 07. Oktober 2006) begonnen haben, ihr Studium nach der vorliegenden Prüfungsordnung fortsetzen. Der Prüfungsausschuss stellt dabei fest, ob und wie die bisher erbrachten Prüfungsleistungen in den neuen Studienplan integriert werden können und nach welchen Bedingungen das Studium nach einem Wechsel fortgeführt werden kann.

Karlsruhe, den 15. April 2009

Professor Dr. sc. tech. Horst Hippler
(Rektor)

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